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Flows Introduction

General

There are 2 basic philosophies to completing checklists: read-and-do, and flow-and-verify.

Under the “read and do” philosophy, the pilot reads the checklist item, then completes the required action, one at a time.

Under the “flow and verify” philosophy, the pilot does multiple action items in a logical sequence, and then reads the checklist to verify everything has been completed.

Flows are used to standardize operations in the AU fleet and help ensure all checklists are being completed. All flows are to be memorized, and completed silently.

For example, upon entering the aircraft, the pilot will accomplish the Before Starting Engine flow (silently). Upon completion of the flow, he/she will read the Before Starting Engine checklist (aloud). Reading the checklist then becomes a verification that all the items in the flow have been completed.

Structure

For each phase of operation (ex. Before start, before takeoff, after landing, etc), the detail of the flow is given in the slide preceding the picture. The picture shows the flow line of where to start (red dot in most cases), and where to go. Electrical switches are highlighted with either a red, amber, or green box. Green means the switch should be placed in the ON position, and red means the switch should be placed in the OFF position. An Amber box indicates that the switch will be in a momentary or intermediate position (ex: during the ground check, the magnetos are turned OFF, then back ON). A red box over anything other than an electrical switch simply means to check that item.
Checklist Usage

Each pilot will carry a paper “preflight” checklist and a paper “normal” checklist. Electronic checklists will be allowed for the preflight inspection, but only paper checklists will be used after the preflight. This is primarily to reduce the amount of “heads-down” time in the cockpit, increase heads-up time, and decrease the amount of time to complete the checklists. If all flows have been memorized, the amount of time it takes to run through a checklist is decreased as opposed to the “read and do” philosophy.

An example of the paper checklist is shown on the right. Checklists are set up as a hybrid between flows and read-and-do. The “flow” portion of each checklist is indicated by a black bar on the side (ex, from “FUEL selector” to “EMERG BATT switch” is a flow).

Regardless of where the flow appears in the checklist (beginning, middle, or end), the flow is to be completed first, and then the checklist will be read aloud from beginning to end.

Prior to reading any checklist, the pilot will read the name of the checklist. Ex: “Before start checklist….. Flaps - Retract, Passengers – Board, Passenger briefing - complete……(etc)…..”

Upon completion of the checklist, the pilot will state “Before starting engine checklist complete”.

Each Student should keep their checklists in their flight bags, but should a replacement be needed, spare checklists may be obtained from dispatch.
Checklist Usage

Engine Start Checklist
The Engine Start checklist is broken into 2 sections: Engine Start to-the-line, and Engine Start below-the-line.

Pilots will complete the “to the line” flow, which ends after priming the engine. Then, they will read the Engine start checklist to the line.

After reading to the line, they will complete the “below the line” flow, and then read the checklist below the line. As with all checklists, upon completing the entire checklist, the pilot will say “engine start checklist complete”.

Descent checklist
In general, the Descent Checklist should be completed within 10 NM from the destination airport. For a VFR local flight, the descent checklist should be completed when leaving the practice area and returning to C20, and for an IFR flight, it should be completed after briefing the instrument approach. For cross-country flights, it should be completed during or prior to commencing the descent from cruise altitude.
Profiles Introduction

Profiles are mandatory callouts that are to be made during specified times/events during flight. Again, the goal is to standardize the way we fly, and increase awareness of what’s happening during the flight. An example of the departure profile is shown on the right.

Verbal callouts are depicted in the gray speech boxes, and supplemental information is given below in the white boxes.

For example, as the pilot lines up on the runway, he/she calls “runway 13 aligned”. He then adds full power, verifies oil pressure and temperature in the green, and verifies RPM is greater than 2240. He then calls out what the RPM is indicating. “2260 RPM, engine instruments in the green”.

