

# A320 Family SOP

This SOP is valid for all aircraft types within the A320 family.

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# 1. Introduction

## 1. Introduction

# 1.1 Purpose

This handbook provides a structured introduction and operational guidance for the Airbus A320 family within our virtual airline.

It is designed to:

- Support new pilots during initial training
- Provide standardized procedures for daily operations
- Ensure consistent and realistic flight execution

The document combines simplified theoretical explanations with operational procedures tailored for flight simulation.

## 1. Introduction

# 1.2 Applicability

This handbook applies to the following aircraft types:

- Airbus A318
- Airbus A319
- Airbus A320
- Airbus A321

All procedures are based on common Airbus philosophy and may be applied across the entire A320 family unless stated otherwise.

## 1. Introduction

# 1.3 Philosophy

The Airbus A320 family is designed around automation and pilot monitoring.

Key principles include:

- **Automation is a tool, not a replacement for pilot awareness**
- **Pilots must understand system behavior, not just operate it**
- **Standardization is essential for safe and efficient operations**

Within this virtual airline, emphasis is placed on:

- Structured workflows
- Clear procedures
- Realistic, but accessible simulation

## 1. Introduction

# 1.4 Training Concept

This handbook is used as the primary training document for obtaining the **virtual Airbus A320 Type Rating** within BlueLake Airways.

It provides all required knowledge and procedures for:

- Aircraft familiarization
- Standard Operating Procedures (SOPs)
- Flight handling and automation management
- Normal and abnormal operations

Pilots may operate the A320 family within the airline once they have:

- Completed the required training
  - Demonstrated sufficient understanding of this handbook
  - Successfully passed any required evaluation or check flight
- 

## Philosophy

Training is focused on:

- Standardization
- Practical application
- Safe and consistent operation

There is no fixed rank progression within the airline.  
Qualification is based solely on aircraft type proficiency.

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## Core Rule

**“Qualification is earned through competence, not rank.”**

## 1. Introduction

# 1.5 Use of this Handbook

This handbook is intended to be used:

- During ground training
- As a reference during flight preparation
- As a standard for all operations within the airline

It is not intended to replace real-world manuals, but to provide a practical and simulation-focused adaptation.

## 2. Aircraft Overview

## 2. Aircraft Overview

# 2.1 General Description

The Airbus A320 family is a series of narrow-body, twin-engine jet airliners designed for short- to medium-haul operations.

It includes:

- A318 (smallest variant)
- A319
- A320 (baseline model)
- A321 (largest variant)

All aircraft share a common cockpit design, allowing pilots to operate multiple variants with minimal additional training.

# 2.2 Key Characteristics

The A320 family introduced several innovations that define modern airliner operations:

## Fly-By-Wire System

The aircraft is controlled electronically rather than mechanically.

Pilot inputs via the sidestick are interpreted by flight control computers, which:

- Enhance stability
  - Prevent excessive maneuvers
  - Protect the aircraft from exceeding limits
- 

## Sidestick Control

Instead of a traditional control column, the A320 uses a sidestick.

Characteristics:

- Located on the side of each pilot
  - Not mechanically linked between pilots
  - Inputs are processed electronically
- 

## ECAM (Electronic Centralized Aircraft Monitoring)

The ECAM system provides:

- System status information
- Automatic failure detection
- Step-by-step guidance in abnormal situations

This reduces pilot workload and improves situational awareness.

## 2.3 Cockpit Philosophy

The Airbus cockpit is designed around the concept of:

**“Manage the flight path, monitor the automation.”**

Key ideas:

- Automation handles routine tasks
- Pilots supervise and intervene when necessary
- Clear system feedback is always available

# 2.4 Differences within the A320 Family

While cockpit operation remains largely identical, there are operational differences:

- **A318 / A319**
  - Shorter fuselage
  - Lower passenger capacity
  - Better performance on shorter runways
- **A320**
  - Standard reference model
  - Balanced performance and capacity
- **A321**
  - Longer fuselage
  - Higher passenger capacity
  - Different handling characteristics (especially during takeoff and landing)

# 2.5 Typical Operations

The A320 family is commonly used for:

- Short-haul routes
- Medium-haul routes
- High-frequency operations

Typical cruise altitude:

- FL320 - FL390

Typical cruise speed:

- Mach 0.76 - 0.80

## 2.6 Summary

The Airbus A320 family combines:

- Advanced automation
- High commonality across variants
- Efficient and reliable performance

Understanding its philosophy is essential before applying operational procedures.

# 3. Cockpit Layout

### 3. Cockpit Layout

# 3.1 General Layout

The Airbus A320 cockpit is designed for efficiency, clarity, and automation management.

It is divided into three main areas:

- **Overhead Panel** (systems control)
- **Main Instrument Panel** (flight information & automation)
- **Pedestal** (thrust, navigation input, communication)

This standardized layout is identical across the A320 family.

### 3. Cockpit Layout

## 3.2 Overhead Panel

The overhead panel is used to control and monitor aircraft systems.

