4 ME VFR/IFR STANDARD OPERATING PROCEDURES

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APPENDIX:

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B. OPEN

C. LIST OF CALL-OUTS

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4.1 INTRODUCTION

4.1.1 It is very important to know specific flight procedures by heart. Before actual flight, drill procedures, scan patterns and call-outs at home or in the aircraft on the ground. By using the aircraft as a training aid, you will soon be able to remember procedures, call-outs and checklists and know your way around the aircraft.

4.1.2 NOTE: The speeds and procedures used in the following may differ from the Aircraft Operation Manual, but are considered school procedures. Using these procedures does not override the students / pilots duty to be aware of exactly what is written in the appropriate AOM.

4.1.3 Amendments to the procedure manual will be published in the form of Cockpit Bulletins, made available through the OPS office. It is the duty of each pilot / student to keep issued Cockpit Bulletins available together with this procedure manual.

4.1.4 Any discrepancies, errors or possibilities for improvement noted must be forwarded to CFI in writing. Reply will follow ASAP.

4.1.5 Nothing in this manual can substitute the use of common sense, rules and regulations compliance and good airmanship. Nothing stated in the below manual can relieve the commander of the obligation to think and act accordingly.

4.1.6 All students and instructors must adhere strictly to SOP. However some operations might call for deviations, these are to be called out loud in the cockpit with the phrase “NON STANDARD”.

4.1.7 The best way to prepare for the twin course is to “chairfly” the Seneca and practice emergency procedures this way. Know all cockpit layouts before flight.

4.1.8 Before flight, understand all subjects on the lesson plan & study common errors for the procedures to be performed during the flight.

4.2 FLIGHT AUTORISATION AND PREFLIGHT CONSIDERATIONS

4.2.1 Each flight must be duly authorized and acknowledged. The following points must be considered.

a) Flight schedule / booking

b) NOTAM

c) Meteorological information

d) Maps & plates

e) ATS flight plan or strip

f) Certificates and ratings

g) Aircraft, log remarks etc.

4.3 CHECKLIST HANDLING

4.3.1 NEVER bend the checklist – they are to be used in the condition in which they are printet.

4.3.2 In order to organize and standardize the cockpit work to the best extent possible, the use of checklists must be a disciplined and uniform job. All checklists on ground may for school use be read in two (2) different ways, depending on personal preference. During flight all checklist reading is done using the Scan-Flow method.

READ & DO: In this system, the right hand takes the checklist and places in the left hand, where the checklist is held against the control column horn or in the left hand if the controls are not held at the time. Then read one item and call it out, e.g. “Alternator”, then perform the required action and call it out, e.g. “ON”.

SCAN-FLOW: All checklists are designed in a way that allows them to follow the scan-flow principle, i.e. all actions come in a logical order. All items are first completed, again calling out the item and required action, e.g. “Alternator – ON”. When the flow is completed, the checklist is then read aloud, confirming all actions have been completed and all selections and settings are the appropriate ones.

4.3.3 A flow must not be interrupted. If the checklist reading is discontinued at other times than those stated in the checklist by a dotted line, the checklist is continued by repeating the last item completed before the interruption. When a checklist is discontinued, it is placed under the right thigh, sticking out in the middle aisle.

4.3.4 Always be meticulous in your actions when reading the checklist, and never drop into the habit of reading the checklist per functionary.

4.3.5 When a checklist is completed, it is placed in either the pocket on the left sidewall or in the space between glare shield and windshield.

4.3.6 Emergency checklists are read by calling out the item stated on the left-hand side of the checklist, stating left or right (system), then the required action from the right-hand side of the checklist, if required supplemented by the word “Simulated”.

4.3.7 In general do not read any checklist bellow 1000’ AGL unless circumstances require so.

4.3.8 Gyro setting: A correctly set DG is the basis for all you navigation, hence it should be clear that gyro must be set frequently and meticulously. As you should understand by now flying NDB tracking requires gyro to be set very precisely while flying under vectors wouldn’t demand the same degree of accuracy regarding the gyro setting since ATC will make sure you end up where they want you to be. It is recommended to do a gyro check/set at least every 15 min, however aircraft maneuvers may require a more often resetting of the gyro. E.g: after level off, airwork, turns etc.

4.4 OPEN

4.5 COCKPIT PREPARATION

4.5.1 Before each lesson, the cockpit must be prepared for the coming flight. This is done by setting the communication and navigation aids to the local frequencies to be used. For Roskilde, this will be :

- COM 1 : EKRK TWR active – EKRK APP stand-by (EKRK TWR)
- COM 2 : EKRK ATIS active – EKRK TWR stand-by (EKRK ATIS)
- NAV 1: Landing runway ILS active – OBS selected to proper final approach course – departure VOR stand-by
- NAV 2 : Landing runway ILS active – OBS selected to proper final approach course secondary departure VOR stand-by
- ADF : RK locator – next beacon to be used in stand-by
- DME : KV DME in frequency mode
- XPDR : Squawk 2000 in stand-by mode
- MKR : Marker beacon sound selected to PHONES on communication panel.

4.5.2 Next, place the Jeppesen Route Manual in a place where you can reach it with ease. Plates are placed in the plate holder in sequence, i.e. top plate is taxi plate, then departure / SID plate, the plate for 1st planned approach at destination, 2nd planned

approach at destination etc., ending with taxi / parking plate for destination. En-route or area charts may be placed on top of glare shield left-hand corner (together with the checklists). These maps are of course folded in such a way that the applicable route segments are facing forward.

4.5.3 Your pinto-board can be stowed next to the flap handle in the middle isle or between the left-hand cockpit wall and the seat. It is important that the pinto-board is not placed in such a way that it may interfere with the handling of any levers, controls, trimwheels etc.

4.6 CALL-OUTS

4.6.1 In the following, we will distinguish between call-outs (marked by the words : Call out : "…") and memotechnics (marked by use of capital letters with bullets, e.g. •A… •B… •C…). A call-out must be called out loud in the cockpit to draw the attention of all crewmembers to a specific event, e.g. "Localizer alive". Memotechnics may be said loud in the cockpit, but only if it helps you – otherwise keep them silent.

4.6.2 Whenever selecting flaps or gear you are to check and call out your speed first, so you don`t overspeed the aircraft with structural stress as a result.

4.7 START-UP

4.7.1 Before engine start the aircraft documents and log must be checked for airworthiness, remarks, due time for technical inspections, LDD, etc. Then check the cockpit and cabin for unauthorized loose objects, everything must be secured and fastened. Furthermore adjust seat and rudder pedal position for your own comfort, before you fasten your seat belt. Remember that the shaded areas on the checklist may be disregarded, if the pilot has been a crewmember on the previous flight.

4.7.2 Starting the engines are done by checklist for the first engine (left), continue starting the right engine by heart. After each engine start, check the following by heart: Oilpressure – Suction – 1000 RPM.

4.7.3 When battery is turned on, check the overvoltage light before turning on the alternators.

4.7.4 Select anticollision and strobe light on. (Strobe light can be selected off if required due to visual disturbance)

4.7.5 After engine start, complete the checklist. Check audio panel in AUTO (sound to PHONES) and COM1 and COM 2 position. Listen to ATIS on COM 2 as you set it for your cockpit preparation. After receiving the ATIS, switch COM 2 to the TWR frequency.

- After receiving the ATIS, always immediately set the QNH received on both altimeters, and verify already now that they are:
  a) Indicating field elevation +/- 60 ft. individually
  b) Indicating no more than 90 ft. difference between the 2 altimeters
- When receiving the ATIS, already now consider:
  (I) What runways can be accepted for departure and,
  (II) The mean wind direction with regard to taxi considerations (set HDG-bug).
  (III) Max tailwind / Max crosswind component.

4.7.6 Perform initial call on COM 2 and when reply has been received, select COM 1 on audio panel in order to check transmission on COM 1.

4.7.7 Otherwise COM 2 shall be used for ATIS, VOLMET, CUT , 121.5 etc. Center Air freq.

is 131.925. Be familiar with the audio panel, check switch position before each call and use COM 1 / 2 buttons on switch row only to monitor frequencies – otherwise, these switches are left in the out position.

4.8 TAXI

4.8.1 Open

4.8.2 As the taxiway layout may be rather complicated, study the most probable route carefully in order to anticipate your taxi clearance, before actually requesting it.

4.8.3 Write down taxi clearance and study the taxi route using the airport chart before first movement. When ready to taxi, switch on the landing I taxi light, make a good lookout and release the parking brake. Then break the aircraft off the blocks by adding power – set power for smooth engine operation.

4.8.4 Check the brakes when the aircraft has rolled the first meter by applying brakes, but do not make a full stop. If obstructions are present within 1/4 wingspan taxi must be performed with utmost care and taxi in a congested area such as the apron must be performed at slow speed. Taxi checks are prohibited under these conditions.

4.8.5 When free of obstacles and congested areas taxi checks may be performed according to memory only. Never read a checklist or study airport layout while taxiing.

4.8.6 Instruments are checked in a left and right turn:

a) Turn-and-bank indicator is checked for direction of turn and opposite ball.

b) Gyro compass is checked for turning according to aircraft movement and headings to correspond to airport layout.

c) Horizon is checked to be steady, i.e. not to bank during the turns.

d) Magnetic compass is checked for turn according to aircraft movement.

e) The call-outs are: “Needle left — ball right — gyro decreasing — horizon steady — compass follows”.

When taxiing, plan your movements so as to obtain “natural” turns left and right to allow for the taxi check.

4.8.7 Open

4.8.8 When clear of obstacles and congested areas the taxi speed should be that of a fast walk once on the taxiway. Speed is controlled with the throttle. When reducing speed first reduce power and if insufficient, use brakes. Consequently your heels should be kept on the floor unless the use of brakes is necessary.

4.8.9 X-feed is checked by selecting fuel-selector in the x-feed position for a minimum of 1 minute for each engine.

4.8.10 It requires much more power to get an aircraft moving, than it does to keep it moving. For this reason all controls must be used prompt and precise. It is poor technique to use excessively high power settings and attempt to control the direction and taxi-speed with the brakes. The lower limit on taxi RPM is 800 RPM. If engine runs uneven with this powersetting, the mixture lever may be retarded 2 cm. from full rich — this will prevent sooting of the spark plugs. Anticipate turns by retarding power in due time before commencing turns. When the turn is almost completed, power may again be added to achieve normal straight taxi speed.

4.8.11 If during taxiing you become unsure of your position, stop, check the airport layout and/or request further instructions. Do not continue until you are absolutely sure of the rest of the routing. Remember that the pilot is responsible for avoiding collision and not entering the active runway without prior permission, so never do paperwork while taxiing.

4.8.12 Before crossing any runways check and call out: **“Clear Left, Clear Right.”**

4.8.13 Open

4.8.14 Open

4.8.15 Open

4.8.16 Open

4.8.17 Open

4.8.18 Open

4.8.19 Open

4.8.20 Open

4.8.21 Open

4.9 AVIONIC CHECK AND SET-UP

4.9.1 When you reach the item “ATC clearance” on your checklist, call TWR and state that you are ready to copy clearance. Read the clearance back using the exact same phraseology and words that TWR used! – then add : “…will advise ready for departure…”.

4.9.2 On larger airports and in most other countries than Denmark, it is customary to request start-up, i.e. request clearance to start engine before taxiing. This is normally done on APRON, GROUND or DELIVERY. In such cases, request both “… start-up and clearance…” when making initial call. It will be different from your “normal” sequence to get the ATC clearance even before starting your engine, so pay extra attention to your checklist to verify that all items have been completed. Interruption of routines is a major “checklist killer”.

4.9.3 After receiving ATC clearance, you must first CHECK your NAVAIDS. All switching of NAVAIDS is done according to the following sequence (both on ground and in the air):

- TUNE the applicable NAVAID frequency and place it in active mode on the radio.
- SELECT the appropriate OBS setting that corresponds to the use you are going to make of it, i.e. ILS tuned = OBS select to final approach course. Observe proper needle deflection and flag warnings disappeared, if applicable, also check TO / FROM indicator for proper indication. On the ADF, use this item to check needle to park position and return to proper relative bearing when switching ANT mode on and off. On the DME, observe likely indication on display (If KV DME on run-up area RWY 21 shows 48 NM, something is wrong!).
- IDENT the NAVAID – use only COM panel switches – make sure radio volume has been turned up and the volume button pulled out to facilitate IDENT. When you have verified proper morse code, just push the COM panel selector out – do not turn down volume or push volume button back in again. If you comply with this procedure, the radio will always be ready for ident by just pushing the COM panel selector in. Always use phones to ident not speakers.

4.9.4 Tune – Select – Ident one navigation aid at a time – then proceed to the next. Check all instruments from top to bottom of each rack. While waiting for the DME ident, test marker beacon anunciator lights for proper operation.

4.9.5 When all NAVAIDS have been checked, you must SET them. Again, use Tune – Select – Ident and in the same sequence as before. The ILS landing runway must always be in stand-by NAV 1. Then call-out: “NAVAIDS set and checked” according to checklist.