For practical reasons, not all information is contained in the profiles. For example, power settings and aircraft limitations (eg flap speeds) are left out as it is expected that the pilot has memorized the power grid, and that he/she knows the aircraft limitations.
General Callouts

These Callouts should be made at all times:
• 200’ before reaching the preselected altitude, the pilot will call “(altitude at) for (altitude set)” (ex, “thirty three for thirty five hundred” or “three thousand three hundred for three thousand five hundred”)

• Anytime an altitude is set in the altitude preselect, the pilot will call “(altitude) set” (ex. “thirty five hundred set” or “three thousand five hundred set”)

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Briefings

The following briefings will be completed on every flight:

• Takeoff Briefing
  • For subsequent takeoffs on the same flight, the pilot may say “as previously briefed”. If the aircraft has been shut down since the last takeoff, a new briefing should be performed.

• Approach Briefing
  • Either an instrument approach briefing or a visual approach briefing, as applicable
A takeoff briefing should be conducted to plan for emergency situations. The following items should be covered:

- Departure Runway
- Type of takeoff (normal, short field, or soft field)
- Action plan if engine fails:
  - On takeoff roll
  - After rotation, below 1000’ AGL
  - Above 1000’ AGL
- Normal action plan (staying in pattern, departing to practice area, flying an instrument departure, etc)

**Briefing Example**

“this will be a soft field takeoff from runway 13. If the engine fails on the takeoff roll, we’ll abort and stay on the runway. If the engine fails after rotation and below pattern altitude, we’ll pitch for best glide and land straight ahead. If it fails above 1000’ we’ll pitch for best glide and pull out the emergency checklist if we have enough altitude. Otherwise, we’ll climb to 3500’ and depart to the northeast practice area (or brief instrument departure procedure, if applicable).”
Visual Approach Briefings

A visual approach briefing should cover the following items:

- Landing runway
- Pattern direction
- Pattern altitude
- Minimum altitude for final
- Any other applicable considerations

**Briefing Example**

“This will be a visual approach to runway 13, right pattern. Pattern altitude is 1700’, my minimum altitude before turning final will be 1200.”
Every instrument approach needs to be briefed, after setting up the radios and GPS for the approach, and prior to completing the descent checklist. (See next page)

Approach setup should include getting the current weather/ATIS, loading the GPS, and tuning the appropriate frequencies and courses.

The following items should be covered in every instrument approach briefing:

- Review ATIS and/or reported field conditions and weather.
- Usable landing length, obstructions, braking action reports, etc.
- Landing Distance Required.
- Review of the Planned Approach Procedure.
- Identity of Navaids to be used and their frequencies.
- Flaps setting.
- Configuration of flight instrumentation. (NAV, GPS, etc)
- Approach Lighting Configuration.
- Missed Approach Procedure
- Planned taxi route for after landing, including runway incursion hot spots and designated hold short areas.
- Any other special considerations or data pertinent to the approach and current weather, aircraft or traffic conditions and any ATC restrictions
Example:

“this will be the ILS 28 approach at Benton Harbor, in green needles (conventional navigation). Localizer frequency is 108.50, and that’s tuned and identified. Final approach course is 274, and that’s dialed in. Runway length is 6005 feet long, touch down zone elevation is 649’. This approach has MALSR approach lights. We have the current weather, winds are ______, ceiling is ________, altimeter is __________. This approach will be vectors to final (or, “we’ll be starting this approach from ELX as the IAF”). Once we’re on the localizer we can descend to 2200 and intercept the glideslope there (or, “stay at 2500’ and intercept the glideslope”). We’ll cross the outer marker at 2111’ on the glideslope and follow it down to our DA of 849’. ½ SM visibility is required for this approach, currently we have ______. If we see the runway, we’ll add full flaps when we break out, and plan on a left turn off the runway. If we don’t see the runway, or for any reason have to go missed, the missed approach procedure is climb to 2500 and right turn direct to MALLY and hold.

