

Navigation database of GPS

waypoint, piece and station identifiers
are for GPS are loaded by means of magnetic
card.

If an IAF or other piece has a pronounceable
piece letter name, that name is used on the
chart and in the database.

DME fixes are given a 5 character identifier
which consist of the letter D, a numerical and
an alphabet letter which correspond to
the DME from the station.

For ex, the IAF waypoint D277H is on
DME fix on the 271 radial at 8 DME
(H & letter).

Some DME fixes at a greater distance
from the station may be coded with two
letters from the VOR identifier followed
by the radial such as X 141

When a waypoint is at a non-aide, it is
coded using the non-aide identifier.

When a Mixed Approach Point is based on timing or a DME distance, a Mixed approach check waypoint (MAWP) is coded and added to the procedure.

The identifier usually consists of either M followed by the runway number or if the MAWP is not at the runway threshold M followed by the final approach course.

Another type of coded waypoint which appears on some Jeppesen CRS approach charts is the Sensor Final approach waypoint. Its symbol is $\pm 0.3 NM CDI$ sensitivity.

It is used for approach which don't have a final approach fix defined and available as the Final approach waypoint (FAWP).

Special GPS Consideration Navigation

- GPS display distance TO the waypoint unlike DME distances
- GPS distance differs because GPS uses straight line along track distance (ATD) while DME uses slant range to the station. ATD & DME vary according to Alt & precision of navigation
- Heading a small variance between chart & GPS indicates that VOR use magnetic variation but GPS use algorithm but some ground track.

Waypoint Sequencing

GPS unit is referred to as TO-TO navigation you receive guidance to the next point but sometimes you need to navigate a specific course or bearing or waypoint.
e.g. when flying a procedure turn
GPS has a hold mode, so when passing a waypoint in hold mode, the external VOR indicator changes from TO FROM

and the GPS does not auto sequence to the next point.

Some built in digital will continue to show the heading TO the waypoint. This heading will dump 180° as you pass the waypoint

GPS An incorrect entry can cause the receiver to leave the approach. If this occurs after the FACP you do a manual approach.

Do not touch GPS between FAF & MAP

Bank Angle / Terrain

To avoid overshooting & understeering approach keep your instruments locked from GPS operating Manual

RAIM FAILURE - ~~no other navigation~~

If RAIM failure indication before FACP

do not descend to MDA (Minimum Altitude) but

should proceed to MAF via the FACP

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perform a missed approach and contact
ATIS.

If a RAIM failure occurs after the Fdscip
the GPS receiver is allowed to continue
operating with an announcement for
up to 5 minutes to complete the approach.

Once a RAIM failure message appears
execute a missed approach.

Missed Approach Routing.

Attention to the missed approach routing
in which the final track is via a specific
course rather than direct to the missed
approach holding waypoint requires additional
action to set the proper course. Because
flying from M.A.P. directly to the missed
approach holding waypoint (M.A.H.W.P.)
may not provide sufficient obstacle clearance,
pilots fly the full missed approach.

GPS Overlay Approach.

It is based on precision approach procedures.
There have limited GPS related info.

Preparation for the approach.

- Turn to Area 3.

- Request a GPS approach. GPS RWY 9.

- Set GPS so you are ready to begin the approach when you arrive at the IAF. Make sure to descend the IAF at which you expect to begin the approach.

You clearances.

After receiving clearance and announcing your intentions on CTAF you should ensure the approach mode is activated.

Automatic change in CDI sensitivity from $\pm 5 NM$ to $\pm 1 NM$ when approach is activated.

I AF Outbound.

As you cross IAF, the GPS receiver prompts you to turn to intercept the outbound course. At this point acknowledge the message, hold your turn and begin a descent.

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to the procedure team minimum altitude
of the
level off prior to beginning the procedure
turn.

Procedure Turn

While enroute the, from the TAF, the
CPS precept you to begin the procedure
turn. Take on CRP approach referring to
the CPS for guidance relative to the
course.

At this time you can complete the before
landing checklist as the possible
exceptions of the landing

Final Approach Course

Once enroute on the final approach
course the CPS receive procedure guidance
to the DME stepdown fix. which act as the
FAWP (low)

Once you are established on the enroute
course, start a descent to, complete
any remaining items on the before landing

At ZNY the GPS receiver the FACP, the GPS receiver RAIMS check

Sensitivity increase = 0.5 at FACP

Mixed Approach

As you reach the MACP, decide if you can land. If not execute mixed approach. Announce on CTAF & fly procedure for mixed approach.