4.10 DEPARTURE BRIEFING

4.10.1 The departure briefing must contain as a minimum the following :

- Take-off type, runway and position, e.g: “IFR departure RWY 22R Bravo intersection, Normal take-off”
- Profile, As a minimum, state turn altitude, to what heading (remember WCA if not radar vectored!) the turn will be made and what altitude you are climbing for, e.g.: “Climb straight ahead to KAS DME 2,0, then a right turn HDG 300° to intercept and follow KAS R270 outbound, climbing to 4000 ft.”. If climbing for a level, state also transition altitude (TA).
- Special considerations during the departure, e.g. SID, minimum climb gradient, maximum IAS, frequency to contact when airborne, compulsory reporting points etc.
- Expected WCA (Set HDG bug accordingly), etc.
- Navigation set-up, e.g. : “NAV 1 KAS – OBS set – identified – stand-by ILS 22L, NAV 2 ODN – OBS set – to be identified – stand-by VES…. etc.”. Again, notice that the Tune – Select – Ident sequence is being used!
- Emergencies: state “Engine failure / fire before 92 kts we stop - Throttle close – gear select/verify down - flaps as required – land/stop the a/c – advice ATC”.
- “Engine failure / fire above 92 kts and no available runway we go – full power – gear up – flaps up – Apply memory items”
- Mention all altiudes in MSL or AGL, not a combination.

4.11 READY FOR LINE-UP

4.11.1 Never report ready for departure unless you are mentally prepared and have all checklist and paperwork completed. Also remember foggles on for IFR flights

4.11.2 After completing the before take-off checklist, you must “read & do” the line-up checklist on the run-up area.

4.12 LINE-UP

4.12.1 Open

4.12.2 Open

4.12.3 When entering the runway call out : “Final clear, lining up RWY… Bravo intersection“ to state weather it is an intersection take-off or full runway length take-off. Call out : “Gyro checked (check and set gyro according to runway heading).

4.12.4 Open

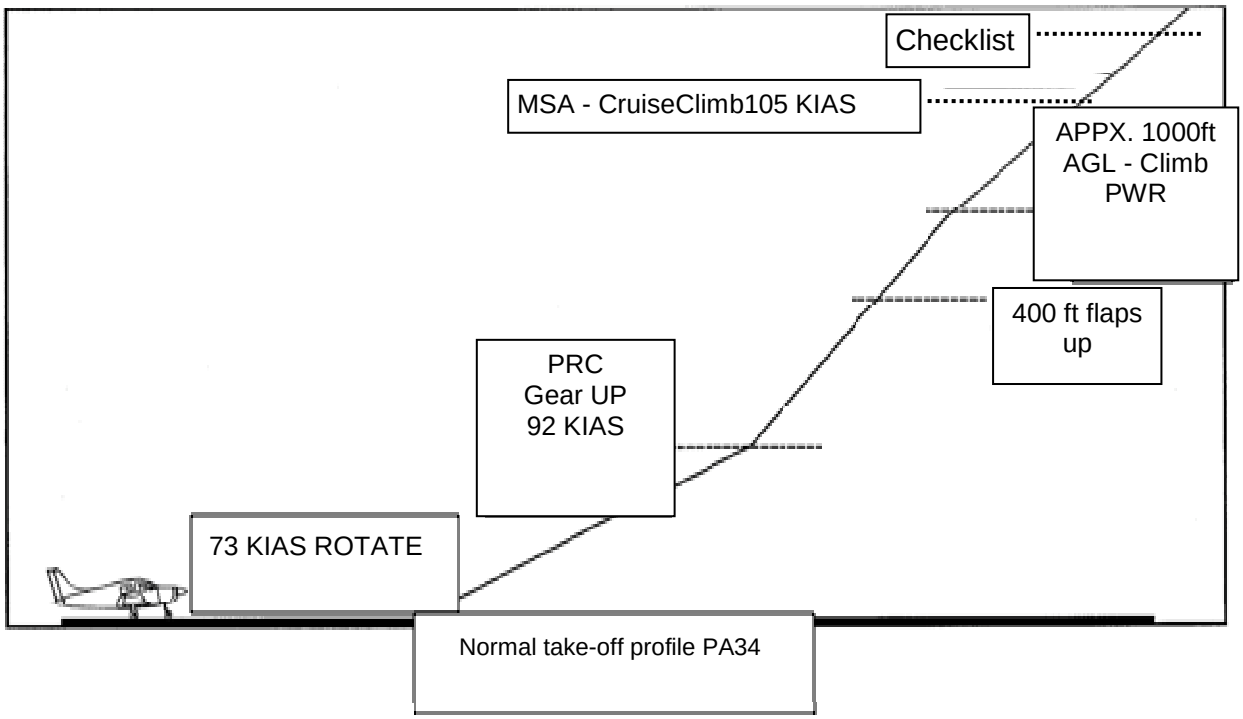
4.13 TAKE-OFF

4.13.1 NORMAL TAKE-OFF

4.13.1.1 When cleared for take-off mentally review the turning altitude and heading to which the turn must be made. Then hold the brakes, advance the throttles to 2000 RPM, call out & do : “Engine instruments checked – timing started”, then release the brakes and smoothly add full power.

4.13.1.2 Open

4.13.1.3 At 73 KIAS call out: “73-rotate”, then smoothly transition to instrument scan and raise the nose to approx. 5 degrees ANU. Maintain this attitude – DO UNDER NO CIRCUMSTANCES LOWER THE NOSE AT THIS POINT. Let the aircraft accelerate slowly to Vy 92 KIAS, then raise the nose to approx. 10 degrees ANU to stop further acceleration.



4.13.1.4 Open

4.13.1.5 Open

4.13.1.6 Open

4.13.1.7 If turbulence at low level is a factor, delay rotation by 5 kt. and climb at V_Y/V_X + 5 kt. – Remember to verify climb performance at this speed complies with climb requirements.

4.13.2 OPEN

4.13.3 OPEN

4.13.4 SHORT FIELD TAKE-OFF

4.13.4.1 If performing short-field take-off using Fl. 25° or obstacle clearance take-off, climb at V_X 78 KIAS. Consult POH and take into consideration speeds during all of the take-off profile.

4.13.4.2 At this point, as soon as possible apply WCA to remain on runway extended centerline, then trim the aircraft to maintain 10° ANU without stick force.

4.13.4.3 Positive rate of climb “gear up”.

4.13.5 OPEN

4.14 CLIMB

4.14.1 At 400 ft. AGL, check and call out : “Flaps up”. If flaps had is used, let the aircraft accelerate to V_Y 92 KIAS and re-trim 1 up.

4.14.2 Passing APPX 1000 ft AGL set climb power 25” MP and 2500 RPM.

4.14.3 Passing TA or MSA if cruise below TA, complete the climb checklist, and continue with cruiseclimb speed 105 KIAS. Remember to identify those NAVAIDS you are going to use that were not already identified on the ground. If ready to commence approach directly after departure, read the G/A checklist – this will cover for both climb, cruise, descent and approach checklists. These can thus be called as “Completed with G/A checklist” when doing ABC.

4.14.4 Open

4.14.5 Open

4.14.6 Open

4.14.7 Open

4.14.8 Open

4.14.9 Open

4.14.10 Passing transition altitude, call out : “Reset altimeters – 1013”, then crosscheck altimeters for identical indication and call out : “Altimeters cross-checked”. Never set STD-setting without being cleared for a flight level by ATC.

4.14.11 Coming up 1000 ft. below assigned altitude or level, call out : “1000 FT TO GO – QNH…. (or 1013)”. This requirement is not applicable to 1000 ft. stepclimbs.

4.15 LEVEL FLIGHT

4.15.1 When at correct altitude or level, lower the nose to 0° ANU, trim 1/1 forward. When passing 120 KIAS, set MP 22” and RPM 2400 for local flights (AOM setting for cruise legs) and make whatever small trim changes are necessary.

4.15.2 Open

4.15.3 Open

4.15.4 Open

4.15.5 Open

4.15.6 Next, complete the cruise checklist and the operational flightplan on navigational flights. Time checks must be completed.

4.15.7 When being transferred from one ATS unit to another, set the new frequency in standby already while you are reading it back. Then switch to the new frequency and establish contact. State level + levelchange + clearance limit in your initial call, e.g.: "Copenhagen Control, OY-JBG, 4000 ft. maintaining inbound MB".

4.15.8 Never "delete" the old frequency (now in stand-by) before you have established firm contact with the new unit.

4.15.9 It is recommended during radar vectors to set gyro only if needed. If gyro was 5 degrees off or more then inform ATC: "New heading due to gyro correction…"

4.15.10 During local flights, COM 2 is used for CUT 131.92 and ATIS. On navigational flights, use it for VOLMET or ATIS frequencies or the frequency of handling agents etc.

4.15.11 Stay ahead in your COM and NAV set-up. As soon as you have switched a new frequency active, you have the old frequency in stand-by – clean up the old mess and set the next frequency you can use in stand-by. It is never too early to set the next applicable frequency in stand-by. When crossing overhead a nav aid during cruise be sure to have it setup and the outbound leg ready well before reaching that nav aid.

4.15.12 When approaching the destination, plan on flying e.g. the last leg of an arrival route on NAV 2 – this will free NAV 1 with its LLZ + GP indicators for the ILS frequency.

4.15.13 Calculate a TOD while on cruise – don't expect ATC to "descend you" at the right time. If you do not tell ATC what you want of them (what approaches to what runways, that you want descent to this and that altitude, that you want another turn in the holding or racetrack… the list goes on!), they will just place you where you mean the least trouble for them. On the other hand, if you state your intentions and requirements clearly, ATC will most likely "play ball" and get you the right clearance. Also bear in mind that ATC can provide you with valuable information like trackmiles to go, WX at destination, help in finding alternates in case of diversion, information about delays that can be corrected by adjusting speed etc.

4.15.14 Always write down and verify your clearances, then think about what the clearance means. There is a lot of difference between "Climb 3000 ft., fly direct KORSA" and "Fly direct KORSA, climb 3000 ft."! If in doubt – get confirmation!

4.15.15 In due time, get latest WX for your destination and decide weather you will continue or divert already now. If no ATIS or VOLMET is available, ask ATC to get the latest WX for you. If you know that the next ATC will give you the weather, then only ask if doubts exits about runway in use. You could also just ask for runway in use.

4.16 DESCENT

4.16.1 Plan on descent with MP 20", ½ trim forward and RPM unchanged. Speed should be approximately 135 KIAS and 500 ft./min due to passenger comfort. Then use speed factor to calculate TOD. Plan on a level segment of not less than 3 NM before final descent. This will allow you to decelerate the aircraft and set configuration for intermediate approach.

4.16.2 On descents, complete the descent checklist before leaving cruising altitude. When cleared down from a level to an altitude, set acknowledged QNH by heart, then perform the approach checklist.

4.16.3 When approaching TOD, commence the memotechnic ABC :

- ATIS – latest WX info from your destination will help you determine….
- Briefing – brief the approach to be flown (see details below)
- Checklist – actually, this item covers both Descent and Approach checklists.

It is recommended to have completed A, B and descent checklist before TOD.

A good practice is to set up as much nav aids as possible before the briefing for better position awareness

Remember to brief the nav setup after the approach briefing. It is ok here to say "to be set for…" if time does not permit the nav briefing to be completed later.

Never brief an approach that will result in a tailwind landing, unless the FI instruct you to for training purposes.

For local flights or continuous approaches it is ok to say "ATIS – same operator". Good practice here will be to request wind check and QNH instead of a full ATIS.

4.16.4 The approach briefing is a review of the approach profile to be flown. All approach briefings must be rehearsed before flight so that this item will not bring any surprises or take up too much mental energy. The briefing is build up around the "minimum necessary" – i.e. only essentials are stated. Therefore, if you need to include more items than the below listed, feel free to do so, but remember: talking takes up time and mental capacity, so keep it simple. However briefing of initial approach flying plus expected ROD on final will usually help to increase your position/situational awareness during the approach and must be a part of your briefing.

During approach remember to "call out"+100 when passing 100 ft above hard altitudes

4.16.5 The briefing must contain as a minimum :

- Plate number and date.
- Approach type and destination
- Final approach course
- Intermediate approach altitude (+ any temperature corrections)

These contents are the same for all approach types.

4.16.6 The following is different in content depending on the type of approach to be flown:

1) Precision :

- Intercept & follow glideslope
- Glideslope check (+ any temperature corrections)
- Decision altitude (+ any temperature corrections)
- Missed approach procedure
- Navigation set-up

2) Non-precision :

- Step down fixes and altitude to descent to (+ any temperature corrections)
- Minimum descent altitude (+ any temperature corrections)
- Decision point
- Missed approach point
- Missed approach procedure
- Navigation set-up

3) Circling approach :

- Minimum descent altitude (+ any temperature corrections)
- Missed approach point
- L/R break for R/L circling to RWY…
- In case of missed approach, climbing turn towards the runway or circling side, then…
- Missed approach procedure (the one for the runway approached, please!)
- Navigation set-up

4.16.7 Here follows examples of all 3 approach briefings – compare them with the actual plates and learn the structure.

1) (Plate number and date) ILS approach runway 11, Roskilde. MSA 2100 ft. Final approach course 114° - intermediate approach altitude 2000 ft. Intercept and follow glideslope- glideslope check 1627 ft. passing RK. DA 345 ft. Missed approach: Climb straight ahead to 500 ft., then turn right to RK climbing to 2000 ft.