Briefing Flow:

- Title
- Frequency
- Course
- Runway info
- Approach lights
- Weather information
- Plan view (where we start the approach from, etc)
- Profile view (brief altitudes, FAF, MAP, etc)
- Minimums and minutes
- Runway plan (left or right turn off)
- Missed approach (* details in top right corner of plate)

(This flow can be modified slightly as needed, but the briefing should always maintain a logical flow. Think of it as telling a story about what you’re going to do during the approach.)
Before Starting Engine

• Passenger Briefing ........................................ COMPLETE
• Weight and Balance ................................. VERIFY IN LIMITS
• Seats ........................................ ADJUSTED AND LOCKED
• Seatbelts/Harnesses ................................. FASTENED
• Circuit Breakers ................................ CHECK IN
• Avionics Master ........................................ OFF
• Carb Heat ............................................. OFF/COLD
Before Starting Engine 2

- Fuel Selector ............................................................... FULLEST TANK
- Altn. Static Source ............................................................ OFF
- Parking Brake ................................................................. ON
- Mixture ................................................................. RICH
- Throttle ............................................................... OPEN ¼ inch
- BATT/ALT Switch .............................................................. ON
- Fuel Pump Switch ............................................................. ON
- Strobe Switch ................................................................. ON
- Prime ................................................................. AS REQ’D THEN LOCK
Engine Start

- Propeller Area - “CLEAR”
- Ignition Switch - START
- Power - ADJUSTED TO-1000RPM
- Oil Pressure - CHECK
Before Taxing

• Avionics Master................................................................. ON
• Mixture ................................................ LEAN OUT 1” FOR TAXI
• LAND Light ................................................................. ON
• Parking Brake ............................................................... OFF
• Throttle ........................................................ APPLY SLOWLY
• Brakes & Steering ....................................................... CHECK
Ground Check

• Parking Brake - SET
• Fuel Selector - FULLEST TANK
• Mixture - ADJUST FOR D.A. & ELEVATION
• Throttle - 2000 RPM
• Carburetor Heat - CHECK ON, THEN OFF
• Ignition Switch – CHECK
  • MAX DROP 175/MAX DIFFERENCE 50 RPM
• Fuel Pump - OFF
• Engine Instruments - CHECK
  • VACUUM 4.9 – 5.1
  • OIL TEMP/PRESSURE
  • FUEL PRESSURE
  • ALT AMPS - NORMAL
• Throttle - FULL BACK THEN 1000 RPM
Before Takeoff

- Annunciator Panel - PRESS TO TEST
- Master Switch - ON
- Flight Instruments - CHECK/SET
- Flight Controls - FREE AND CORRECT
- Fuel Selector - FULLEST TANK
- Flaps - 0° NORMAL/25° SHORT or SOFT
- Trim - SET FOR TAKEOFF
- Carburetor Heat - OFF
- Mixture - ADJUST FOR D.A. & ELEVATION
- Fuel Pump - ON
- LANDING Light - ON
- Primer - IN & LOCKED
- Door/Window - LATCHED/CLOSED
- Seatbelts - FASTENED
- Empty Seats - SECURED
- Takeoff Briefing - COMPLETE
Part 1
Verify Heading indicator matches runway heading.
Set full power, verify >2240 RPM.

Airspeed Alive
60 KTS, Rotate

Runway (___) Aligned
## RPM, Engine Instruments in the green

Verify Airspeed increasing, RPM >2300

At 1000 AGL, pitch for 87 KTS, turn off Fuel pump and verify flaps up

1000 Ft Fuel Pump Off Flaps Up

Maintain Vx until clear of obstacles

When clear of obstacles, pitch for Vy and raise the flaps

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Descent (within 10 miles)

- COM/NAV Radios & Avionics – CHECK AND SET
- Landing Light - ON
- Altimeter – SET
- Heading Indicator – SET
- Fuel Selector – FULLEST TANK
- Toe Brakes – DEPRESS TO CHECK
- Seatbelts/Harnesses – FASTEN/ADJUSTED
- Seat Backs – ERECT
Seatbelts/harnesses
Seat backs

BEGIN
Before Landing

• (G) Fuel Selector – PROPER TANK
• (M)ixture – FULL RICH
• (S) Fuel Pump – ON
• (S) Landing Light – AS REQUIRED
Stabilized Approach Criteria
By no lower than 500’ AGL on a visual approach
• Airspeed 70-75
• Descent Rate no greater than 1000 FPM
• Fully Configured to land
  • Flaps 40 (or as required)
  • Gear Down
If not stabilized by 500 AGL, a go-around should be performed