Since the GPS receiver is in the hold mode you must manually sequence to the first waypoint in the mixed approach procedure. When you sequence to the MACP, the GPS receiver remains in the hold mode and provide course guidance.

ATC clearance

IFR - climbs at an optimum rate of ascent
1000ft of your assigned altitude. Then, you
should climb at a rate between 500 and
1500ft/min.

If unable to maintain your climb rate by ATC
(500ft/min).

Keep to the centerline.

Element of an IFR clearance
- Aircraft id.

- Clearance limit

If delays at destination can be cleared to
a file sheet of your destination, \Rightarrow please
Expect flexible clearance (EFC)

Short Range clearance is issued to arrive
within one hour outside the departure
terminal area.

Short Range clearance contains the
frequency of the ATIS that will give you
long range, often use in non-visual
environment to get to radar area.

Rules of flight

Altitude level & route selected by the pilot
ATC can assign it.

Altitude Devotee

Maintain altitude in controlled airspace
ATC will inform of change.
Maintain request with new ATC.

Cruise clearance, ATC use "cruise" instead of "maintain"
from mini IFR to assigned alt. as cleared
further clearance.

But if go down need clearance to go up again.
No approach clearance issue by ATC because
you are in uncontrolled airspace.

Holding instructions

according to ATC
as published

Abbreviated IFR Departure Clearance
based on basic instructions → clear as filed

ATC can change flight Plan & DP (departure procedure)
if not mention by the STAR (Standard
Terminal arrival Route)

Altitude clearance contours because of your destination airport or clearance limit. He assigned specific altitudes NP info, step frequency, transponder code

VFR on Top does not cancel IFR plan but gives flexibility. Safely VFR crossing altitude \rightarrow VFR cancellation \rightarrow below class A.

Once approved you must maintain altitude according to VFR \approx 0-179 ~~above~~ + 500
~~180~~ 360 - even + 500

VFR no guarantee separation.

A climb to VFR on top clearance should be requested in order to climb through or level layers or descend unilaterally and continue the flight VFR.

Approach clearances.

When you land air RW not aligned with the approach being flown. He can't allow you a circling approach clearance

you can be requested to conduct approach
(ATC cannot issue) - used instead of published approach
disturbance & VFR traffic clearance is given
(it is like VFR but approach)

Visual approach (usually ATIS or requested)
airport must be visible in preceding aircraft
ceiling 1000 ft AGL Vis 3 SM

Without prior request ATC may issue
DP, STDA and visual approach clearance

VFR Procedures to an IFR clearance

"maintain VFR conditions" unless requested
you remain resp for safety

Composite Flight Plan

one procedure IFR other VFR
close to IFR position conduct FSS, class VFR
and other IFR clearance

Terrain aware central (TEC)

IFR procedures that allow to fly straight,
level altitude routes between terminal
areas & usually non-terrain

Departure Restrictions

Release time: specifies the earliest time you may depart.

Held for release \Rightarrow you cannot until a certain time given.

Clearance void in airport without controlled towers.

\hookrightarrow Clearance void if not off the x box

If you do not depart, inform ATC before 30 min after end of time otherwise S & R.

Clearance Readback

- altitude assignment

- standard vector

- instructions.

ATC clear, ATC advises ATC request
clarity where there ATC see the info

Clearance Shortfall

1/10/15

Departure Chart

JFR are designed according to US Standard
for Terminal Instrument Procedures (TERPs)

200 ft MSL

at end RWY ≥ 35 ft AGL

400 ft AGL within 2 NM

Instrument Departure procedure (DP)
is used after takeoff to provide a transition
between the airport and enroute structure

For example, Refer DP.

~~Do not~~ ~~clear~~ DP = NO DP in enroute flight plan

Relat NAV DP contain instructions to all
aircraft followed by one or more constraints
such that requires aircraft to fly
appropriate fix with the enroute structure

Many pilot nav DP include a ~~vertical~~ vector
segment that helps you join the DP.

Also include vertical description of the initial
takeoff & transition procedure.

Vector DP. . . ATC provides vector vectors that start just after takeoff and continues until you reach your filed or assigned route.