Navigation set-up : NAV 1 ILS 11, OBS set, identified, stand-by KOR, NAV 2 ILS 11, OBS set, identified, stand-by TNO, ADF RK, identified, DME KV, identified.

2) (Plate number and date) NDB approach runway 11, Roskilde. MSA 2100 ft. Final approach course 114° - intermediate approach altitude 2000 ft. Passing KV DME 6,4, descent for 1700 ft. Passing RK, descent for minimum descent altitude 740 ft. Decision point KV DME 1,5, missed approach point KV DME 1,0. Missed approach: Turn right to RK climbing to 2000 ft.

Navigation set-up : NAV 1 KOR, OBS set, identified, stand-by ILS 11, NAV 2 KOR, OBS set, identified, stand-by ILS 11, ADF RK, identified, DME KV, identified.

3) (Plate number and date) ILS approach runway 21, circling 11, Roskilde. MSA 2100 ft. Final approach course 209° - intermediate approach altitude 3000 ft. Intercept and follow glideslope – glideslope check 1420 ft. passing SN distance 4,0. Minimum descent altitude 610 ft. Missed approach point 5 min 17 sec from SN distance 9,0. It will be a right break for a lefthand circling to runway 11. In case of missed approach, climbing turn towards the approaching runway or circling side, then right turn to RK climbing to 2000 ft.

Navigation set-up: NAV 1 ILS 21, OBS set, identified, stand-by KOR, NAV 2 ILS 21, OBS set, identified, stand-by KOR, ADF RK, identified, DME KOR, identified.

4.16.8 Be meticulous in your briefing and set-up. A wrong briefing has brought more than one flight to an early and spectacular end!

4.16.9 For continuous approaches, remember to obtain approach clearance and consider initial approach flying before initial approach fix.

4.16.10 Open

4.16.11 During prolonged descents, verify that you are still on profile, i.e. not getting late or early down to desired altitude. Remember that you must have at least 3 NM level flight before final descent.

4.16.12 1000 ft. prior to assigned level or altitude, call out : "1000 FT TO GO – QNH…. (or 1013)". This requirement is not applicable to 1000 ft. step-downs.

4.16.13 100 ft. prior to assigned level or altitude, call out: "100 to go", start adding power smoothly to MP 22" trim ½ back and observe level-out at correct altitude. Then adjust the trim precisely.

4.16.14 Open

4.17 OPEN

4.18 ARRIVAL SEGMENT

4.18.1 During this segment, you have free speed SOP-wise, but remember to adjust speed to how well ahead you are mentally and ABC-wise. Remember to verify approach plates for descent profile required during arrival phase. If you are not following an arrival route, check MSA or MORA as applicable before you accept descent.

4.18.2 Remember that no descent are to be made below MSA unless being radar vectored or established in a procedure. If flying towards a nav aid and ATC clears you below MSA – you MUST confirm vectored.

4.18.3 If under vectors, remember to keep your mental picture of where you are. ADF and DME in combination give you a good picture of where you are in relation to the approach.

4.19 INITIAL APPROACH SEGMENT

4.19.1 If you are performing straight-in approach or are being radar vectored, you must reduce speed to 110 KIAS and select Fl.10° and approx. MP 16-18" 2500 RPM no later than 3 NM from initial descent on approach profile. Remember to maintain position awareness. During vectors, consider to set flaps 10 on base leg.

4.19.2 During vectors: When you are cleared approach you don't have to follow the last assigned heading any more. You are free to adjust heading for at better intercept should this be necessary unless clearance was: "On present heading, intercept & follow…" Then you must request new heading from ATC.

4.19.3 Are you flying full procedure, e.g. via a locator, you will start the approach by a memotechnic known as 4 x T :

- Turn to outbound heading (to track outbound leg) when passing the fix and remember to start descent if stated in the approach procedure.
- Time the outbound leg when passing abeam the fix (or when turn is completed, whichever is later)
- Throttle, i.e. set MP 16-18" select Fl.10° when beacon outbound for the approach, then trim ¼ forward to maintain 110 KIAS. Verify that the aircraft is trimmed, turn has stopped and that the aircraft is under positive control. Powersetting for single engine is MP 22-24" (Power settings mentioned is valid for level flight. During descent set power to maintain required ROD and speed 110 KIAS)
- Talk, i.e. report beacon outbound to the applicable unit.

4.19.4 Always make sure that you are actually cleared the approach – not just another turn in the holding! If you are established in the holding and ATC clears you for approach, you have to finish the holding and then join the racetrack if applicable. Ask ATC if in doubt.

4.19.5 Your outbound leg will be limited by either a timing or a fix – make sure you know exactly what you are waiting for to happen! Always during the approach, ask yourself : "What's next?" – "What then?" On outbound leg also remember to set the DG.

4.19.6 If ATC is interrupting at a crucial time (e.g. during a part of ABC, the 4 x T or during simulated failure/fire), ask them to stand-by, i.e. say: "Standby, O-BG". When time allows, contact them again.

4.19.7 At the latest during this stage, state to ATC what your intentions are after this approach (full stop, missed approach for new approach, full procedure or radar vectored, circling to land etc.). If you do not complete this task on the outbound leg, you will most likely be asked when you are busy on the final approach.

4.20 FINAL APPROACH SEGMENT

4.20.1 When turning inbound, remember to roll out on a 60° or 30° intercept heading to get you established on the final approach course. Intercept angle and lead can be adjusted for wind direction and force, distance from FAP / FAF and other factors, but always use standard 60° and / or 30° intercepts.

4.20.2 When getting established on a LLZ or VOR radial, remember to call out : "Localizer alive" or "Needle alive" when you observe this. Then roll off to a lesser intercept, and shortly before you have the needle centered, roll out to your reference heading, i.e. your final approach course + calculated or "guesstimated" WCA. If a heading bug is available, it is set to final approach course – this will allow you to constantly monitor your actual WCA on the DG. Do not set the bug to reference heading, as this heading will change continuously during the approach.

Note: Regarding HDG-bug. The above described procedure is the more correct one. However it has proven again and again that the HDG-bug has "magnetic characteristics" and as such, will draw you to it in stressed situations (simulated failure/fire, go-around etc.) As a consequence it WILL be accepted if you choose to set the HDG-bug to your calculated reference heading instead of the more correct inbound track.

4.20.3 Make small adjustments to the reference heading. If e.g. the LLZ opens to the right when you are on reference heading 120° (115° + 5° WCA), turn right to heading 130° to re-center the needle. When the needle is centered, roll back to heading 125° - this will be your new reference heading, as 120° made the needle open to the right. The idea is to start off with 5° corrections to the reference heading (as in this example - 120° to 125°), then gradually decrease the oscillations around the correct heading. You might find that heading 125° makes the needle open slightly to the left. Then roll to 120° to re-center the needle, when it is in center, roll back to heading 123°. In this way, you will soon establish yourself on the correct heading.

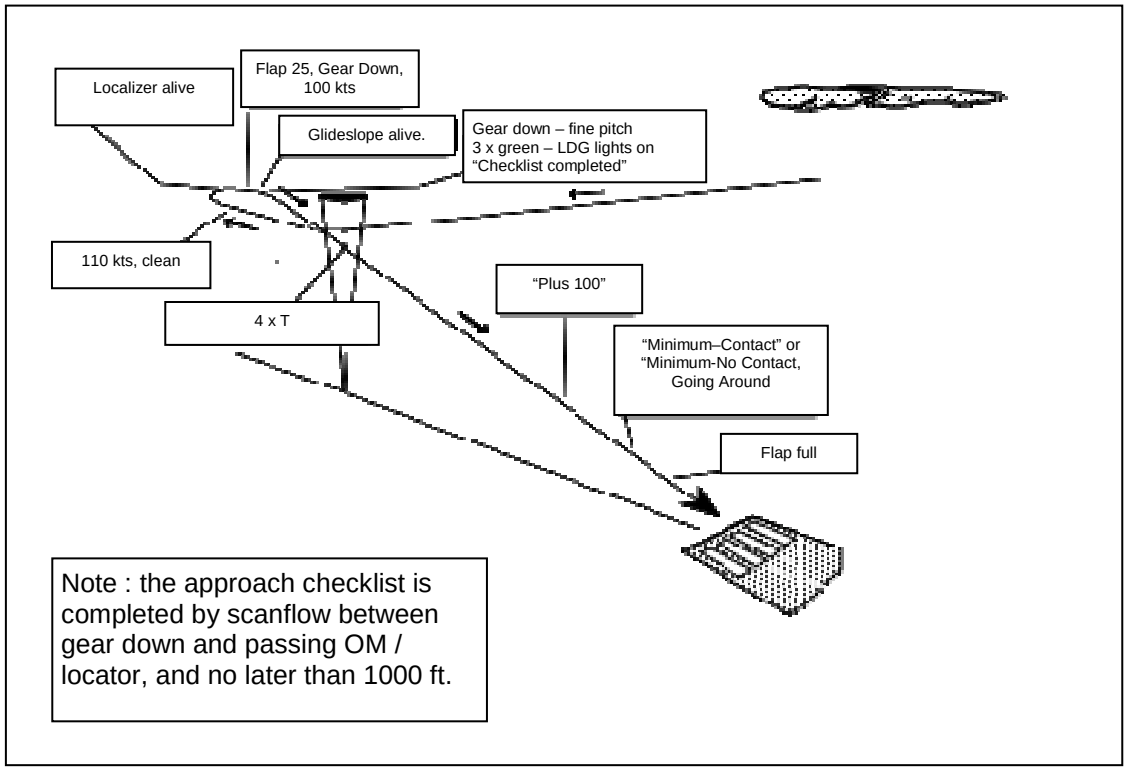
4.20.4 All turns are made on the AI. When the wings are level, cross-check the DG to verify that you have rolled out on the correct heading. Do not look at the DG while making small "correction turns". When getting established on a glide slope, remember to call out "GLIDE SLOPE ALIVE".

4.20.5 When passing FAP / FAF or initiating first descent on profile, you must both re-configure the aircraft for final approach and start your descent on the profile. It is imperative here to roughly know the power settings you need to use for both descend and level flight during the approach. The procedure is :

- Throttle 14-15" MP in zero wind conditions to establish a target ROD. On a precision approach, this will be ½ your ground speed times 10 (take the GS from the GPS or DME – divide it by 2 – add a zero at the end, then you have your target ROD on a 3° ILS GP). On a non-precision approach, add at least 200 FPM ROD in order to reach MDA before DP.

- Speed check – gear down selected without delay start lowering the nose and select flaps
- Fl.25° must be set
- Pitch for 100 KIAS will be approximately -3° AND
- Trim for 100 KIAS will be ½ trim forward
- You should be in this configuration at glideslope intercept or DME distance for descend. Start configuring approx. 0,2 NM before on a non precision approach and when half dot high on an ILS. Considerations of wind must be made.
- When aircraft under control complete the approach checklist by heart (call-out & do : "Props fine – 3 x green – Landing lights on – Checklist completed") and remove it with your right hand from under the thigh and stow it properly. Use scan-flow method without reading the checklist. This must be completed before passing 1000 AAL and preferable ASAP when you have established ROD on the approach.

Note: When starting descent on any approach always call out the next "important" altitude and/or distance.



4.20.6 When flying the approach single-engine the target power-setting is 18" MP for decent. Configuration- and speed-vise, you fly the single-engine approach exactly as a two-engine approach, except that all level flight is with gear up and 22-24" MP. Remember to retract the gear no later than +100 ft. above the level segment and add the power smoothly. Note that we do not retract the gear on a straight-in ILS, as this does not involve level flight. Always check/call out speed before selecting gear up (max 108 KIAS). Call out: "+100, Speed checked xxx KIAS, Gear up, Add power"

4.20.7 When passing OM, locator or equivalent position, it is once again time for the 4 x T :

- Turn to reference heading (back to wind corrected heading if intercepting) – this is a reminder to find the ref. heading and keep it
- Time – start the timing, weather it is a timed approach or not. It is better to time once too often than to miss a timing.
- Throttle – verify correct configuration, target ROD and 100 KIAS. Again, make sure that you control the aircraft positively at this point and is stabilized in pitch, heading, speed and ROD.
- Talk – first talk inside the cockpit and call out: "Glideslope checked XXXX ft. – timing is started" The altitude passing will be different depending on temperature.
- Talk – next outside the cockpit and advise TWR, e.g. : "O-BG, beacon inbound"

4.20.8 When 100 ft. above minima, call out : "+100". This callout is only used as a warning to alert the pilot of next step which is to determine weather to land or go around. Remember it is important that you don't look away from your instruments at this point and only sporadically scan outside the cockpit for the approach lights.