Main sections include:

- Electrical system
- Fuel system
- Hydraulic system
- Air conditioning and pressurization
- Anti-ice systems

#### **Design principle:**

- “Dark cockpit philosophy”
  - In normal operation, no lights should be illuminated
  - Lights indicate abnormal or non-standard conditions

### 3. Cockpit Layout

# 3.3 Main Instrument Panel

This is the primary area for flight control and monitoring.

## Primary Flight Display (PFD)

Displays essential flight data:

- Attitude (pitch & bank)
  - Airspeed
  - Altitude
  - Vertical speed
- 

## Navigation Display (ND)

Shows:

- Flight plan route
  - Weather radar (if active)
  - Navigation aids
  - Terrain (if enabled)
- 

## ECAM Displays

The ECAM system consists of two screens:

- **Upper ECAM (E/WD):**
  - Engine parameters
  - Warning and status messages
- **Lower ECAM (SD):**
  - System pages (e.g. HYD, FUEL, ELEC)

### **Purpose:**

To provide automatic system monitoring and assist pilots in abnormal situations.

### 3. Cockpit Layout

# 3.4 Flight Control Unit (FCU)

The FCU is located on the glare shield and is used to control the autopilot.

Functions include:

- Speed selection
- Heading selection
- Altitude selection
- Vertical modes (climb/descent)

**Key concept:**

- **Managed Mode** → aircraft follows flight plan
- **Selected Mode** → pilot manually sets values

### 3. Cockpit Layout

## 3.5 Pedestal

The pedestal contains systems used during active flight management.

### Thrust Levers

- Control engine thrust
  - Include detents:
    - IDLE
    - CL (Climb)
    - FLX/MCT
    - TOGA
- 

### MCDU (Multipurpose Control and Display Unit)

Used to interact with the Flight Management System (FMS).

Main functions:

- Route planning
  - Performance calculations
  - Navigation management
- 

### Radio and Communication Panels

Used for:

- ATC communication
- Navigation frequency tuning

### 3. Cockpit Layout

## 3.6 Sidestick

Each pilot controls the aircraft using a sidestick.

Characteristics:

- Independent for each pilot
- No physical linkage between sides
- Inputs are processed by flight control computers

### 3. Cockpit Layout

# 3.7 Summary

The A320 cockpit is designed around:

- Automation
- Clear information display
- Efficient pilot interaction

Pilots are expected to:

- Understand where systems are located
- Use automation effectively
- Monitor all systems continuously

A solid understanding of the cockpit layout is essential before performing operational procedures.

# 4. Standard Operating Procedures (SOPs)

# 4.1 Cockpit Preparation

## Objective

To ensure the aircraft is correctly configured, powered, and programmed prior to engine start.

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## Crew Concept

- **PF (Pilot Flying):**
    - Reviews flight plan
    - Performs MCDU setup
    - Cross-checks entries
  - **PM (Pilot Monitoring):**
    - Performs cockpit setup
    - Powers aircraft systems
    - Executes checklists
- 

## Initial Cockpit Setup

### PM:

1. BAT 1 + BAT 2 → ON
2. External Power → ON (if available)

### Check:

- ECAM displays active
  - No abnormal warnings
- 

## Overhead Panel Setup (PM)

- Fuel Pumps → ON
- Hydraulic Panel → CHECK
- Electrical Panel → CHECK

- Air Conditioning → SET

#### **ADIRS:**

- Set all IR selectors → NAV
- 

## Cockpit Lighting (PM)

- Set as required for conditions
- 

## MCDU Initialization (PF)

### INIT A Page:

- FROM / TO → Set departure & arrival airport
  - Flight Number → INSERT
  - Cost Index → SET
  - Cruise Level → SET
- 

### Flight Plan Page:

- Insert route (airways / waypoints)
  - Check for discontinuities
  - Insert SID (Standard Instrument Departure)
  - Verify routing
- 

### INIT B Page:

- Block Fuel → INSERT
  - Zero Fuel Weight → INSERT
- 

### Performance Setup:

- V1 / VR / V2 → CALCULATE & INSERT
- FLEX Temperature → SET (if applicable)
- Thrust Reduction / Acceleration Altitude → SET

---

# FMGS Crosscheck

**PM cross-checks all entries:**

- Route correctness
- Fuel values
- Performance data

---

# Flight Instruments Setup

**Both pilots:**

- Set Barometric Reference
- Set Initial Altitude
- Set Vertical Display Selector on Above

---

# Takeoff Briefing (PF)

Must include:

- Runway
- SID
- Initial altitude
- Expected routing
- Threats & considerations

---

# Before Start Checklist

Performed when all preparation is complete.

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# Key Principles

- Always verify MCDU entries
- Cross-check between PF and PM

- Avoid rushing the setup
- 

# Philosophy

A correct cockpit preparation ensures:

- Reduced workload during taxi and takeoff
- Fewer errors in flight
- Better situational awareness

A rushed or incomplete setup increases risk significantly.

## 4.2 Engine Start

### Objective

To safely start the engines while ensuring proper coordination with ground crew and maintaining full control of the aircraft during pushback or stand departure.