Departure Procedures

Standard minimum - 1 SM vis for SE & TWE
1.5 SM for more than 2 engine

Braking Visibility is the greatest distance a weather observer on the ground can see the aircraft one half the horizon in SM; in METAR

Runway Visibility (RV) is the visibility determined for a particular RWY by a transmissometer, near RWY, in SM

Runway Visual Range (RVR), which is based on what a pilot in a moving aircraft should see when looking down the runway from the approach end.
It use 3 transmissometer.

Touchdown RVR

used RVR and Reduced RVR

METAR^{RVR} is for info but ATC RVR is separate every minute.

Departure Options

Graphic departures procedure - DP not mandatory \Rightarrow NO DP.

Textual Departures

Procedure departure \Rightarrow ATC is responsible

IFR departure direct contact departure
contact until advised to do so

"Procedure Contact" issued by ATC to say you are cleared & proceed with flight following

"Resume own navigation"

IFR Departure is another IFR.

1703

Enroute Climb.

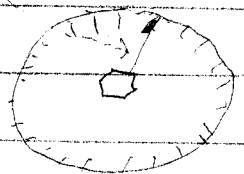
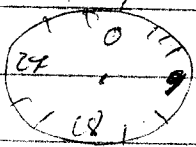
Descent below 18000ft \rightarrow Low altitude enroute climb also called Vertical Descent

Descent at 18000 - above and up to FL 420 are shown as High altitude enroute climb and are called jet thrust

High altitude climb are similar to normal climb but at high altitude, best speed only the jet engine layer area at small scale climb \rightarrow speed

Front Panel shows the area course

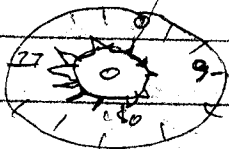
VOR \rightarrow The pointer symbol indicates magnetic north



TACAN and DME panel



VORTOC and VOR/DME



MCA

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NDB

A small version of their signal is available
a compass locator beacon, shown on
Top compass locator procedure as example
function on TWEB

ILS localizer, MLS (Micro wave landing
system) LDA (localizer type directional
aid) SDF (simplified directional
facility). If it series an enroute fix, the
reply has the frequency and
identifier nearby in a sequential
ended wave.

The localizer track course is sometimes
used to establish a fix and is labeled
as such on the chart.

① Remote Communications Outlet (RCO)

2,1 G KANKAKE
CHICAGO WX-2.0
KANKAKE

0
(W) 711.6 KF

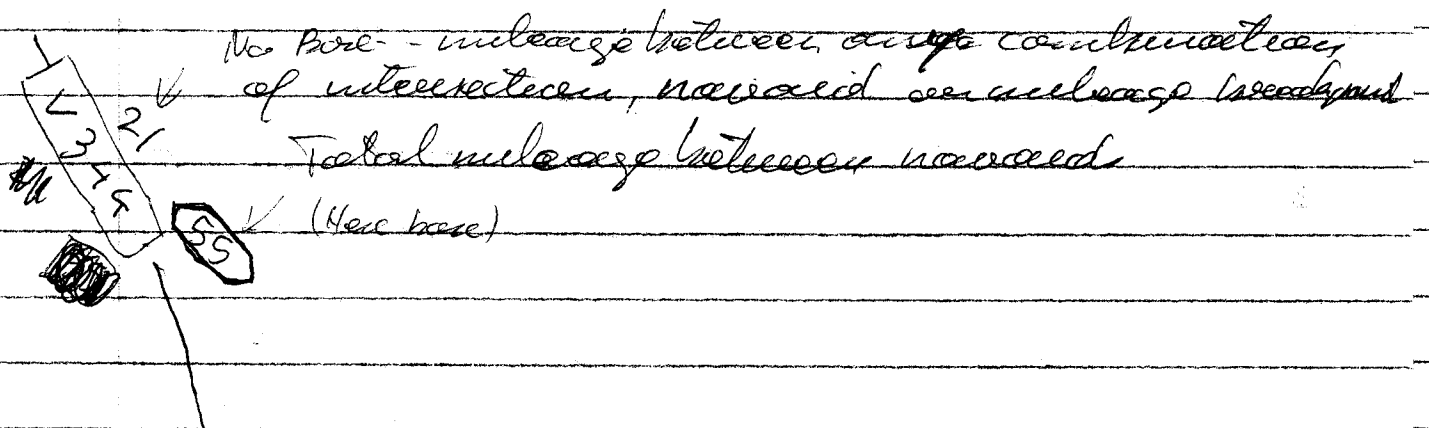
Facility information
name, frequency, and
identifier of navigation aid
in a box indicate that the facility
is part of an airway.
off airway facility is not boxed!