4.20.9 On a precision approach, when reaching decision altitude, call out either : "Minima – contact – landing" or "Minima – no contact – going around".

4.20.10 On a non-precision approach, level off at minimum descent altitude (MDA). You must plan your descent so as to reach MDA some time before calculated DP. This will allow you to make occasional scans outside the cockpit in order to spot the runway or the approach lights while flying level towards the DP. At the DP, call out either: "CONTACT" –and continue for landing , or :"NO CONTACT – GOING AROUND" –and initiate climb towards missed approach point (MAP). From MAP follow missed approach procedure as published or as given to you by ATC. DP must of course be situated before or at the MAP.

4.20.11 The DP is found like this :

- On a timed approach: MDH divided by 10 equals the number of seconds that you must subtract from the time to MAP. E.g MAP = 2:55 , MDH = 500 ft. This gives you 50 seconds, equalling a DP at time 2:05 (2:55 - 50 = 2:05)
- On a DME approach: MDH divided by 400 ft gives the distance from the TDZ where you would leave MDH for a 4 degrees approach.

4.20.12 In either case, the DP gives the pilot an indication that beyond this point, a landing is not possible and a go around must be initiated without hesitation.If the PIC finds it safe to try again. If the PIC finds it safe to try again he/she may situate the DP closer to the threshold, but must consider that the approachangel will be steeper than a normal 3° approach. This will typically involve a high sinkrate on the final to get the aircraft on the ground, reducing your safety margins substantially in a low-visibility environment. As soon as the runway or approach lights are spotted, call out : "Contact – landing".

4.20.13 The DP must of course be situated before or at the MAPt.

4.20.14 No later than when the MAPt is reached, call out either : "Minima – contact – landing" or "Minima – no contact – going around".

4.20.15 Remember that a missed approach may be executed after having obtained contact and having passed the MAPt. Windshear, runway incursions in front of you or an unstabilized final may require a missed approach to be initiated even when you thought that landing was assured. Be prepared for the possibility – and do not fall victim to target fascination, making it almost impossible to comprehend that a go-around may be initiated after having called: "Landing".

4.20.16 If offered a visual approach, remember that you may only conduct visual approaches to instrument runways that have a missed approach procedure. Visual approach to RWY 03 at Roskilde is thus not possible, no matter how good the weather is, unless a radar vectored missed approach procedure is obtained from ATC. If not possible to obtain such a clearance and you want to land RWY 03 in VFR conditions, IFR must be cancelled.

4.21 CIRCLING

4.21.1 When wind or other conditions (like runway contamination or a wrecked aircraft on the runway) prevent landing on the runway you have flown the approach to, you have the option of circling to land on another runway. The circling can follow any type of approach and is classified as a non-precision approach. It involves leveling of at circling MDA and flying up to the missed approach point at this altitude. As you do not have to land at the runway you are approaching, there is no DP to a circling approach.

4.21.2 Max speed for circling Cat. A aircraft is 100 KIAS, powersetting is MP 20" and RPM 2500 with gear down and Flaps 25°. Single-engine circling is flown with gear up, Fl 25°, powersetting 22-24" MP and 100 KIAS.

4.21.3 Be aware that the circling approach – unlike other approaches – require a visibility (not an RVR) for operational minima. Other approaches may be commenced if only the RVR are above specified values. The reason why RVR may not be used is that RVR is the distance you may se the runway lights on the centerline. As these lights are unidirectional, you will not be able to see the same amount of light when you break away from the centerline.

Note: EKRK local regulations regarding avoidance of overflying "RED cities" does not apply during circling. Normally you should try to avoid these cities, BUT do not let it compromise your circling/final approach.

4.21.4 No later than when the MAPt is reached, call out either : "Minima – contact – breaking R / L" or "Minima – no contact – going around".

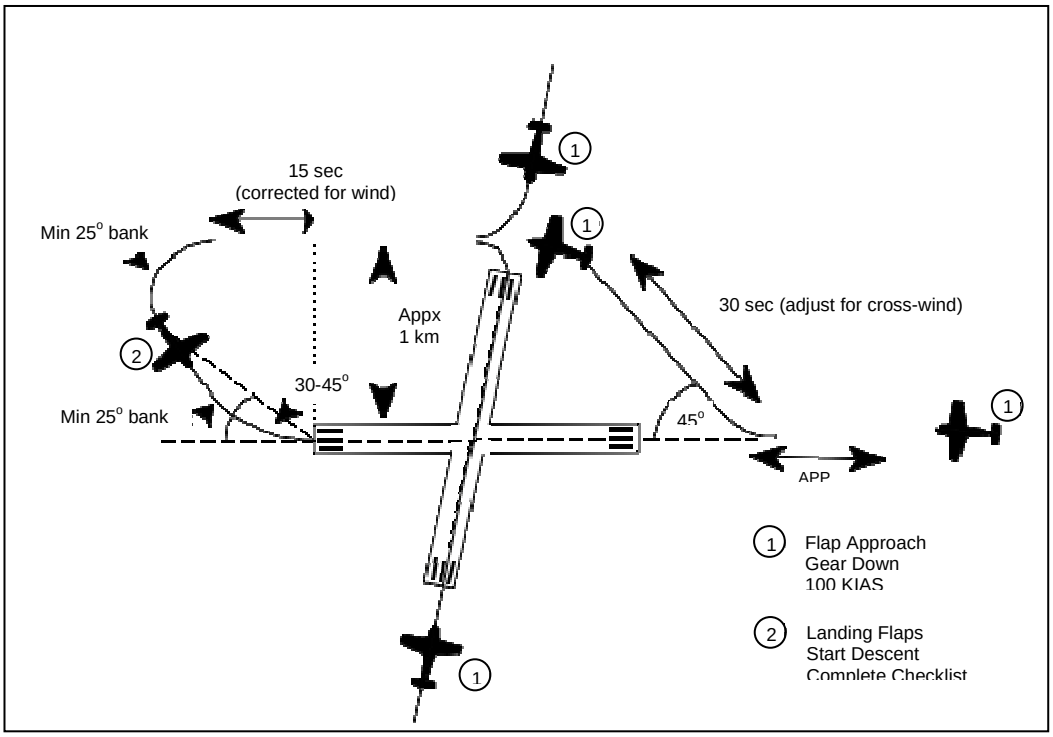
- If you circle for the runway opposite to the runway approached, you break off 45 degrees from the runway track. Remember to have pre-calculated the required heading corrected for wind. When you break, beware not to climb – check your VSI and divide the time between scanning outside and cross-checking your flight instruments like ALT, ASI and VSI. You will often be asked to report when breaking – so make this report during the turn.
- You maintain the 45 degree break for 30 seconds corrected for wind – 1 sec. per knot (per. minute.) headwind component or tailwind component. The timing has of course been pre-calculated.
- When time is up, turn to a heading that will make you parallel the runway (downwind).

4.21.5 If you circle to another runway than the opposite of the approached, omit timing when breaking and turn to a heading that will make you parallel the runway (downwind).

4.21.6 When you pass the threshold of the runway on which you are going to land, commence a new timing. This time, you time 15 seconds corrected for wind – 1 sec. per knot (per. minute) headwind component or tailwind component. When time is up, turn base. Remember to maintain circling MDA during the turn and when you roll out. Do not leave MDA before within 45° of landing runway.

4.21.7 Single eng circling: Gear should not be selected down until leaving MDA on base. Final checks is done when 3 x greens visible.

4.21.8 When you intercept a normal 3° visual approach slope, you set MP 15" and maintain speed 100 KIAS or less. If single-engine operation 18" MP. In both cases, verify gear down (3 x green) and select flaps 40° when landing is assured. Speed is then reduced to 90 KIAS.



4.22 LANDING

4.22.1.1 NORMAL LANDING

4.22.1.2 Beware not to "tuck under" the glideslope or level off after contact has been established. Immediately after calling: "Contact – landing", return to your instruments and verify that no parameters have changed during your outside scan.

4.22.1.3 When visual contact has been obtained and landing is assured, extend the flaps to 40°, trim ½ forward and maintain speed 90 KIAS. Maintain a normal 3° approach slope by using power. Slowly reduce speed to cross the threshold at 80 KIAS.

4.22.1.4 Good scan flow every time at contact is: Throttle reduce, Gear down (single engine), Flaps as required and neutralize rudder trim (single engine). After this is completed do 2nd time final checks (red, blue, green). Never plan/perform tailwind landings during school flights.

4.22.1.5 When passing the threshold, start reducing power to idle and proceed to a normal landing. Do not prolong the flare, as most landings following instrument approaches are made on wet and / or contaminated runways. Make a firm touch-down to avoid aqua-planning.

4.22.1.6 Remember to take braking action into account when determining the maximum cross-wind component you can accept for a given landing, taking both depth and extent of contamination, runway length and slope etc. into consideration.

4.22.1.7 Grass landings prohibited according to school philosophy.

4.22.1.8 If the wind is gusty, add ½ of gust to final and threshold speed. Maximum addition: 10 kt.

Note: Consider to land with flaps 25° to avoid flap overspeed. If landing with flap 25° remember to call out: Non-standard, Landing flap 25° due to gusting condition.

4.22.1.9 Traffic pattern is flown as follows:

- Set 16-18" during downwind (22-24" SE) and Flaps 10, speed 100 KIAS.
- Reduce power to 14-16" (18" SE) abeam threshold, select gear down and maintain 100 KIAS while descending.
- Perform landing checks, once gear is down (3 x greens)
- Set Flaps 25 on base, with 100 KIAS.
- Set flaps full on final and landing assured, reduce speed to 90 KIAS.
- Do 2nd time final checks (red, blue, green)
- Slowly reduce speed to cross the threshold at 80 KIAS.

4.22.2 POWER OFF LANDING

- There is no specific glide speed published on this aircraft, but maintain blue line (92 KIAS) for glide.
- Climb to a higher than normal traffic pattern altitude (ie. 1500 MSL at EKRK), and fly towards the landing threshold.
- Retard both throttles to idle and maintain altitude until reaching blue line, then trim to maintain blue line all the way down to the flare.
- Set flaps in order to make the landing and set gear down no later than base (for safety).
- Propellers should be set in fine pitch during the exercise, even though a feather position would give a better glide.
- Perform your landing checks, once gear is down.
- It is always better to come in a little high and then use gear and flaps to land correct than being low since you will not be able to gain already lost altitude.

4.22.3 SHORTFIELD LANDING

- Fly the pattern as a normal pattern, but pass threshold slightly lower than normal.
- Close throttles to pass threshold with 80 KIAS and idle power.
- Make a firm touchdown and use max braking when nosewheel is on the ground.
- Consider to retract flaps during landing run to improve wheel braking.

4.22.4 OPEN

4.23 OPEN

4.24 MISSED APPROACH FLYING

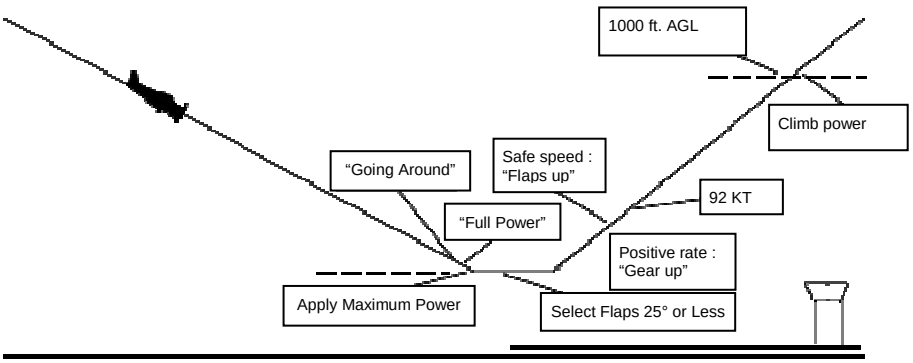
4.24.1 If no contact is made at DA or when time is up in MDH (or – if for any reason – the landing must be abandoned after these points have been passed), the missed approach procedure must be initiated without hesitation.

4.24.2 The missed approach may be initiated earlier, e.g. if all hopes of completing the approach to landing are lost or if you become unstabilized during the approach (+/- ½ scale deflection or +/- 5° on locator approaches). However, do not initiate any scheduled turns during the missed approach before passing overhead the missed approach point, unless receiving vectors or you manage to climb above the MSA before passing the missed approach point. Then, of course, turn as you (or ATC) please(s).

CAUTION: Not complying with the 4T's procedure, thus forgetting timing, might put you in a very delicate spot if a timing was required to establish the MAPt. Especially if the missed approach procedure requires you to make a turn. E.g. you are performing a LLZ approach to runway 21 at EKRK and forgets to start timing. Of course you will have to abandon the approach since you are no longer able to pinpoint the MAPt. So you perform the G/A procedure but unfortunately this doesn't solve your problem since the missed approach procedure call's for a right hand turn to RK locator when passing MAPt. Now some quick thinking is required and one solution could be to ask ATC for a straight ahead vectored missed approach. But nothing general can be stated regarding this type of situation, since procedures varies from one runway to the other. As you see it makes everything a lot easier if you remember to start timing when required.