---

### General Principle

Engine start must only be performed when:

- Aircraft is correctly configured
  - Area around aircraft is clear
  - Ground crew confirms readiness
- 

### Mandatory Condition

**Engine start is only permitted after “CLEAR TO START” from ground crew**

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## Engine Start WITH Pushback

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### Preconditions

- Pushback clearance received
  - Ground crew connected (headset)
  - Beacon → ON
  - APU BLEED → ON
  - Fuel Pumps → ON
-

# Procedure

## **PF:**

- “Request pushback and start”

## **PM:**

- Communicates with ground
- 

# Pushback Initiation

- Parking Brake → RELEASE (on instruction)
  - Pushback begins
- 

# Engine Start Sequence

After “**CLEAR TO START**”:

**PF:** “Start Engine 1”

**PM:** “Starting Engine 1”

---

## **PM:**

- ENG MODE Selector → IGN/START
  - ENG 1 MASTER → ON
- 

# ECAM Monitoring (PM)

- N2 rotation
  - Fuel Flow at ~20% N2
  - EGT rise
  - Stable parameters
- 

# Callouts

- “N2 increasing”
  - “Fuel Flow”
  - “EGT rising”
  - “Engine 1 stabilized”
- 

- Repeat for Engine 2
- 

## During Pushback

- Monitor aircraft movement
  - Maintain communication with ground crew
  - Avoid distractions during engine start
- 

## After Pushback

- Parking Brake → SET (on instruction)
  - Ground crew disconnect confirmed
- 

# Engine Start WITHOUT Pushback (Self Maneuvering Stand)

---

## Preconditions

- Area around aircraft visually confirmed clear
  - No ground crew in hazard area
  - Beacon → ON
  - APU BLEED → ON
  - Fuel Pumps → ON
- 

## Procedure

**PF:**

- Confirms: “Area clear”
- 

## Engine Start

**PF:** “Start Engine 1”

**PM:** “Starting Engine 1”

---

**PM:**

- ENG MODE Selector → IGN/START
  - ENG 1 MASTER → ON
- 

## ECAM Monitoring

- N2 rotation
  - Fuel Flow
  - EGT rise
  - Stabilization
- 

- Repeat for Engine 2
- 

## Key Difference

- No pushback coordination required
  - PF responsible for visual clearance
- 

## After Start Actions (Both Cases)

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**PM Flow:**

- ENG MODE Selector → NORM
  - APU BLEED → OFF
  - APU → OFF (if not required)
  - Anti-Ice → AS REQUIRED
  - Flaps → SET
  - Pitch Trim → SET
- 

## Key Principles

- Engine start is a controlled and monitored process
  - Ground crew safety has priority
  - Standard sequence must always be followed
- 

## Core Rule

**“No clear area - no engine start.”**

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## Outcome

- Engines started safely
  - Aircraft ready for taxi
  - Full coordination between cockpit and ground
- 

## Single Engine Taxi Policy

To improve fuel efficiency and reduce engine wear, single engine taxi should be used when operationally feasible.

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## Application

Single engine taxi is required when:

- Expected taxi time exceeds **10 minutes**

Applicable airports are defined in the respective **airport briefing**.

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# Procedure

- Start **Engine 1 only** during engine start phase
- Keep **Engine 2 OFF**

---

# Considerations

- Maintain sufficient thrust for taxi
- Monitor aircraft handling (asymmetric thrust)
- Use additional thrust carefully if required

## 4.3 Taxi

### Objective

To safely maneuver the aircraft from stand to runway while maintaining full control, situational awareness and ground crew safety.

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### Taxi Phase Definition

The taxi phase begins when:

- Pushback is completed
  - **OR**
  - Aircraft starts moving under its own power (self-maneuvering stand)
- 

### Taxi Clearance

**PF:** Requests taxi clearance

**PM:** Handles ATC communication

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### Taxi Procedure

**PF:**

- Releases parking brake
  - Applies **minimum thrust required** to initiate movement
- 

### Thrust Management

- Use **IDLE thrust whenever possible**

- Apply thrust only to start movement
  - Avoid continuous thrust application
- 

## Steering

- Nose wheel steering via tiller (PF)
  - Rudder pedals for small corrections
  - Use smooth and controlled inputs
- 

## Speed Control

- Standard taxi speed: **~20 kt**
  - Outside apron: **max 30 kt**
  - Tight turns: **max 15 kt**
- 

## Brake Usage

- Apply brakes smoothly
  - Avoid aggressive braking
  - Maintain passenger comfort
- 

## Self Maneuvering / 180° Turns

At stands where no pushback is used and a **self-turn (e.g. 180°)** is required:

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## Procedure

### PF:

- Release parking brake
- Use **minimum thrust only**
- Initiate slow, controlled turn

---

## Speed & Control

- Maintain very low speed
- Avoid tight or aggressive steering
- Aircraft should roll smoothly through the turn

---

## Lighting Policy (Ground Safety)

During initial movement (nose still facing stand/apron):

- Taxi Lights → OFF
- Runway Turnoff Lights → OFF

---

Once aligned with taxi direction:

- Taxi Lights → TAXI
- Runway Turnoff Lights → ON

---

## Purpose

- Prevent blinding ground personnel
- Increase apron safety
- Ensure professional operation

---

## Taxi Lights Configuration

During normal taxi:

- Taxi Lights → TAXI
  - Runway Turnoff Lights → ON
  - Landing Lights → OFF
-

# Monitoring (PM)

- Brake temperature
  - Taxi route
  - External traffic
  - Clearance compliance
- 

# Flight Control Check

Performed during taxi:

**PF:** “Flight Controls Check”

**PM monitors ECAM:**

- Full and free movement
  - Correct deflection
- 

# Before Takeoff Preparation

- Complete Before Takeoff Checklist
  - Verify aircraft configuration
- 

# Key Principles

- Maintain situational awareness at all times
  - Taxi with low energy and high precision
  - Protect ground crew through proper light usage
- 

# Core Rule

**“Taxi is a low-energy phase - precision over speed.”**

---

# Outcome

A correct taxi ensures:

- Safe ground operations
  - Reduced workload before takeoff
  - Proper aircraft positioning
- 

# Second Engine Start (Single Engine Taxi Operations)

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## Objective

To ensure both engines are available and stabilized prior to takeoff.

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## Timing

☐ The second engine must be started:

- **At latest 5 minutes before expected takeoff**
- 

## Procedure

- Start remaining engine according to **Engine Start SOP (4.2)**
  - Ensure full stabilization before runway entry
- 

## Monitoring

- Confirm engine parameters stable
- Verify no abnormal indications
- Complete required after start flow

---

# Operational Note

- Plan engine start early enough to avoid:
  - Time pressure
  - Delays at holding point

---

# Core Rule

**“Be ready before the runway - not on it.”**

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#### 4. Standard Operating Procedures (SOPs)

## 4.4 Takeoff

### Line-Up

**PF:**

- Align aircraft with runway centerline

**PM:**

- Confirms runway and clearance
- 

### Takeoff Clearance

**PM:** Confirms ATC clearance

**PF:** "Takeoff"

---

### Thrust Application

1. Thrust Levers → ~50% N1 (stabilization)
  2. Then → FLEX/MCT or TOGA
- 

### Standard Callouts (PM)

- "MAN FLEX / MAN TOGA"
  - "Thrust Set"
- 

### Takeoff Roll

**PM Callouts:**

- "100 knots"
- "V1"
- "Rotate"

---

# Rotation

## PF:

- Smooth pitch input ( $\sim 2-3^\circ/\text{sec}$ )
  - Target pitch  $\sim 15^\circ$
- 

# Liftoff

## PM:

- "Positive Climb"

## PF:

- "Gear Up"
- 

# Initial Climb

- Maintain runway track
  - Follow FD (Flight Director)
- 

# After Takeoff

- At acceleration altitude:
    - Pitch down
    - Flaps retract according to schedule
- 

# Climb Thrust

- Thrust Levers  $\rightarrow$  CL detent
- 

# Autopilot Engagement

The autopilot may only be engaged when the aircraft is properly stabilized and following the Flight Director.

## Conditions for Autopilot Engagement:

- Aircraft is in a stable climb
- No excessive pitch or bank
- **Flight Director crossbars are aligned (aircraft follows FD commands)**
- No abnormal flight parameters

## Recommendation:

- Typical engagement above 500–1000 ft AGL
- 

# Key Principle

**“Follow the Flight Director first - then engage the autopilot.”**

Engaging the autopilot while not aligned with the Flight Director may result in:

- Abrupt aircraft movements
  - Unstable flight path
  - Loss of situational awareness
- 

# Philosophy

A stabilized and disciplined takeoff ensures:

- Safe departure
  - Proper energy management
  - Smooth transition into climb phase
-

# 4.5 Climb

## Objective

To establish a stable and efficient climb profile after takeoff.

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## After Takeoff Flow

At acceleration altitude:

**PF:**

- Reduce pitch attitude
- Select climb profile

**PM:**

- Monitor speed increase
- 

## Flap Retraction

- Retract flaps according to speed schedule
  - Ensure aircraft is clean (Flaps 0)
- 

## Thrust Setting

- Thrust Levers → CL detent
- 

## Autopilot

- Engage when conditions are met (see 4.4)

---

# Standard Procedure

- **Climb Mode → MANAGED**
- **Speed → MANAGED**

The aircraft shall follow:

- FMGS vertical profile
- SID constraints
- Pre-programmed speed schedule

---

# Exceptions

Selected modes may only be used if:

- **ATC explicitly assigns:**
  - A specific speed
  - A specific vertical rate or altitude constraint
- **Operational reasons require intervention**, such as:
  - Avoiding traffic
  - Weather deviations
  - Energy management corrections

---

# Monitoring (PM)

- Both pilots must ensure:
  - The aircraft follows the intended vertical profile
  - Speed constraints are respected
  - No unintended mode changes occur

---

# Passing Transition Altitude

- Set Standard Pressure (STD)

---

# During Climb

- As soon as its safe: Turn off the seat belt sign
  - When passing FL250: Set Vertical Display Selector on Below
- 

## Key Principles

- “Managed by default – Selected only when required.”
- Maintain situational awareness
- Monitor automation continuously
- Anticipate level-off

# 4.6 Cruise

## Objective

To maintain a stable and efficient flight at cruise altitude.