10/10

Victory Airways (V) owned VOM, VOR + AC and VOR/DME stations.

The number of the airway indicates its general direction. Even numbered airways usually run more or less east and west, while odd numbered airways generally run N-S or S-N on each side.

All distance on enroute chart are in NM.

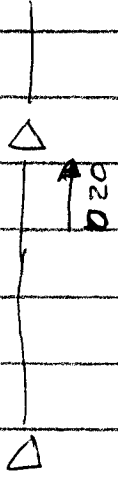


(AFCOM) X

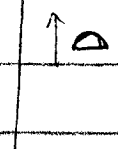
A Release break point - X, indicates a change of direction and where no intersection is designated. Also → computer navigation fix with ATC functions.

VOLCA Δ

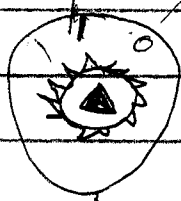
Intersections mean to check program in flight. S letter name. Arrivals are placed next to the intersection. Below the no airway that form the intersection.



Intersection defined by MFE or indicated by
 an arrow with the letter D below it
 If it is the first intersection from the runway
 the mileage is found along the runway
 as a standard mileage marker



Compulsory reporting point is identified
 by a solid triangle
 Non compulsory reporting point
 are often indicated by open triangles



Minimum enroute altitude ^{MFA} generally
 decreases distance & navigation speed
 clearance

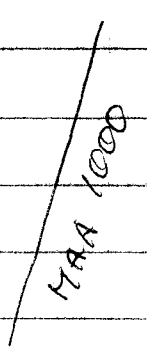
1000

Minimum distance clearance altitude
 (MOCRA) - generally navigation speed
 within 22 NM of VDB

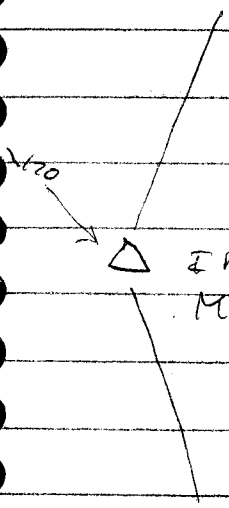
14000

in Mountain in MFA with 2000 ft above
 highest obstacle with 4 NM of extended
 course

MFE



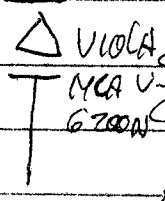
Maximum authorized Altitude (MAA)
 At higher altitude, you might be able to receive two or more VOR stations simultaneously on the same frequency making the signal unreliable for navigation. MAA guarantees one freq



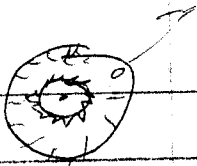
Minimum reception altitude (MRA)
 to receive a navigation signal forming an intersection or a fix.
 Note - you can receive below MRA but you cannot identify unless or fix.



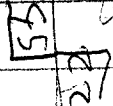
Altitude crossing necessary at intersections indicate a change in MRA. You normally climb climb upon reaching the fix unless the change occurs.



In some cases terrain data does not allow navigation signal may dictate Minimum Crossing Altitude (MCA). As you must climb before reaching the fix at MCA.

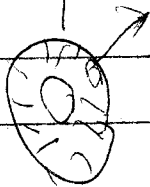


Usually frequencies moderate between navigation aids
 in other case. Changeover point
 (COP)



Communication

Typ display only two or 3 digit numbers
 etc. also 120, MHz range
 (27, 2 = 27)



Remote communication outlet (RCO)

Receipt

Receipt with call CG are in blue and
 have the city name in capital letters.
 The capital letters show the name under
 the approach chart is filed, while the
 receipt name is below

	ATIS 134, 15
	ASOS 135, 17
FSS freq 2.6 → 127.6 MHz → 2.6 Seattle	
	CTAF 123, 0

approach cleared
 288 MHz airport elevation

PORTLAND
 cancelled int'l
 KCMH 298-630

airport elevation

Airport permitted in green areas no instrument approach (in Tepp) (in NOA it has)

Parentheses indicate no military landing field

Certain airports have tech around bleedip

Military airports are marked with a ∇ tick
the ∇ \Rightarrow helicopter only

Airspace

in US all airspace at a distance of 500ft
MSL (except within 1000ft AGL) is controlled
airspace.