4.24.3 The missed approach consist of the following steps on two engines :

- Apply full power
- Verify flaps 25° or less
- Set G/A attitude = 5° ANU
- At positive ROC, retract the gear
- At safe speed (above V_X 78 KIAS) retract all the flaps
- Maintain 5° ANU – don't let the nose drop! Trim 2 back!
- At V_Y 92 KIAS, set 10° ANU and trim for 92 KIAS
- The call-outs are : "Going around – Full power – Fl. 25 – G/A attitude – Positive ROC – Gear up – Safe speed – Flaps up"
- Fly missed approach profile. When commencing any turn (or when time otherwise allows), contact ATC and advise that you are going missed approach.
- When passing 1000 ft. AGL, set climb power and perform the G/A checklist (scanflow) when suitable.
- Read the G/A checklist.
- Or if diverting to alternate, passing TA or MSA if cruise below TA, complete the climb checklist.



Go-around profile

4.24.4 The missed approach procedure single-engine is :

- Apply full power – anticipate required rudder input to maintain heading
- Verify flaps 25° or less
- Set G/A attitude = 1-2° ANU, be carefull to avoid low speed.
- When descent is broken (VSI tendency is up-going), retract the gear and the flaps without hesitation
- Set 5° ANU and trim 1 back to climb at V_{YSE} 92 KIAS – don't let the nose drop!
- The call-outs are : "Going around – Full power – Fl. 25 – G/A attitude – Descent broken – Gear up – Flaps up"
- Maintain 92 KIAS through-out the climb.
- If choosing to disregard the emergency checklist due to approach, complete the Go around/Climb checklist first, then the applicable emergency checklist.

4.24.5 If commencing a missed approach from circling, the following rules apply :

- Initiate normal go-around and climb straight ahead to circling MDA if you have already descended below this altitude (base or final).
- Next, initiate a climbing turn towards the landing runway – or, if already on base or final, toward the circling side.
- Continue the turn and intercept the missed approach track (QDM/QDR) of the runway you approached or follow turn direction, i.e. if a right turn is specified, you must end your manoeuvre with a right turn
- Follow the normal missed approach procedure.

4.25 RUNWAY VACATED

4.25.1 When clear of active runway, contact appropriate GND or APRON frequency for taxi and parking instructions. Then retract the wing flaps, and complete the after landing checklist by heart (scanflow principle) Flaps up – Cowl flaps open – Transponder SBY– fuelpumps OFF – pitotheat OFF – strobe-light OFF – one taxi light ON. Look at airport map, and remember to verify your taxi clearance before crossing stoplines or active runways.

4.26 PARKING AND SHUT-DOWN

4.26.1 Before shutting the aircraft down set up the NAVAIDs for the next flight – so that cockpit preparation is already completed for the next flight, then read the after landing and parking checklist.

4.27 AIRWORK

4.27.1.1 Airwork configuration two engines is clean, 110 KIAS and 2500 RPM. Setup for airwork is: select cowl flaps open – mixture rich – RPM 2500 – MP 16-18" – fuel pumps on - speed 110 KIAS.

4.27.1.2 Single-engine airwork is flown clean, 100 KIAS, fine pitch and MP 22-24". Setup for SE airwork is: mixture rich – fine pitch – MP 22-24" – fuel pump on – speed 100 KIAS.

4.27.1.3 Verify that you have clearance for airwork. ATC will in this way plan for your speed and heading changes. If you need altitude variations (like for stalls), remember to get clearance for airwork between two altitudes.

4.27.1.4 Remember to find and set target power and pitch for all exercises. All trimming must be in doses of ¼, ½ and 1/1.

4.27.2 Open

4.27.3 When doing slow flight two engines, you are to fly in landing configuration gear down and flaps full speed 90 KIAS. Set up for airwork, maintain heading and altitude (be focused on your instrument X-check) Set power to 15" MP, select flaps 10^0, gear down, flaps 25^0 and then flaps full. 5 kts. prior to target speed, the power is adjusted for the new required setting. Small changes require small power adjustments to gradually settle on desired speed. Remember to anticipate pitch and trim changes when reducing or adding power. Make pitch changes in doses of 1° and trim changes in doses of ¼, ½ and 1/1.

Recovery from slow flight: Perform a Go around but maintain altitude. Omit call outs: "Go around attitude & Positive rate of climb". Instead use call out "Safe speed" twice.

4.27.3.1 Single-engine slow flight is with flaps 10°, speed 90 KIAS. Recovery is the same as for single-engine go-around but again remember to maintain altitude.

4.27.3.2 Open

4.27.4 Initiate every stall by the following Set up for airwork, and perform ACSEL check:

- A – Altitude, any fully developed stall exercise must be completed at 5000 ft. AGL.
- C – Configuration, brief intended configuration.
- S – Safety – check for loose objects within the aircraft and stow any found.
- E – Check engine instruments and verify set-up for airwork completed
- L – Location – verify cleared for airwork and an altitude band available

4.27.4.1 Standard call-outs during stall exercises (fully developed) are: “Expect stall warning – Stall” - thereafter as for go-around (“Going around – Full power – Fl. 25 or less – G/A attitude – Positive ROC – Gear up – Safe speed – Flaps up”). These call-oust must be performed irrespective of type of stall as configuration and speed schedule must be verified! Remember the differences in single-engine stalls (…half power… V_{MC}… full power…). If recovery is made from first indication do NOT call “expect stall warning”.

4.27.5 Clean stall two engines is: Reduce the power to idle, maintain heading and maintain altitude by raising the nose. Remember to call: “expect gear warning” before reducing the MP below the setting for audio gearwarning. The airspeed will drop, and eventually the aircraft will stall at max. angle of attack. You identify the stall by first indication – unless otherwise agreed with FI. To recover:

- Lower the nose to 0^0 ANU.
- Apply full power from right to left.
- Raise the nose to 5^0 ANU .
- When pos ROC set climbpower.

4.27.5.1 Clean stall single-engine is : Reduce the power to idle, remember to anticipate shift in required rudder input. Remember to call: “expect gear warning” before reducing the MP below the setting for audio gear warning. The airspeed will drop, and eventually – at first indication, we recover :

- Lower the nose to 3-5° AND
- Set half power – anticipate yaw – passing V_{MC} – full power
- Raise the nose to approximately 1-2° ANU, maintain level flight while accelerating for 92 KIAS
- Approaching 92 KIAS, raise the nose to 5° ANU and climb back to initial altitude at this speed

4.27.6 Open

4.27.7 Stall in landing configuration two engines is: Set power MP 15”. Select flaps 10^0 – gear down – select flaps 25° and flaps full, then reduce power to idle, set fine pitch. Maintain heading and level. To recover:

- Lower the nose to 0 ANU
- Apply full power from right to left
- Select flaps 25^0
- Set attitude to 5^0 ANU immediately
- Positive ROC - gear up
- At safe speed select flaps up and climb with V_Y
- Set climbpower 25” MP and 2500 RPM.
- Climb back to the assigned altitude.
- Set airwork or cruise power as required.

4.27.7.1 Single-engine stall in landing configuration is: Set power MP 20". Select flaps 10^0 – gear down – select flaps 25° and flaps full, then reduce power to idle – remember to anticipate shift in required rudder input, set fine pitch. Maintain heading and level. To recover:

- Lower the nose to -5^0 AND
- Set half power – anticipate yaw – passing V_{MC} – full power
- Select flaps 25^0
- Set attitude to $1\text{-}2^0$ ANU immediately
- Descent broken - gear up and flaps up without hesitation
- Approaching 92 KIAS, set 5° ANU and climb with V_{YSE}
- Climb back to the assigned altitude.
- Set airwork or cruise power as required.

4.27.8 Open

4.27.9 Stalls during turns are flown the same way, but remember to level the wings using rudder only, not ailerons.

Note: It is good practice to set propellers in fine pitch after throttle is set to idle during stall setup to avoid adding full power without first setting propellers in fine pitch. During the stall recovery, full power MUST still be given from the right.

4.27.10 Open

4.27.11 Open

4.27.12 Open

4.27.13 Two-engine steep turns are flown at 45° bank and 110 KIAS. Remember to increase backpressure and add power to 20-22" MP when passing 30° bank in the roll-in and vice versa in the roll-out. Cross-check VSI in roll-in and –out! Single-engine steep turns are flown with 45° bank and 100 KIAS, power 24" -full throttle MP during the turn.

4.27.14 Rated climbs and descents are rehearsed at 100 KIAS and 500 FPM ROC / ROD. Change power approximately 2-3", + / - 2° ANU and ½ trim.

4.27.15 Open

4.28 VOR INTERCEPTS AND TRACKING

4.28.1 When intercepting VOR radials, use standard 60° and 30° intercepts. If far away from the station or you fly into a strong headwind, 90° intercepts may be used.

4.28.2 For VOR intercepts, tune proper VOR, select track to follow along given radial in the top of the VOR instrument, then ident the station. If needle deflects to the right, roll out on a heading e.g. 60° to the right of (i.e. larger than) the OBS setting. Do not correct this heading for wind. If wind is a problem, select a larger (90°) or lesser (30°) intercept.

4.28.3 When the needle starts to move away from full scale deflection, call out : “Needle alive” and roll off to a 30° intercept. Remember that full scale deflection on instrument when tuned to a VOR is 10°. This means : when you have 10° to go on a 60° intercept, you roll off to a 30° intercept. This is called “Turning with 10° lead” If you had continued on a 60° intercept until the needle was centered, you would have flown straight through the radial.

4.28.4 The lead for the various intercepts in zero wind is :

- 90° intercept = 20° lead
- 60° intercept = 10° lead
- 30° intercept = 5° lead

4.28.5 If intercepting in head- or tailwind, decrease respectively increase your lead. There is no idea in turning to a 30° intercept heading if you estimate that your WCA along the radial will be 25° - in this case, you would only attack the radial with 5°.

4.28.6 When established on the proper radial, turn to reference heading and track the radial.

4.28.7 Use heading-bug on wind corrected heading.

4.29 QDM / QDR INTERCEPTS AND TRACKING

4.29.1 When intercepting a QDM or QDR, first establish your present QDM / QDR. Make sure the ADF instrument scale is indicating north up – in this case, the instrument will give you the relative bearing to the beacon. Also make use of the 45° increment markings found both on the DG and the ADF instrument. If a heading bug is available, it is set to desired QDM / QDR.

4.29.2 When you have found your present QDM, determine weather the actual QDM is to the left or right of your target QDM. If QDM is to the right of target QDM, make a 60° intercept to the right of target QDM and vice versa. I.e., the rule is :

4.29.3 If QDM is right of target – turn right. If QDM is left of target – turn left

4.29.4 When you have found your present QDR, determine weather the actual QDR is to the left or right of your target QDR. If QDR is to the left of target, pull the end of the needle to the right (i.e. onto the target) by turning right. So, the rule is :

- If QDR is right of target – pull the end of the needle to the left onto target
- If QDR is left of target – pull the end of the needle to the right onto target

4.29.5 Use standard 90°, 60° and 30° intercepts with standard leads and same wind considerations as for VOR intercepts

4.29.6 Remember : when flying QDM, the needle will always open more and more during the intercept. When flying QDR, the needle will always close more and more during the intercept.

4.29.7 When established on proper QDM /QDR, turn to reference heading and track. Be scrupulous to monitor and track the pre-selected QDM / QDR. Be aggressive in your corrections when you discover that you have drifted off track : Drifting off an ADF bearing is less noticeable than drifting off a VOR radial. Therefore, you will most likely have drifted further off your QDM / QDR before it is discovered and corrective action taken. Remember that you can always see actual WCA on the ADF needle, so make sure that the nose is on the correct side of the needle for correction. If you turn right by 10° and the needle still opens 20° to the right, you have not accomplished much if your intention was to correct to the right – the needle will continue opening if your WCA is less than 20° to the left!

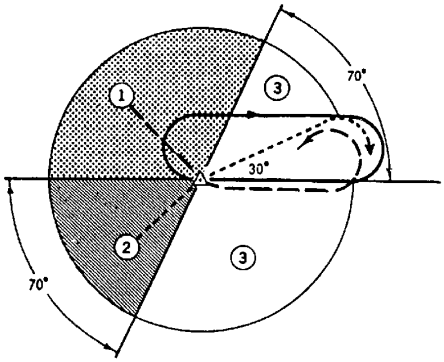
4.29.8 Be especially keen on not drifting downwind. A 3° error into the wind can be solved by a 5°-10° heading change. The same 3° error downwind will require a heading change of maybe 20° to be resolved in the same amount of time. Be very aggressive in your corrections if you have drifted downwind - 5° corrections will not do much good – remember to verify actual vs. estimated WCA by looking at the ADF needle!

4.30 GPS

4.30.1 Do not use GPS as primary source of navigation

4.31 HOLDING

4.31.1 Holdings shall be flown clean at 110 IAS and 16-18 mp and Rpm set according to flight progress. Entry in the holding will be according to your heading when passing over the fix. The entry sectors are listed below :



1) Parallel entry
2) Offset entry
3) Direct entry

4.31.2 When flying inbound the fix, you must figure out 3 things :

- What entry shall I use?
- What will be my outbound heading?
- What will be my outbound timing?