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## Establishing Cruise

- Aircraft levels off at cruise altitude
  - Thrust reduces automatically
- 

## Autopilot & Automation

- Autopilot engaged
  - Managed speed (Mach mode typically active)
- 

## Cruise Speed Management

During cruise, the aircraft should remain in **Managed Speed Mode** under normal conditions.

---

## Standard Procedure

- **Autopilot → ENGAGED**
- **Speed Mode → MANAGED (Mach mode)**

The aircraft automatically optimizes:

- Fuel efficiency
- Speed profile

---

# Exceptions

Selected speed may only be used if:

- **ATC assigns a specific speed**
- Turbulence requires speed adjustment
- Operational considerations demand deviation

---

# Monitoring Duties

**Both pilots:**

- Monitor flight progress
- Check fuel consumption
- Verify route

---

# Systems Monitoring (PM)

- ECAM parameters normal
- Monitor Mach number and fuel consumption
- Ensure compliance with ATC instructions
- Detect any unexpected automation behavior

---

# Navigation

- Follow programmed route
- Monitor for deviations

---

# ATC Interaction

- Maintain assigned altitude and speed
  - Respond to new clearances
-

# Situational Awareness

- Monitor weather
  - Anticipate descent planning
- 

## Key Principles

- “Let the aircraft manage efficiency - intervene only when necessary.”
- Stay ahead of the aircraft
- Avoid complacency
- Continuously cross-check systems

# 4.7 Descent

## Objective

To conduct a controlled and passenger-comfort-oriented descent from cruise altitude to approach phase while maintaining compliance with all constraints.

---

## Descent Philosophy (VA Standard)

The descent is primarily flown with a focus on:

- **Passenger comfort (smooth vertical profile)**
  - **Pilot control over vertical path**
  - **Compliance with ATC and charted constraints**
- 

## Descent Preparation

### **PF:**

- Reviews arrival (STAR, constraints, transition)
- Conducts approach briefing

### **PM:**

- Programs arrival and approach into MCDU
  - Verifies constraints and routing
- 

## Top of Descent (TOD)

- Descent initiated prior to or at TOD
  - ATC clearance must be received before descent
-

# Descent Mode (STANDARD VA PROCEDURE)

## Vertical Mode:

- **Primary Mode → SELECTED V/S (Vertical Speed)**

The descent is manually controlled to ensure:

- Smooth cabin experience
  - Stable and predictable vertical profile
- 

## Managed Mode Usage:

- **Managed Descent is NOT the default**
- It is used **only when required to comply with constraints**

Examples:

- Altitude restrictions on STAR
  - Complex vertical profiles
  - When automation assistance is beneficial
- 

# Speed Management

- **Speed Mode → MANAGED (throughout STAR)**

The aircraft shall:

- Follow FMGS speed profile
  - Respect all published constraints
- 

# After STAR (Approach Phase Transition)

- Speed may be adjusted as required:
    - ATC instructions
    - Approach setup
    - Traffic situation
-

# Exceptions

Selected modes may be used if:

- **ATC assigns specific:**
    - Speed
    - Descent rate
    - Altitude constraints
  - **Abnormal situations occur**
- 

## Monitoring (PM)

- Vertical path vs constraints
  - Speed profile
  - ATC compliance
  - Energy state (too high / too fast)
- 

## Energy Management

If aircraft is high or fast:

- Increase descent rate (V/S adjustment)
  - Use Speed Brakes as required
- 

## Thrust Management

- Typically idle during descent
  - Monitor engine parameters
- 

## Transition Level

- Set local QNH when passing transition level
-

# Key Principles

- Smooth descent is priority
  - Maintain control over vertical profile
  - Use automation selectively, not blindly
- 

## Core Rule

**“Vertical path is pilot-controlled - speed is aircraft-managed.”**

---

## Outcome

A properly managed descent results in:

- Passenger comfort
- Stabilized approach conditions
- Reduced workload in final phase

# 4.8 Approach

## Objective

To establish a stable, controlled and smooth transition from descent into final approach, ensuring a safe and predictable landing.

---

## Approach Philosophy (VA Standard)

The approach continues the descent philosophy:

- **Vertical path** → primarily pilot controlled (Selected modes)
- **Speed** → managed by aircraft (Managed mode)

Focus:

- Passenger comfort
  - Stabilized approach
  - Controlled energy management
- 

## Approach Preparation

**PF:**

- Conducts full approach briefing:
  - Runway
  - Approach type (ILS / RNAV)
  - Minimums
  - Missed approach procedure

**PM:**

- Verifies MCDU setup
  - Tunes and identifies navigation aids
  - Sets minimums
-

# Initial Approach Phase

- Descent continues using:
    - **Selected V/S (preferred)**
    - Managed Descent only if required
  - **Speed → MANAGED**
- 

# Localizer Capture

- Arm approach mode (APPR) as required
  - Monitor LOC capture
- 

# Glide Slope Intercept

## Configuration Requirement:

**Flaps 2 must be set BEFORE Glide Slope capture**

This ensures:

- Stable aerodynamic configuration
  - Smooth GS interception
  - Reduced workload during capture
- 