Below 14500 ∇ central \rightarrow white \rightarrow B, C, D, E
 \rightarrow Uncontrolled \rightarrow Tepp shaded gray
NO S procedure

~~Read p 9-17~~

B \rightarrow narrow shaded band with letter
B repeated at intervals

C - blue shaded outline

D & E - dashed blue line and letter
D or E. * shows port unus (see wgs)

Species whose feces were found in the VFA not all have
small species masses or blebs.

Re-calculated & restricted - masses had been added

Warning, about 140 species generally

207 C16

Enroute Radar Procedures

After TEC → Tower enroute center procedure

Instructions to contact the center after T of

- name of the facility
- Frequency
- Request

Acknowledge change of freq.

Initial callup to center

- facility ID
- aircraft ID
- altitude
- assigned altitude

"radar contact" → radar flight follow

"radar contact lost" or "radar service terminated" end of service

If no acknowledgment of demand of freq change
revert to previous one.

Prepends to ATIS at all times →
concerning own altitude

7/1/17

- an altitude change of VFR on top.
- time & altitude separation according to holding fix or clearance limit.
- leaving a holding fix or clearance limit
- missed approach, unavailability to land 500 ft min.
- change in TAS 5% or 10 knots
- loss of navigational capability
- No Radar services last report in compulsory period \rightarrow few extra definite descents.

Compulsory reporting period \rightarrow IFR \rightarrow ▲

GPS Notam present to flight should alert to any satellite outages

IFR - 0-179 \rightarrow add ~~1000~~ thousand - < 18000 MSL

- @ 180-360 - even < 18000

IFR plan with VFR on top clearance
fly VFR whenever available

⁷⁵⁰⁰ > 18000 MSL - Flight level $\sim 29,92$
is lowest usable flight altitude to avoid conflict

Descent clearance

→ descend a minimum

- "at pilot discretion" like you choose
level off, descent until not reasonable

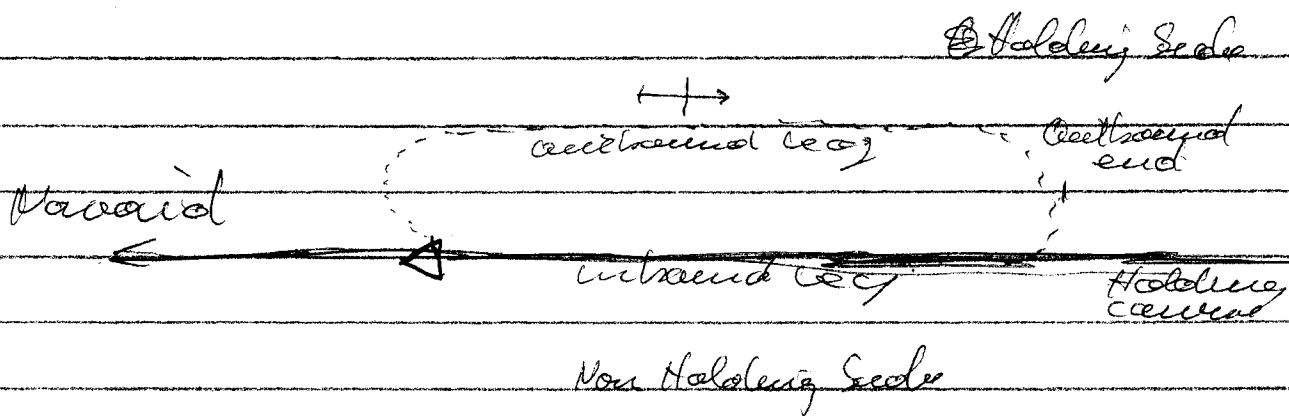
7/7/19

Holding procedure

- Turns are made to the right via standard holding pattern and to the left via non standard holding pattern