Example of call out: “Parallel entry, Hdg 125 to track 119, Timing 50 seconds”. Be sure to reduce speed prior to arriving at the fix and have the inbound radial set, preferable on nav 1. (VOR-holding)

4.31.3 The entry is most easily determined by looking at the holding plate, looking at the heading you have inbound the holding fix and determining what entry would be the most convenient. In 80% of the cases, the entry found in this way will be the correct.

4.31.4 For offset entry track radial/QDR outbound.

4.31.5 Doubt as to the entry will most often arise when approaching from the holding side – the choice will be between a direct and a parallel entry. In these cases, you can calculate the exact heading required for either direct or parallel entry and see which one matches your heading best.

4.31.6 The inbound heading is the inbound track + WCA. The WCA is calculated by finding the crosswind component and dividing it by your speedfactor (90 KTAS = SF 1,5). Or you can make an educated guess, called “guesstimating”. Use WCA in 5° increments – this will make reading off the ADF scale easier.

4.31.7 Outbound WCA (for 1 min legs) is 2 times inbound WCA with wind from non-holding side and 3 times inbound WCA with wind from holding side – up to a maximum WCA outbound of 30°. In this way, you make sure never to end up on the non-holding side, where the primary area is smallest.

4.31.8 If outbound time is more than 1 min standard, consider less WCA.

4.31.9 Outbound timing commences when you pass abeam the fix (TO indication if inbound radial set correct) or when the wings are level, whichever occurs later. The standard timing is 1 min. below FL140 in zero wind, but other values may be stated. Outbound timing is corrected by +/- 1 second per kt. head- or tailwind component per minute. If you in a 2 minute holding have a 10 kt. headwind, your outbound timing will be 2 min + 10 seconds for each of the 2 minutes = 2:20.

4.31.10 Outbound timing for parallel and offset entry commences when wings level on outbound leg.

4.31.11 Remember to correct for wind influence when turning in the holding. Turns in headwind may be completed at rate ½ to make better headway into the wind. Turns in tailwind may be completed at up to 25° bank (school procedure) to lesson your turn radius.

4.31.12 When turning to the inbound track, remember to roll out on an intercept heading – never turn directly to your reference heading.

4.31.13 Remember in each beacon passage to use the 4 x T : Turn – Time – Throttle – Talk

4.32 OPEN

4.33 HANDLING EMERGENCIES

4.33.1 As you will discover, most conceivable emergencies can be described and remedial actions suggested, but an SOP cannot cover every possible situation that can arise during flight. Therefore: Nothing in the below or above procedures can substitute good airmanship and decision-making by the commander, with whom the full and final responsibility for the flight, the passengers, cargo and aircraft rests!

4.33.2 The most common IFR emergency is the loss of vacuum pump suction, rendering the AI and DG unserviceable. Fly T&B instrument with ball centered and wings level – this will assure that the wings are level. Altitude is maintained using VSI and altimeter. 90% of the scan time is used on maintaining the T&B exactly level.

4.33.2.1 Turns on partial panel are timed turns. Turn at rate 1 equals a turn rate of 3° / sec.. Turns up to 30° = 10 sec. may be counted – larger turns must be timed. Make sure to roll into and out of turns using precise coordination. The faster you roll into and out of the turns, the more precisely you can control your turns.

4.33.2.2 Climbs and descents are executed using small doses of power and pitch. Make sure to shift attention between ASI and VSI. Remember that pitch will control VSI / ASI tendency – not the actual needle position. The aim is then to have zero tendency when the appropriate needle points to the desired value.

4.33.3 Engine fire during taxi: Turn the aircraft to a tailwind position, preferably a quartering tailwind from the "good engine" while shutting off the fuel of the burning engine. Remember to set the parking brake before applying full throttle on burning engine and continuing with the engine fire on ground procedure : Advise ATC, when the burning engine stops : Both mixtures to idle-cut-off, master OFF, magnetos OFF, checklist at captains discretion. Then evacuate L/H or R/H side, always opposite to the burning engine. Remember to bring the fire extinguisher if time permits.

4.33.4 Engine failure or fire during take-off below 92 KIAS: Throttles back, check/verify gear down, flaps as required and land the aircraft straight ahead or to the sides, turning according to wind and to avoid obstacles. In case of fire : Turn as applicable to avoid fire spreading or to vacate runway if time permits. Then continue with applicable on-ground emergency procedure.

Note: It is imperative that, during any failure/fire in the air, you do not touch any handles/buttons without calling out: "Left or Right" first (scanflow as well as checklist). Forgetting to prelabel with Left or Right as appropriate will be considered as if you had closed/switched off both system in question.

4.33.5 ENGINE FAILURE ABOVE 92 KIAS AND NO AVAILABLE RUNWAY (OR ENGINE FAILURE DURING G/A:

- Maintain heading by using rudder and up to 5 degrees bank into good engine, simultaneously lower the nose to approximately 2° ANU. Call out: "Engine failure"
- Apply full power from right to left, one section (mixture, props and throttles) at a time
- Gear up – flaps up
- Identify dead engine by leg. Call out: "L/R leg dead"
- Verify dead engine by retarding the throttle of the dead engine fully. Call out: "L/R throttle close"
- Feather the propeller of the dead engine by retarding the propeller lever fully. For training purposes, retard the prop lever only 1-2 cm. Call out: "L/R prop feather"
- Establish target pitch 5° ANU, trim for V_{YSE} 92 KIAS by ½ trim up
- Set cowl flaps

- Trim full rudder trim toward good engine – maintain heading!
- When positive control over the aircraft has been established and speed and heading is verified (according to clearance) : contact ATC and state your intentions (contingency procedure).
- Continue according to the clearance obtained, and when passing 1000 ft AAL, select mixture of dead engine to idle-cut-off. For training purposes, retard the mixture lever only 1-2 cm. Call out: "L/R mixture idle cut-off"
- Select fuel valve off for dead engine. For training purposes, touch the fuel valve only. Call out: "L/R fuel selector off"
- Continue with emergency checklist, then normal checklist. If returning for approach, read the G/A checklist instead of the climb, cruise, descend and approach checklists.
- If weather doesn't permit landing back at departure aerodrome and flight is continued to take-off alternate, consider a restart once at cruise and appropriate checklists have been performed.

4.33.6 ENGINE FIRE ABOVE 92 KIAS AND NO AVAILABLE RUNWAY (OR ENGINE FIRE DURING G/A):

- Apply full power from right to left, one section (mixtures, propellers and throttles) at a time
- Gear up – flaps up
- Identify burning engine by visual means. Call out: "L/R engine burning". Climb to at least 400 ft. AAL at full power / V_Y 10° ANU
- Lower the nose to appx 2° ANU and retard the throttle of the burning engine fully – anticipate yaw and maintain heading. Call out: "L/R throttle closed".
- Maintain heading by using rudder and up to 5 degrees bank into good engine.
- Feather the propeller of the burning engine by retarding the propeller lever fully. For training purposes, retard the prop lever only 1-2 cm. Call out: "L/R prop feather".
- Select mixture of burning engine to idle-cut-off. For training purposes, retard the mixture lever only 1-2 cm. Call out: "L/R mixture idle cut-off".
- Select fuel valve off for burning engine. For training purposes, touch the fuel valve only. Call out: "L/R fuel selector off".
- Close cabin heat and defroster. For training purposes, touch the handles only.
- Establish target pitch 5° ANU, trim for V_{YSE} 92 KIAS by ½ trim up
- Set cowl flaps.
- Call out: "Status on fire"
- Trim full rudder trim toward good engine – maintain heading!
- When positive control over the aircraft has been established and speed and heading is verified (according to clearance) : contact ATC and state your intentions (contingency procedure). If fire is ongoing, operational minima must be disregarded ("busting minima"). If fire is out, state to ATC: "Engine fire, fire is out"
- Otherwise, continue according to the clearance obtained. Continue with emergency checklist (Engine fire in flight), then normal checklist. If returning for approach, read the G/A checklist instead of the climb, cruise, descend and

approach checklists.

- Do not attempt restart.

4.33.7 Open

4.33.8 Open

4.33.9 ENGINE FAILURE DURING CRUISE:

- Maintain heading by using rudder and wings level. Call out: “Engine failure”.
- Apply full power from right to left, one section (mixtures, propellers, throttles) at a time.
- Gear up, flaps up.
- Identify dead engine by leg. Call out: “L/R leg dead”.
- Verify dead engine by retarding the throttle of the dead engine fully – then simulate to set half power on the affected engine. Call out: “L/R throttle closed, now set to half power”
- Trim the aircraft ½ up and rudder trim toward good engine – maintain altitude and heading but do NOT let speed drop below V_{YSE}. If altitude cannot be maintained at this speed, get clearance for descent immediately. If this is not possible, feather dead engine without hesitation. Otherwise continue trouble-shooting by heart.
- Check both fuelselectors ON. If already ON, SIMULATE to select the fuelselector for the dead engine to x-feed position (fully aft). Call out: “L/R fuel selector x-feed”.
- Alternate air open on affected engine (if suspecting engine failure due to icing conditions select alternate air open on both engines). Call out: “L/R or BOTH alternate air ON.
- Fuel-pumps ON.
- Check magnetos ON for affected engine, if already ON, simulate to check one magneto at a time (but remember to select ON again before testing the next). Call out: “L/R magnetos checked”.
- If this procedure does not restore power, and IF TIME PERMITS, then read the emergency checklist (Engine failure during cruise to confirm that all by-heart items has been performed. If power is still not restored, feather affected engine by-heart and continue with feathering checklist.
- If unable to maintain altitude on one engine, inform ATC of emergency drift-down.
- Land as soon as possible.
- If experiencing an engine failure during cruise climb (above MSA) set nose down for level flight and continue with engine failure during cruise procedure. Always consider feathering the propeller at any point doing the procedure if safe altitude cannot be maintained.

4.33.10 ENGINE FIRE DURING CRUISE:

- Apply full power from right to left, one section (mixture, props and throttles) at a time
- Gear up – flaps up
- Identify burning engine by visual means. Call out: “L/R engine burning”

- Retard the throttle of the burning engine fully – anticipate yaw and maintain heading. Call out: “L/R throttle close”
- Maintain heading by using rudder and wings level.
- Feather the propeller of the burning engine by retarding the propeller lever fully. For training purposes, retard the prop lever only 1-2 cm. Call out “L/R prop feather”
- Select mixture of burning engine to idle-cut-off. For training purposes, retard the mixture lever only 1-2 cm. Call out: “L/R mixture idle cut-off”
- Select fuel valve off for burning engine. For training purposes, touch the fuel valve only. Call out: “L/R fuel selector off”
- Close cabin heat and defroster. For training purposes, touch the handles only.
- Set cowl flaps.
- Call out: “Status on fire”
- Trim ½ rudder trim toward good engine – maintain heading!
- When positive control over the aircraft has been established and speed and heading is verified (according to clearance): contact ATC and state your intentions (emergency drift-down).
- Continue with emergency checklist (Engine fire in flight).
- If fire is out: land as soon as possible. If fire is ongoing: land immediately!

4.33.11 ENGINE FIRE DURING AIRWORK:

- Apply full power from right to left, one section (mixtures, propellers and throttles) at a time
- Verify flaps 25° or less
- Maintain level flight
- At positive ROC (or zero rate of descent), retract the gear
- At safe speed (above V_X 78 KIAS) retract all the flaps.
- Note that up till now, the procedure sequence is exactly the same as for two-engine G/A!
- Trim 1 forward and accelerate past V_{YSE} 92 KIAS
- Identify burning engine by visual means. Call out: “L/R engine burning”
- Retard the throttle of the burning engine fully – anticipate yaw and maintain heading. Call out: “L/R throttle close”
- Maintain heading by using rudder and wings level.
- Feather the propeller of the burning engine by retarding the propeller lever fully. For training purposes, retard the prop lever only 1-2 cm. Call out: “L/R prop feather”
- Select mixture of burning engine to idle-cut-off. For training purposes, retard the mixture lever only 1-2 cm. Call out: “L/R mixture idle cut-off”
- Select fuel valve off for burning engine. For training purposes, touch the fuel valve only. Call out: “L/R fuel selector off”
- Close cabin heat and defroster. For training purposes, touch the handles only.

- Set cowl flaps.
- Call out: “Status on fire”
- Trim ½ rudder trim toward good engine – maintain heading!
- When positive control over the aircraft has been established and speed and heading is verified (according to clearance): contact ATC and state your intentions (emergency drift-down).
- Continue with emergency checklist (Engine fire in flight).
- If fire is out: land as soon as possible. If fire is ongoing: land immediately!