# Configuration During Approach

Progressive configuration:

- Flaps 1 → as speed decreases
  - **Flaps 2 → BEFORE GS capture (mandatory SOP)**
- 

# Final Approach (Stabilization Phase)

## Configuration Targets:

By **latest 5 NM Final:**

- Gear → DOWN
  - Flaps → FULL (in progress or completed)
- 

## Stabilization Requirement:

By **2 NM Final (latest at MINIMUM call)**:

The aircraft **MUST** be:

- Fully configured (**Flaps FULL, Gear DOWN**)
  - At **Final Approach Speed (VAPP)**
  - On correct vertical and lateral path
  - Stable descent rate
- 

## Speed Management

- **Managed Speed maintained throughout STAR and approach**

On final:

- Aircraft transitions to **VAPP automatically**
  - Manual intervention only if required
- 

## Stabilized Approach Criteria

At:

- **1000 ft (IMC)**
- **500 ft (VMC)**

Aircraft must be:

- On correct flight path
  - At correct speed
  - Fully configured
  - Stable
- 

## If NOT stabilized:

## Monitoring (PM)

- Localizer / Glide slope deviation
  - Speed trend (VAPP control)
  - Configuration status
  - Callouts
- 

## Standard Callouts

- “LOC STAR”
  - “GLIDE SLOPE STAR”
  - “FLAPS 2”
  - “GEAR DOWN”
  - “FLAPS FULL”
  - “STABLE”
- 

## Mode Philosophy

- **Vertical path:**
    - Controlled via GS or pilot input
  - **Speed:**
    - Managed by aircraft
- 

## Exceptions

Deviation from SOP allowed only if:

- **ATC instructions**
  - **Abnormal situations**
  - **Safety requires immediate action**
- 

## Core Rule

**“Stabilize early - never chase the aircraft.”**

---

# Outcome

A correct approach results in:

- Fully stabilized final
- Predictable aircraft behavior
- Safe and smooth landing phase

# 4.9 Landing

## Objective

To safely land the aircraft from a stabilized approach and conduct a controlled rollout while maintaining compliance with ATC and ensuring passenger comfort.

---

## Landing Clearance Policy (VA Standard)

### Without Landing Clearance:

If **no landing clearance** is received:

☐ At **MINIMUM call**:

- **MANDATORY GO-AROUND**
- 

### With “Expect Late Landing Clearance”:

If ATC issues:

☐ **“Expect Late Landing Clearance”**

Procedure:

- Continue approach below minimums
- Continue until **over the runway threshold**

If still **NO landing clearance**:

- **Initiate GO-AROUND at/over threshold**
- 

## Final Approach (Short Final)

- Maintain stabilized approach

- Monitor speed (VAPP)
  - Small corrections only
- 

## Flare

### PF:

- At ~**20 ft** → **initiate flare**
  - Smoothly reduce descent rate
- 

## Touchdown

- Target:
    - Main gear touchdown first
    - Within touchdown zone
- 

## After Touchdown

### PF:

- Maintain runway centerline

### PM:

- Monitor deceleration
- 

## Automatic Systems

- Spoilers → Deploy automatically
  - Autobrake → Active
  - Reverse Thrust → As required
- 

## Deceleration Phase

## Autobrake Policy:

- **High-speed exit (rapid vacate):**
  - Autobrake remains active until **80 knots**
- **Normal rollout:**
  - Autobrake remains active until **60 knots**

☐ Autobrake must **NOT be disconnected before these speeds**

---

## Manual Braking

- Take over braking after autobrake phase as required
- 

## Runway Exit Speeds

### High-Speed Turnoff:

- Target: **40 knots**
  - Maximum: **50 knots**
- 

### Standard / Tight Turns:

- Follow Airbus standard:
    - **Maximum 15 knots**
- 

## Reverse Thrust

- Use as required for runway conditions
  - Reduce to idle at ~70 knots (typical)
- 

## Callouts (Typical)

- "RETARD" (automatic)
- "SPOILERS"
- "REVERSERS GREEN"

- “80 knots”
  - “60 knots”
- 

## After Landing

- Vacate runway when safe
  - Inform ATC
  - Begin after landing flow
- 

## Key Principles

- Respect landing clearance at all times
  - Never continue below minimums without authorization
  - Maintain full control during rollout
- 

## Core Rule

**“No clearance - no landing.”**

**“Any deviation results in a GO-AROUND - landing is considered a bonus, not a requirement.”**

---

## Outcome

A correct landing results in:

- Safe touchdown
- Controlled deceleration
- Efficient runway exit

# 4.10 Taxi & Shutdown

## Objective

To safely taxi from the runway to the gate and perform complete aircraft shutdown while maintaining SOP compliance, passenger comfort, and ground crew safety.