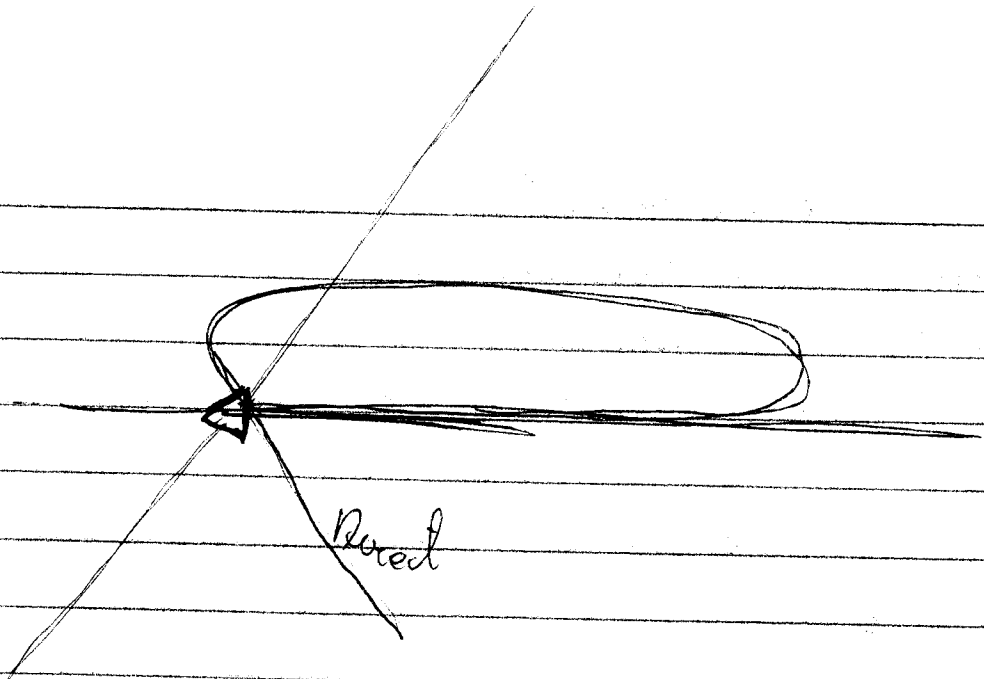
Holding begins ~~at~~ ends at Fix.

The inboard leg of the pattern is flown in accordance the fix on the holding course it is called the holding course

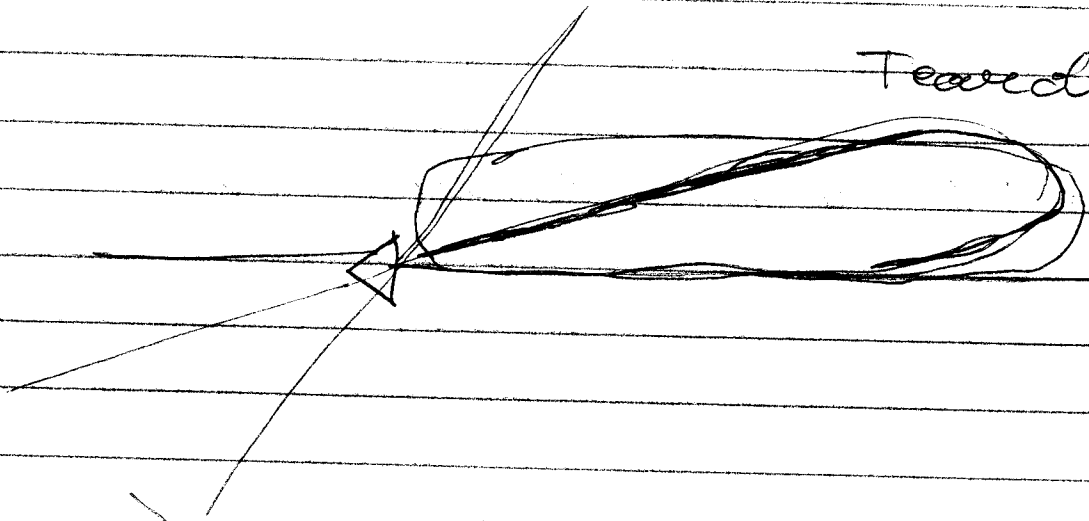


Timing for the outbound leg of either a std or non standard holding pattern begins when the holding fix is at the completion of the turn outbound.