4.33.12 ENGINE FAILURE DURING APPROACH:

- This procedure is used instead of “Engine failure during cruise” and below MSA when an approach is imminent and the time available before approach is commenced is insufficient.
- Maintain heading by using rudder and wings level.
- Call out: “Engine failure”
- Set sufficient power, i.e. during level flight full power, if descending on the profile approx. 18” MP. Call out: “Mixture rich – Propellers fine – Power set”
- Call out: “Gear stays – flap stays” or “Gear up – flaps up” as appropriate.
- Identify dead engine by leg. Call out: “L/R leg dead”
- Verify dead engine by retarding the throttle of the dead engine fully. Call out: “L/R throttle close”
- Feather the propeller of the dead engine by retarding the propeller lever fully. For training purposes, retard the prop lever only 1-2 cm. Call out: “L/R prop feather”
- Trim ½ up to maintain target ROD on profile
- Trim ½ rudder trim toward good engine – maintain heading!
- If above 1000 ft AAL, select mixture of dead engine to idle-cut-off. For training purposes, retard the mixture lever only 1-2 cm. Call out: “L/R mixture idle cut-off”
- If above 1000 ft AAL, select fuel valve off for dead engine. For training purposes, touch the fuel valve only. Call out: “L/R fuel selector off”
- Call-out: “Disregard emergency checklist due to approach”.
- Verify correct heading, speed & ROD to maintain approach profile. Set target power.
- Contact ATC and advise them of your problem. Request fire brigade for landing.
- If on a non-precision-approach, remember that all level flight is with the gear up. No later than +100 ft., retract the gear and add power to 22-24” MP smoothly. Anticipate yaw and maintain track. Call out: “+100 – Speed checked xxx – Gear up”
- In case of go-around remember to do the engine failure after takeoff emergency checklist when time permits.

4.33.13 ENGINE FIRE DURING APPROACH

- This procedure is used instead of “Engine fire during cruise” when an approach is imminent and the time available before approach is commenced is insufficient.
- Maintain heading by using rudder and wings level.
- Call out: “Engine fire”
- Set sufficient power, i.e. during level flight full power, if descending on the profile approx. 18” MP.
- Call out: “Gear stays – flap stays” or “Gear up – Flaps up” as appropriate.
- Identify burning engine by visual means. Call out: “L/R engine burning”
- Retard the throttle of the burning engine fully – anticipate yaw and maintain heading. Call out: “L/R throttle close”
- Maintain heading by using rudder and wings level.
- Feather the propeller of the burning engine by retarding the propeller lever fully. For training purposes, retard the prop lever only 1-2 cm. Call out: “L/R prop feather”
- Select mixture of burning engine to idle-cut-off. For training purposes, retard the mixture lever only 1-2 cm. Call out: “L/R mixture idle cut-off”
- Select fuel valve off for burning engine. For training purposes, touch the fuel valve only. Call out: “L/R fuel selector off”
- Close cabin heat and defroster. For training purposes, touch the handles only.
- Set cowl flaps.
- Call out: “Status on fire”
- Call-out: “Disregard emergency checklist due to approach”.
- Trim ½ rudder trim toward good engine – maintain heading!
- Verify correct heading, speed & ROD to maintain approach profile. Set target power.
- Contact ATC and advise them of your problem. Request fire brigade for landing.
- If on a non-precision-approach, remember that all level flight is with the gear up. No later than +100 ft., retract the gear and add power to 22-24” MP smoothly. Anticipate yaw and maintain track. Call out: “+100 – Speed checked xxx – Gear up”
- If a go-around is needed remember to do engine fire in flight emergency checklist when the time permits.
- If fire occurs on short final: consider to continue approach without performing fire procedure but remember to declare an emergency.
- Continue with “On ground emergency checklist” after landing.
- If fire is ongoing, operational minima must be disregarded (“busting minima”). This means that vectors for an ILS is to be considered no matter what the RVR is.

4.33.14 ALTERNATOR FAILURE:

4.33.14.1 When the failure is discovered, take the checklist and complete the procedure. If power is not restored, monitor electrical load (max. 50 A). A dual alternator failure must be treated as an emergency. If all electrical power is lost, continue VMC or divert using MDR navigation to reach areas of VMC conditions. If not possible, land as soon as possible. Available power from the battery will last you approximately 25 min. Consider systems affected (gear etc.)

4.33.15 ELECTRICAL FIRE:

4.33.15.1 Turn off the master switch, then proceed with the emergency checklist. Have the fire extinguisher at hand. Most hand-held fire extinguishers contain Halon 1211 (CF_2ClBr), which is not poisonous at low temperatures. At higher temperatures, the substance may decompose, releasing free chloride ions. These can join with atmospheric water vapour to produce HCl — which when inhaled can cause lung oedema. However, fires in small aircraft will seldom reach such high temperatures before being discovered and dealt with.

4.33.16 CABIN FIRE:

4.33.16.1 If discovering a fire in solids, it is best extinguished with water, coffee or other fluids. Fires on persons may be beaten out by hand. If neither of these methods work, the fire extinguisher may be safely used on persons. If a cabin fire prevails, divert, depending on aircraft location relative to aerodromes and intensity of smoke and fire. Evacuating smoke may relieve the problem temporarily, but the inflow of fresh atmospheric air may restart or intensify the fire.

4.33.17 SMOKE AND FIRE OF UNKNOWN SOURCE:

4.33.17.1 Normally, your only option will be to treat the problem as an electrical fire. If this does not solve the problem, a diversion, precautionary or emergency landing is the only option, depending on aircraft location relative to aerodromes and intensity of smoke and fire. Evacuating smoke may relieve the problem temporarily, but the inflow of fresh atmospheric air may restart or intensify the fire.

4.33.18 OPEN

4.33.19 UNEXPECTED ICING ENCOUNTER:

4.33.19.1 Should you – planning and forecasted weather withstanding – encounter in-flight icing, immediately switch on all anti-ice equipment and increase power to maximum to fly level at the highest possible airspeed – this will diminish ice formation and leave you with some margin to the considerably increased stall-speed associated with icing. Ask for descent – if necessary declare an emergency – to get into layers of positive temperature. Descent at the highest possible IAS considering turbulence and at a rate that is consistent with the icing intensity. Use wing de-ice boots only after approx. ½ an inch of ice has accumulated on the wings – otherwise, the ice may just break up and "follow" the boot movement. Remember, that a high ROD may cause you to level-off using pitch instead of increased power – the increased α of this manoeuvre may cause the aircraft to stall with ice accumulating on wings and tailplane. Be very careful if flaps are required : the use of flaps will add the ice accumulation rate considerably, as well as they may cause tailplane stall when extended. Consider a high-speed, flapless approach – of course to a runway of suitable length!

4.33.20 OPEN

4.33.21 FLAP FAILURE:

4.33.21.1 When the flaps fail, you have 2 major concerns:

- Increased V_{TH} – New V_{TH} is based on MLM stall speed clean configuration (65 KIAS) multiplied by 1,3. 65 x 1,3 equals 84,5 rounded to 85 KIAS. The increased V_{TH} will lead to your next problem:
- Increased landing distance. Your landing distance will normally increase with the square root of the increased V_{TH} in percent, but this is only true if the configuration is unchanged, which is not the case here. Since we don't know the exact relationship between the decreased drag and the increased speed, we use a 50% safety factor, which is merely based on experience.
- Example: landing distance from AOM: 410m. 410 x 1,5 = 615m. On top of this we still aim to use maximum 70% of landing distance available on the runway, so still use factor 1,43 as well. Minimum landing distance available should then be: 615 x 1,43 = 880m

4.33.22 STUCK CONTROLS:

4.33.22.1 In case of stuck or unserviceable elevator control, you can control attitude with power, trim and configuration. Remember to anticipate attitude changes when extending or retracting configuration and leading I correcting them with power and trim. Power will work faster than trim! Remember to also anticipate aircraft pitch-down when entering the ground effect for landing. Preferably set up for a long, straight-in approach and allow for much increased landing distance. In case of stuck rudder or aileron, these may to some degree substitute each other or split power may be used. The most critical loss will be the rudder.

4.33.23 RECOVERY FROM UNUSUAL ATTITUDE:

4.33.23.1 Speed low or decreasing add full power, speed high or increasing retard power to idle - wings level - nose to horizon thereafter correct parameters to smooth operation. On partial panel, you centre T&B indicator and ball, then correct VSI deviation from 0 ROC / ROD by smooth pitch inputs.

4.33.24 COMMUNICATION FAILURE: In case of communication failure when flying IFR you should initially use the following:

T - **TROUBLESHOOT**: First check frequency, volume, COM panel set-up, headset jacks etc.

A - **A-MODE**. Squawk 7600 on transponder.

V - **VMC**. If VMC mantain VMC and land as soon as practical. If IMC continue with PACED.

P - **PROCEED**. Proceed according to flightplan filled.

A - **ARRANGE FLIGHT**. Arrange to be overhead IAF at destination after estimated enroute time EET in ATC flightplan.

C - **COMMENCE DESCENT**. Descent to be overhead IAF so you can start the approach after EET has expired.

E - **EXECUTE APPROACH**. Do the approach to expected runway in use according to the standart approach plate.

D - **DIVERT**. If no contact is achieved on the approach then divert to selected alternate aerodrome.

Remember that this procedure is not always the correct way in case of communication failure, because some aedromes might have their own communication failure procedure. Check this on the approach plate or in the emergency chapter in the Jeppesen Airway Manual.

4.33.25 OPEN DOOR

4.33.25.1 If the door should spring open during flight then continue to fly the aircraft. The only problem you are facing is an increased noise level in the cockpit due to the wind flow. The aircraft handles the same as always. Fly the aircraft up to a safe level where you have time to get the door closed again. Consider asking ATC for vectors to solve the problem. Once at level flight the following procedure should be used: Reduce speed to 89 KIAS, close the cabin vents and open the storm window. If the top latch is open then latch it. If the door is open at the side, pull the door to close it. If both are open, close the door first, and then the top latch. If a person is occupying the right front seat instruct that person to do the procedure if possible. If unable to get the door closed in flight, consider to land the aircraft and close the door at the ground before departure again.

4.33.25.2 If the rear door springs open during flight, and unless a qualified person who can close it is already occupying the seat next to that door, then land the aircraft as soon as practical and close the door properly before departure again.

4.33.26 PROPELLER OVERSPEED

4.33.26.1 If the air charge in the propeller governor is lost during flight, then this may cause the propeller to overspeed if the throttles are advanced rapidly or if airspeed is abruptly increased. The propeller will then not feather and the following procedure should be used to gain control of the propeller: Close throttle on the affected engine. Slow the speed to 92 KIAS. Pull propeller control back to low RPM. Then slowly increase the throttle until propeller governor is engaging again. Slowly increase propeller and throttle to desired power setting. Continue flight at reduced speed and land as soon as practical. If unable to gain control of the propeller overspeed then shut down the engine and continue flight on one engine.

4.33.27 VMC RECOVERY

4.33.27.1 Flights at or bellow VMC is an undesired state of the a/c and should only be practiced as two engine slow flight with an instructor onboard. VMC recovery is not normally performed in the a/c but in the simulator only. Should you however find your self in a situation where the speed is below VMC and you are flying single engine or experiencing an engine failure, the following procedure is used to recover from the situation:

- Close throttle on good engine in order to stop a/c yawing.
- Lower the nose to appx 5° below the horizon.
- Slowly set only half power on good engine.
- Let a/c accelerate to a speed above VMC.
- Slowly increase to full power.
- Raise the nose again.
- Continue climb or flight with minimum V_{YSE}.

4.34 SIMULATED VS. ACTUAL ACTIONS DURING SIMULATED EMERGENCIES

4.34.1 All emergencies on the ground may be conducted with actual actions. Exempted from this is the actual use of fire extinguisher.

4.34.2 All switch and fuel selector actions are simulated. Propeller feathering and mixture idle-cut-off are marked by retarding the lever 1-2 cm.

NOTE: Fuel selector, cabin heat and defroster, master switch, alternators, starters, fuel pumps, magnetos and emergency extension are not to be touched during simulated emergencies – Just point at them.

4.34.3 An engine failure will be simulated by the FI retarding one of the throttles. When the student has simulated feather of the applicable propeller, the FI will set zero thrust power (12" MP / 2000 RPM ISA conditions) while the student sets the trims.

4.34.4 Recovery from single-engine flight to normal operation is done by the student. First neutralize rudder trim (coordinate with rudder), then full power from right to left (mixture, propeller, throttle). Anticipate yaw when adding power.

4.34.5 Cowlflaps may be handled at FI discretion.

4.35 HARD WARNINGS

4.35.1 Hard warnings are: Unexpected & non-briefed stall warning, gear warning, GPWS etc.

4.35.2 An unexpected hard warning must be followed immediately by a go-around or appropriate immediate action.

4.35.3 If performing actions that are known to trigger a warning, first call out the action, then the expected warning. E.g. before a stall exercise: "Throttle to idle — expect stall warning". First then perform the action and observe the warning as briefed.

4.36 TEMPERATURE CORRECTIONS

4.36.1 All altitudes at or below MEA, MOCA, MORA and MSA (whichever is applicable) must be corrected for temperature below ISA. Corrections are first applied when the temperature has dropped to ISA -15°C – remember to verify ISA temperature using correct pressure altitude.