---

## Taxi After Landing

### Initial Rollout

**PF:**

- Maintain runway centerline
- Smoothly decelerate using:
  - Autobrake (until 60–80 kt, siehe Landing SOP)
  - Reverse thrust (as required, idle ~70 kt)

**PM:**

- Monitor speed and runway clearance
  - Call out speed reductions
- 

## Runway Exit

- Enter taxiway at appropriate speed:
  - **High-speed exit:** 40 kt target, max 50 kt
  - **Tighter turns / standard turns:** max 15 kt

**PF:**

- Steer via tiller / rudder pedals
- Maintain smooth control

**PM:**

- Monitor external traffic
  - Verify lights and brake status
- 

## Taxi to Gate

- **Taxi speed:** approx. **20 kt**
- Outside apron: up to **30 kt allowed**
- Follow ATC instructions
- Maintain situational awareness

### Lights:

- Taxi lights → TAXI
  - Landing lights → OFF
  - Turnoff lights → ON
- 

## Approach to Parking Spot / Stand

### PF:

- Align aircraft with stand
- Reduce speed gradually
- Apply brakes smoothly

### PM:

- Monitor nose wheel alignment
- Monitor stand guidance (marshaller / VDGS)
- Call out distance and alignment

### Ground Crew Safety:

- **ALL front lights (Taxi, Landing, Turnoff) → OFF**
  - Ensure visibility hazards minimized for ground personnel
- 

## Engine Shutdown Procedure

Engine shutdown is based on **technical requirements**, not ground crew signals.

---

# Cooldown Requirement

After engine operation at higher thrust settings:

☐ A **minimum cooldown period of 60 seconds** must be observed before shutdown.

This applies from:

- The last time engine thrust exceeded approximately **50% N1**

---

# Purpose of Cooldown

The cooldown period ensures:

- Stabilization of engine temperatures
- Protection of internal components
- Prevention of thermal damage

---

# Standard Procedure

After parking brake is set:

1. Maintain engines at **IDLE thrust**
2. Monitor engine parameters
3. Wait **minimum 60 seconds cooldown**

---

# Engine Shutdown

After cooldown is complete:

- ENG MASTER switches → OFF

---

# Important Notes

- Do **NOT** shut down engines immediately after high thrust usage
  - Reverse thrust and taxi phases must be considered in cooldown timing
  - Ground crew does **NOT** determine shutdown timing
- 

## After Engine Shutdown (Turnaround)

---

### Objective

To safely transition the aircraft from engine operation to ground handling during turnaround while ensuring system stability and ground crew safety.

---

### Engine Spool Down Monitoring

After engine shutdown:

- Monitor engine parameters (N1)
  - Ensure engines are fully spooled down
- 

### Beacon Light Policy

**Beacon must remain ON until engines are fully spooled down**

- Wait until **N1 < 10%** on both engines

Only then:

- Beacon → OFF
- 

### Purpose

This ensures:

- Clear indication to ground crew that engines are no longer hazardous

- Prevention of personnel approaching running or spooling engines
- 

## APU Usage During Turnaround

The APU may remain in operation during turnaround depending on environmental conditions.

---

## Standard Practice

- APU → RUNNING (if required)
- 

## Typical Use Cases

APU should remain ON when:

- **High outside temperatures (heat)** → cabin cooling required
  - **Low outside temperatures (cold)** → cabin heating required
  - No external power or air supply available
- 

## When APU May Be Turned OFF

- External power is connected and stable
  - Environmental conditions allow
- 

## Electrical Configuration

- External Power → PREFERRED (if available)
  - APU → BACKUP or primary (if needed)
- 

## Cabin & Systems

- Seatbelt Signs → OFF

- Fuel Pumps → AS REQUIRED
  - Lighting → AS REQUIRED
- 

## Key Principles

- Engine shutdown does not end aircraft responsibility
  - Systems must remain stable during turnaround
  - Passenger comfort must be considered
- 

## Core Rule

**“Shutdown is a transition - not the end of operation.”**

---

## Outcome

- Safe handover to ground operations
  - Protected ground crew
  - Aircraft ready for next departure
- 

# Aircraft Shutdown Procedure

Apply if crew leave the aircraft and no new crew is there to take the aircraft.

## Before Shutdown

### PM / PF:

- Verify systems powered down safely
  - Check fuel, lights, electrical systems
-

# Standard Shutdown Flow

1. **Engines** → **OFF** (Engine Master switches)
  2. **APU** → **ON** (if ground power needed)
  3. **External Power** → **CONNECTED**
  4. **Battery switches** → **OFF (as required)**
  5. **Anti-collision lights** → **OFF**
  6. **Flight Instruments** → **Parked / Safe**
  7. **Parking Brake** → **SET**
- 

## After Shutdown

- Perform walk-around (virtual / checklist)
  - Ensure aircraft ready for next flight
  - Log flight details if required
- 

## Key Principles

- Smooth, controlled taxi to gate
  - Maximum taxi speed 20 kt (30 kt outside apron)
  - All front lights **OFF** when entering parking stand
  - Follow VA philosophy: passenger comfort & ground crew safety first
  - Shutdown only after full stop and all systems verified
- 

## Outcome

- Aircraft safely at gate
- Engines off, systems secured
- Crew ready for debriefing / next flight

# 5. Checklists & Flows

# 5.1 Philosophy

Checklists are used to **verify actions**, not to perform them.