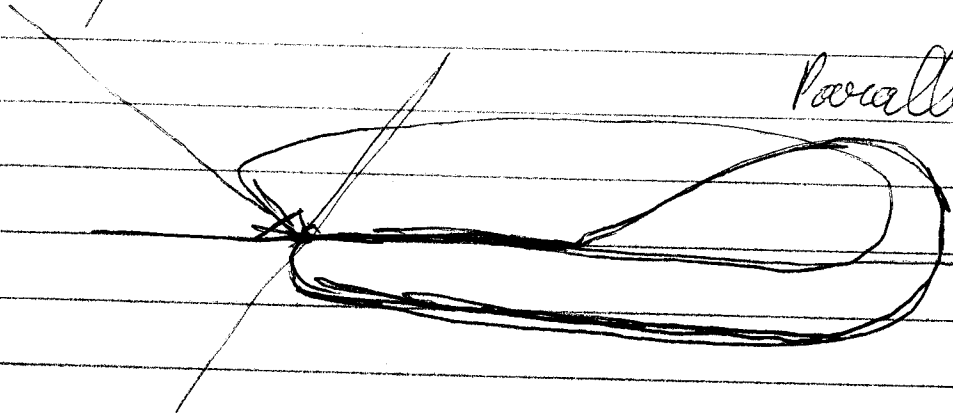
Maximum holding speed for civil aircraft
200 KIAS at 6000 MSL and below. 230 KIAS - 6001 ft
M90 to 14000 MSL and 265 KIAS above 14000 ft



Rosed



Tweedledee



Parallel entry

7/21

A holding demand.

Holding duration.

Holding fee

Expected settlement clearance (EFC)

If holding not published clearance contract
incidence

Free pattern using DME, the clearance
gives the settlement leg length in AM

At EFC, if not ATC contract you compare

7/22

Arrival Chart

The Standard Terminal Arrival Route (STAR)

STAR begins at a named aerodrome or aerodrome where all the arrival procedures begin.

Vertical Navigation Planning included within STAR, to schedule the altitude of each altitude flying time for best performance aircraft.

An expected altitude is given for a leg. Fix along the route.

17/23

Approval Procedures

ATC can issue ETTA (Standard Terminal
approval) is - "No STTA" in flight plan

Minimum crossing altitude and approved
restrictions appear on some ETTA,
but it is not a clearance.

ATC uses the stated clearance
as in case of lost communication.

Clearance ATIS for current weather

Proced in case.

NOTAM

AUOS, AGOS.

Control Union or FSS.

Review the Approach

Radio frequency.

Initial clearance.

Descent minimum.

Descent approach point and procedure.

Approach checklist.

Check fuel level

Be ready for missed approach or alternate
airport.

Altitude

Descent via clearance \rightarrow published altitudes
in STAR.

Any ATC amendment of STAR cancel it

ATC expect you to maintain ± 100 ft

17/25

Approach descent.

Instrument Approach ^{procedures} (IAP)

Receivable approach \rightarrow aligned slope & horizontal
guidance
in ILS and Receiver approach
mode (PAP)

Non Receiver approach \rightarrow VOR, NDB
horizontal course guidance rather than slope

Most common approaches: VOR, NDB, GPS,
ILS localizer.
waypoints - CNA, SDF, VOR/DME
RNAV and RLS.

Approach sequence

Initial, intermediate, final approach

Finaler ^{transition} receive approach in terminal
area, technically not sequenced but part
of instrument approach procedures
with execute and approval clearance

Initial approach segment \rightarrow to align plane
for approach vectors.

It begins at an initial approach fix (IAF)

IAF give location of initial approach fix
distance & altitude.

Intermediate Approach segment
position aircraft for final descent

The intermediate segment begins within
 30° of the approach course.

Intermediate Fix (IF)

Final Approach Segment

To get correct reference

The final approach segment

It starts where the glideslope is established

Final approach Fix (FAF)

To manoeuvre to a specific height to provide to
land at a specified approach altitude
to the usability of the field.

For a non precision final approach segment

begin at a designated Final approach fix
(FAF) or where you are established on the
final approach

With in VOA & NDB it is where the procedure
turn intersect the final approach course
intersect. It is called the Final approach
point (FAP)

Missed Approach Segment

Start at Missed Approach Point (MAP)

It depend on the type of approach

in precision approach \Rightarrow at designated
altitude on the glide slope called Decision Height

(DH). For Non precision \Rightarrow a fix by visual

or a specified time after you cross the final approach

approach fix.

Checklist (Jepp)

- Headset

- Main check

- Backup check

- Landing minimum

- Communication

Heading Section

Procedure title - ICS DME Part 1
indicate the type of approach instrument
required. Use ICS, & DME.

When a letter appears in the procedure
title, needs VOR-A approach not for
straight landing

Japp (ANES) use class number numbers to
identify → 21-1

• The first digit → approach number
if more than one approach same city
and state name, 1st → 1 - the 2nd → 2 etc.