4.36.2 The altitudes are corrected by using table from DOC 8168 or by adding 4% of the corresponding height per 10°C below ISA. Make sure that all such corrections are calculated and applied in due time before commencing the approach.

4.36.3 If cleared down to the MSA (e.g. 2100 ft.), remember to request ATC to level-off at e.g. 2300 ft. due to temperature.

4.36.4 All temperature corrected altitudes at or above intermediate approach altitude must be requested due to traffic separation issues. All temperature corrected approach altitudes below intermediate approach altitude can be flown without confirmation from ATC.

4.37 OPEN

APPENDIX

The Appendix section has been added in order to help you out in the planning and preparation of your flight.

The following sections have been added to this SOP:

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APPENDIX A:
NAVIGATION

The following must be ready before you meet with the instructor, regardless of whether the flight is to be performed spic or dual :

- operational flight plan
- ATC-flight plan
- weather information (VMC-forecast, TAF/METAR, low-sig chart)
- NOTAM and list of active shooting areas
- plates for departure AD, destination AD plus relevant alternatives for the route.

1. Planning the flight.

1.1. Planning the route.
OPEN

1.2. Plates for the relevant aerodromes.
An important part of the planning is to study thoroughly the conditions at especially the destination aerodrome. This for example includes opening hours, frequencies (radio, tower, perhaps ATIS), local restrictions on the approach, fuelling possibilities, landing fees and the magnetic direction of the runways.

Often it will be necessary to phone the aerodromes in good time before the flight (for example the day before). This is of course especially valid if the aerodrome has PPR.

1.3. The operational flight plan.
When the route is printed (or while you are printing it), true tracks and distances for each leg are entered in the operational flight plan. Furthermore the magnetic variation for each leg is found, from which the magnetic track is derived.

1.3.1. Minimum altitudes.
Our minimum altitude, for each leg shall be stated in the operational flight plan. This is done by checking the route MEA, MOCA or MORA for the route you are flying. If flying direct between nav aids the highest GRID MORA, or if inside coverage of airport MSA, is stated.

1.3.2. Max. obstacle.
OPEN

1.3.3. Planned altitude.
In this column you enter the altitude at which you plan to fly the leg in question.

1.3.3.1. Gliding altitude and PET.
OPEN

1.3.4. TAS, GS and RPM.
TAS for the given flight altitude is found from the performance curves in the POH. GS is calculated upon the wind at the given altitude and the TAS on your flight computer. From the performance tables in the POH the throttle setting giving the desired engine output, for example 75%, is found.

1.3.5. Wind at altitude.
The wind at the chosen flight altitude given by the flight meteorologist. Please note: all winds given by the meteorologist (including METAR and TAF) are in true degrees. Thus it is actually only the wind from the met-report/ATIS and the wind given by ATC, which are in magnetic degrees.

1.3.6. Remarks column.
OPEN

1.3.6.1. Comm frequencies area.
Here it is a good idea to write down the relevant frequencies for the flight planned in order to help your self to stay ahead of the aircraft during flight.

1.3.6.2. Notam area.
Write down any relevant notams here. Remember also to check notams for the FIR general. There might be information that you need to know before flight.

1.3.6.3. Nav. Aids (range) area.
Write down all relevant Nav. Aids here and also the max range. This is done so you have them ready at hand and don't need to search the plates for them when needed.

1.3.7. Fuel calculation.
Generally on fuel calculation: You must always be conservative when you determine your fuel flow. Different POH's often have different ways of stating fuel flow. If you are in doubt, use the highest!

1.3.7.1. Taxifuel.
Calculate 2 USG for taxi.

1.3.7.2. Climbfuel.
The consumption for climb can be found in the performance curve or -table. If such a curve or table is not given for the aircraft in question, a rule of thumb is used: 27 USG per hour and rate of climb is found in the performance tables. Se also the section below on Top of Climb calculation.

1.3.7.3. Trip fuel.
Trip fuel is found according to the total time airborne (which you know from the front of the operational flight plan, and of course you subtract the time to climb, if you have made TOC-calculation) and the fuel flow for the given percentage of power, for example 65%.

Note: On non-navigational flights climb fuel can be set to 0 and trip fuel be calculated as 22 USG pr block hour. Contingency fuel, alternate fuel and final reserve is calculated as normal.

1.3.7.4. Contingency fuel.
Contingency fuel is a route reserve, which makes up 10% of trip fuel. Contingency fuel is calculated with the same fuel flow as for trip fuel. This reserve is a safety addition meant to cover a possible greater consumption than precalculated. This could be in case of stronger headwind than given by the meteorologist, greater fuel flow than stated in the POH as a result of aircraft age or the like.

1.3.7.5. Final reserve.
Our final reserve (also referred to as holding fuel) makes up for 45 minutes of flight, calculated at minimum powersetting (55%) for all IFR flights.

1.3.7.6. Alternate fuel.
Use the same fuel flow as for Trip fuel.

1.3.7.7. Minimum block.
Is an addition of all of the above times and fuel quantities.

1.3.7.8. Extra fuel.
Extra fuel is made up of the difference between minimum block and the total fuel supply. This fuel quantity is converted into time, again using minimum powersetting (55%) to calculate fuel flow.

1.3.7.9. Endurance.
Is an addition of the number of minutes for minimum block and extra fuel. The amount of fuel stated in this square is the amount that we have in the tanks at departure.

1.3.8. Top of Climb calculation.
Calculation of TOC gives us an extra ”leg” on top of the operational flight plan. By calculating this we get a distance and a time which relates to the phase starting when we are airborne and extending to the point at which we reach our cruise altitude. This is useful, because we can then derive a fuel consumption for climb which is more precise than the rules of thumb that are otherwise used. Nevertheless, TOC is only calculated if the first chosen flight altitude exceeds 2500’.

The actual calculation is made based on the aircraft’s performance curves and the current atmospheric conditions. For climb calculations you must always use the wind and the temperature at the altitude which makes up 2/3 of the cruising altitude.

1.3.9. Mass and balance.
The mass and balance table is filled out. Here, the empty mass is as found in the POH. For persons’ weights, you can use either actual weights or standard weights according to BL 5-5. In the C.G. range envelope is marked both takeoff mass, landing mass and zero fuel mass. Of course you must at this point check that neither C.G. limits nor maximum certified masses are violated!

1.3.10. Takeoff- and landing distances.
The tables concerning takeoff- and landingdistances are filled out according to the current atmospheric conditions, actual TOM/LM, runway conditions and so forth. Remember to correct distances for actual threshold speed. Also remember to observe the rule about 50% - 150% depending on head- or tail-wind.

1.3.11. The performance table.
This table is meant to provide a general view over the prevailing atmospheric conditions on the day of the flight. In the squares concerning wind conditions at departure and destination you fill in the maximum crosswind component (remember: maximum spic crosswind component is 10 KT!), the expected runway in use and the actual crosswind component – which of course may not exceed the maximum allowed.

2. Carrying out the flight.

2.1. Startup, taxi, takeoff and departure.
Before startup: Keep good order in the cockpit and make sure to have plates and maps folded appropriately and within reach. Do your com/nav setup already here; you have a good chance of foreseeing which frequencies to be used. Remember to note the off block time.

In the runup it is important to make a thorough departure briefing, so that your are mentally ahead and know what is to happen and in which order.

When your are lined up, procedures and callouts are as usual. However, it shall be noted, that on a navigational flight it is particularly important to remember to start your timing in order to get a hold of your airborne time. Consequently: You start the stopwatch, perform your takeoff, and when you have reached cruising altitude (or above 1000’ AGL if the initial climb is prolonged) you look at the stopwatch, subtract the number of minutes from what your wrist watch reads, and thus you have the airborne time, which is the basis of your entire time calculation.

During the departure there are thus two things that are most important: To get started on your time calculation and to place the aircraft on the initial track as soon as possible. Check lists have priority below these things – you must delay the check list reading until your are in control of the flight.

2.2. Time calculation.
ETO means "estimated time over", ATO "actual time over" and RETO "re-estimated time over".

As mentioned the airborne time is the basis of the time calculation, as it is actually the first ATO upon which we calculate the entire column of ETO's. When you've got your airborne time, you add to this the flight time to the first turning point, and thus you get the ETO for this turning point. The flight time to the next turning point is added to the first ETO, whereby you get the ETO for the second turning point and so forth.

Every time you reach a turning point, you must check if the ATO is equal to the ETO (see turning point procedure below). If there is a difference between ETO and ATO, you must make a new estimate for the next turning point, whereby you get a RETO.

Example of time check calculation during flight: Your ETO for point A is 22, for point B 30. You reach point A at time 24, thus the ATO for point A is 24. In the DIFF-column for point A you write +2, and in the RETO-column for point B you write 32.

2.3. Tracking and the four T's.
During the actual flight the single most important thing is at any given time to know where you are. This is accomplished by constantly following the track in the map with your right forefinger. The only exception to this is when your are working with check lists or the like (for example, your right forefinger can't turn off the fuel pump and be in the map at the same time!).

The navigation along the track between the various turning points is done by using a good IFR scan flow. This means that even though you are flying the aircraft you must also stay on radial inbound/outbound a VOR, maintaining a QDM/QDR or maintaining a heading given by ATC if under radar vectors.

When you are overhead a turning point/nav aid, perform the four T's:

TURN: Enter a turn towards the heading for the next leg.
TIME: Look at your wrist watch and remember the number you read.
THROTTLE: Set RPM for next leg (if any change).
TALK: Make a position report to the relevant ATS-unit. On most IFR flights it is only necessary to do position reports when asked to do so by ATC.

After turn completed, you enter the actual time overhead the turn point in the flightplan and recalculate time to the next one. Then you do a technical check including a minimum of the following items: Check engine gauges, fuel quantity and annunciator panel for normal readings. Reset the directional gyro if it has drifted during the turn.

Always stay ahead of the aircraft. You must at all times know what's next! Keep on considering the number and priority of your tasks – if you are not busy at all times, there is most likely something you have forgotten or something you could be preparing for!

APPENDIX B:

OPEN

APPENDIX C:
LIST OF CALL-OUTS

This list will help you when drilling your flight procedures and the call-outs are listed in sequence of flight progress.

Call-out summary

"Needle left - ball right - gyro decreasing - horizon steady - compass follows"

During taxiing in order to check instruments and compass.

"Clear Left - Clear Right"
Before crossing any RWY's and taxiways.

"IFR departure RWY 22R - Bravo intersection - Normal Takeoff"

Take-off part of departure briefing.

"NAV 1 KAS - OBS Set - identified - stand-by ILS 22 L - NAV2 ODN - OBS set - to be identified - stand-by VES…etc."
Navigation set-up part of departure briefing.

"Engine failure/fire before 92 kts we stop - Throttle close - select verify gear down - flaps as required - Land/stop the A/C - advice ATC."
Engine failure song (failure/fire before 92 kts) of departure briefing.

"Engine failure/fire above 92 kts and no available runway we go - full power- gear up - flaps up and apply memory items"
Engine failure song (failure/fire above 92 kts) of departure briefing.

"Checklist completed."
Completion of checklist before lining up.

"Final clear - lining up RWY xx - intersection xx".
When entering the runway.

"Engine instruments checked - timing started"
After increasing throttles to 2000 rpm during takeoff.

"73 rotate"
When reaching rotation speed of 73 KIAS, add backpressure on control.

"Gear up"
When positive rate of climb.

“Flaps up”
Passing 400 ft AGL.

“Reset altimeters - 1013”
When passing transition altitude.

“1000 FT TO GO - QNH XXXX”
1000 ft before assigned altitude.

“Speed xxx checked” (say out loud actual speed before setting flaps/gear/crosscheck correct speed)
In order to confirm correct speed before setting flaps or gear.

“Localizer alive”
When localizer needle is moving.

“Needle alive”
When vor needle is moving.

“Glide slope alive”
When glide slope is moving.

“Props fine - 3 *green - landing lights on”
To be checked before descending below 1000 AAL.

“+ 100”
To alert the pilot 100 ft above minima.

“Minima - contact-landing”
On precision approach at DA when decision is to land.

“Minima - no-contact - going around”
On precision approach at DA when decision is to make a go around.

“Contact - landing”
When runway lights are spotted on a non-precision approach.

“Minima - contact-landing”
No later than when MAPt is reached and decision is to land.

“Minima - no contact - going around”
No later than when MAPt is reached and decision is to make a go around.

“Minima – contact - breaking R/L”
No later than when MAPt is reached and decision is to land on a circling approach.

“Going around - Full power - FL.25 - G/A attitude - Positive ROC - Gear up - Safe speed - Flaps up”
Going around on 2-engines.

“Going around - Full power - FL.25 - G/A attitude - Descent broken - Gear up - Flaps up”
Going around on 1-engine.

“Expect gear warning”
Before throttles are closed for stalls in clean configuration.

“Expect stall warning - Stall” - thereafter as for G/A 2-eng
Before throttles are closed for fully developed stalls in any configuration.

“Expect stall warning - Stall - Half power – VMC - Full power” - thereafter as for G/A 1-eng.
1-engine stall recovery