Visual Approach

- Cross the threshold at 66 kts
- Flaps 25° 80 KTS
- 500’ Stabilized
- 1500 RPM Flaps 10° -500 FPM 85 KTS
- Flaps 40° 70-75 KTS No lower than 500’ AGL before turning final
- 2100 RPM 1000’ AGL 90 KTS
- Before Landing Checklist- Gas on fullest tank, Mixture rich, Switches on
- Switches = fuel pump & landing light on
- Descent Checklist Complete
- Complete T.O.C. Rev. 1.3a 04MAY20
Precision Approach

Stabilized Approach Criteria
By no lower than 1000’ AGL on an instrument approach
- Airspeed 90
- Descent Rate no greater than 1000 FPM
- On Glidespath
- Configured to land
  - Flaps 10° (or as required)
  - Gear Down
If not stabilized by 1000 AGL, a go-around should be performed

Before Landing Checklist:
- Gas on a full tank,
- Mixture rich,
- Switches on (fuel pump, landing light on)
- Minutes (….)
- Minimums (….)
- Missed (….)

When Localizer starts moving, Verify no red X’s or red flags
When Glideslope starts moving
- ~2 NM from FAF slow to 90 KTS
- Outer Marker Altitude Checked

Approach briefing should be completed prior to Descent Checklist

1000’, Stabilized
- 1000’ AGL
- Approaching Minimums
- Approach Lights in Sight
- Runway in sight, Landing

Missed Approach
- 100’ above DH
- DH
- 100’ above TDZE
- Add landing flaps when runway in sight

NOTE:
"approaching minimums” and “approach lights in sight” calls may be omitted if the runway is in sight, and “runway in sight, landing” call has been made

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Non-Precision Approach

Stabilized Approach Criteria
By no lower than 1000’ AGL on an instrument approach
• Airspeed 90
• Descent Rate no greater than 1000 FPM
• On Glidepath
• Configured to land
  • Flaps 10° (or as required)
  • Gear Down
If not stabilized by 1000 AGL, a go-around should be performed

Before Landing Checklist
Gas on a full tank,
Mixture rich,
Switches on (fuel pump, landing light on)
Minutes (…..)
Minimums (…..)
Missed (…..)

When course starts moving.
Verify no red X’s or red flags

Descent Checklist
Complete

Approach briefing should be completed prior to Descent Checklist

Course Alive,
No Flags

Final Approach Fix
Altitude Checked

Flaps 10°

Verify indicated altitude against Approach Plate FAF

MDA

1000’ AGL

1000’, Stabilized

Approaching Minimums

MDA

MDA

Missed Approach point

Add landing flaps when runway in sight

“runway in sight, landing” call may be made prior to MAP.
Do not descend from MDA prior to reaching VDP

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T.O.C.
Go Around/Missed Approach

Add full power, reduce flaps to 25° (if flaps are less than 25°, leave them in the current position, and raise them when airspeed is above Vx)
Carb Heat off, Pitch for Vx

Maintain Vx until clear of obstacles

When clear of obstacles, pitch for Vy and raise the flaps

Go Around, Full Power Flaps 25

Vy

1000 Ft
Fuel Pump Off
Flaps Up

At 1000 AGL, pitch for 87 KTS, turn off Fuel pump and verify flaps up
After Landing Checklist

• Clear Runway
• Trim/Flaps – SET NEUTRAL/RETRACTED
• Mixture - LEAN 1 inch
• Fuel Pump – OFF
• Landing Light Switch – AS REQUIRED
Stopping Engine

- Parking Brake .......................................................... SET
- LANDING Light .......................................................... OFF
- Fuel Pump .............................................................. OFF
- Avionics ................................................................. OFF
- Throttle ................................................................. IDLE
- Ignition Switch ....................................................... GROUND CHECK
- Mixture ................................................................. IDLE CUT-OFF
- Strobe ................................................................. OFF
- Battery Master Switch ............................................. OFF
- Ignition ................................................................. OFF