• The 2nd digit identifies the type of class

0 - Area, DP, STAR, Class B ed

1 - ICS, LOC, MLS, LDA, SDF

2 - Reserved

3 - VOR, VOR DME

4 - TACAN

5 - Reserved

6 - NDB

7 - Reserved

8 - PRR, HSR, Standard GPS

9 - VOR DME RNAV - Class

Manual Flight Procedure (CUEP)

The Minimum safe altitude \rightarrow 1000ft of
obstruction clearance with 75 APL
But - no navigation or communication
guaranteed
- use in emergency a UKA.

Plan View

A procedure turn is a standard method
of reversing course. If depicted on the plan
view it means you may reverse course any
point you desire (but some side of and in the
distance).

If a holding or trackkeep pattern is shown
instead of a procedure turn it is the only
approved method of course reversal
if not shown \rightarrow no course reversal allowed.

Profile View

Different views are shown in profile views

The Termination zone elevation (TZE)
is the highest elevation in the first 3000ft
of the boundary.

The Height Above Touchdown (HAT) is measured from the touchdown zone elevation to the threshold elevation of the runway ~~segment~~ by the approach.

The Height Above Airport (HAA) is measured above the official airport elevation which is the highest point of an airport ~~surface~~ runway.

The Threshold Crossing Height (TCH) is the altitude at which you cross the runway threshold when established on the glide slope centerline.

Stepdown fixes: to descend to a lower altitude above obstacle. One stepdown fix permitted between the final approach fix (FAF) and the missed approach point (MAP).

A Visual Descent Point (VDP) may also be depicted in the profile. (V)

A descent from the Minimum Descent Altitude should not be started before VDP

Canding Manner

A canding approach is a procedure where a pilot involves executing an approach to one runway and then canding on another.

During a go-around maneuver, you are cleared for an approach to one runway with a clearance to land on a 2nd runway.

Aircraft Approach categories based on approach speed:

A - up to 90 kts

B - 91 to 120 kts

C - 121 to 140 kts

D - 141 to 165 kts

E - Above 165 kts

Minimum Descent Procedures

In Precision approach \rightarrow ^{control} ~~MCP~~ \rightarrow at Decision Height (DH) ~~MSL~~ (HOC)
Decision Altitude (DA(H)) MSL

Non Precision approach \rightarrow
Minimum descent altitude (Height) ~~MCP~~ ^{MCA}
to decide.

Sealed top:

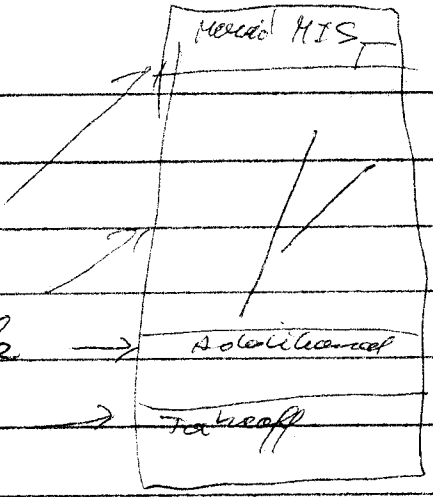
On approach directly \rightarrow SM \rightarrow present to see a U-bolts
 \rightarrow ft \rightarrow A.V.R. equipment

Improvement component a resolved minimum

77 C 43

Approach Chart

- Heading
- Approach plan view
- Additional runway info
- Takeoff and alternate minimum



Heading Section

Approach, its location, elevations, magnetic variation and azimuth communications frequencies.

Plan View x Additional RWY info info on RWY x lighting system

The Approach Reference Point (ARP) is the approximate center of all usable runway surface and is where the official latitude and longitude coordinates are derived.

Takeoff and Alternate Minimum

If the forecast weather at your destination time of arrival places minimum VFR, indicate a ceiling of less than 2000 ft

or a visibility of less than 3 statute miles
you must list an alternate airport on your
IFR flight plan

The standard alternate minimum floor
precision approaches are a ceiling of 600
ft and a visibility of ≥ 24 .

For nonprecision approaches an 800 ft
ceiling and ≥ 4 visibility.

exam revision

Control Display Units = CDU

08/11/17

Liquid crystal Display

Fly by Wire - no direct mechanical link between control & cockpit

EICAS - Engine Indication Terrain Engine Operation

Engine Alert System CAS

Engine Indications and Engine Alerting System

CFIT - Central Flight into Terrain (accident)