All procedures follow the principle:

## ☐ FLOW → CHECKLIST

- **Flow:** Memory-based actions performed in a logical sequence
  - **Checklist:** Verification that all required items are correctly set
- 

## Core Rule

**“The flow sets the aircraft - the checklist verifies it.”**

---

## General Rules

- Checklists are performed **by PM**
- PF confirms critical items when required
- No checklist is performed during high workload phases unless required
- Interruptions → checklist must be restarted

## 5.2 Cockpit Preparation

### ? PM Flow (Overhead ? Pedestal ? Screens)

- BAT 1 + 2 → ON
  - EXT PWR → ON
  - Fuel Pumps → ON
  - ADIRS (3x) → NAV
  - Electrical Panel → CHECK
  - Hydraulics → CHECK
  - Air Conditioning → SET
  - Anti-Ice → OFF
  - Probe/Window Heat → AUTO
- 

### ? PF Flow (MCDU + Instruments)

- MCDU INIT A → COMPLETE
  - Flight Plan → INSERT + CHECK
  - INIT B → INSERT weights/fuel
  - PERF TO → SET speeds & FLEX
  - FCU:
    - Initial Altitude → SET
    - Heading → SET
  - Baro → SET
- 

### ? Cockpit Preparation Checklist

- Batteries → ON
- External Power → ON
- ADIRS → NAV
- Fuel Pumps → ON
- MCDU → PROGRAMMED
- ECAM → CHECKED

# 5.3 Before Start

## PM Flow

- Beacon → ON
  - Doors → CLOSED
  - Fuel Pumps → ON
  - APU BLEED → ON
- 

## ? PF Flow

- Confirm pushback clearance
  - Brief start sequence
- 

## ? Before Start Checklist

- Doors → CLOSED
- Beacon → ON
- APU BLEED → ON
- Fuel Pumps → ON

# 5.4 After Start

## ? PM Flow

- ENG MODE → NORM
  - APU BLEED → OFF
  - APU → OFF
  - Anti-Ice → AS REQUIRED
  - Flaps → SET
  - Pitch Trim → SET
- 

## ? PF Flow

- Monitor engine start
  - Verify parameters
- 

## ? After Start Checklist

- Engine Mode → NORM
- Flaps → SET
- Trim → SET

# 5.5 Taxi

## ?PM Flow

- Flight Controls → CHECK (ECAM)
  - Brake Temp → CHECK
  - Taxi Lights → ON
  - Takeoff Config → VERIFY
- 

## ? PF Flow

- Parking Brake → RELEASE
  - Thrust → IDLE / minimal
  - Steering → CONTROLLED
- 

## ? Taxi Checklist

- Flight Controls → CHECKED
- Instruments → SET
- Takeoff Briefing → COMPLETE

# 5.6 Before Takeoff

## ? PM Flow

- Cabin → READY
  - ECAM → NORMAL
  - Takeoff Config → CHECK
- 

## ? PF Flow

- Line-up briefing
  - Final runway verification
- 

## ? Before Takeoff Checklist

- Flaps → SET
- Trim → SET
- Cabin → READY

# 5.7 After Takeoff

## ? PM Flow

- Gear → UP (on command)
  - Flaps → RETRACT (on schedule)
  - Packs → ON
- 

## ? PF Flow

- Follow FD
  - Monitor climb
- 

## ? After Takeoff Checklist

- Gear → UP
- Flaps → UP
- Packs → ON

# 5.8 Approach

## ? PM Flow

- Minimums → SET
  - Nav Aids → SET
  - ECAM → CHECK
- 

## ? PF Flow

- Approach Briefing
  - Mode setup
- 

## ? Approach Checklist

- Minimums → SET
- Approach → BRIEFED
- Navigation → SET

# 5.9 Landing

## ? PM Flow

- Gear → DOWN
  - Flaps → FULL
  - Speed → CHECK
- 

## ? PF Flow

- Stabilize approach
  - Monitor FD
- 

## ? Landing Checklist

- Gear → DOWN
- Flaps → FULL
- Speed → CHECKED

# 5.10 After Landing

## ? PM Flow

- Spoilers → RETRACT
  - Flaps → UP
  - APU → START
- 

## ? PF Flow

- Taxi control
  - Vacate runway
- 

## ? After Landing Checklist

- Spoilers → RETRACTED
- Flaps → UP
- APU → START

# 5.11 Shutdown

## ? PM Flow

- Engines → OFF
  - Beacon → OFF
  - External Power → ON
- 

## ? PF Flow

- Parking Brake → SET
  - Confirm shutdown
- 

## ? Shutdown Checklist

- Engines → OFF
- Beacon → OFF
- External Power → ON

# 5.12 Key Principles

- Flows must be consistent
  - Checklists must not be skipped
  - PF/PM roles must be respected
- 

## Core Rule

**“Discipline in flows creates safety in flight.”**

---

## Outcome

- Standardized cockpit workflow
- Reduced workload
- Airline-level operation

# 6. MCDU / FMS Guide

# 6.1 Objective

The MCDU (Multipurpose Control and Display Unit) is used to manage:

- Flight planning
- Navigation
- Performance calculations
- Aircraft guidance

Correct setup is essential for safe and efficient flight operations.

---

## General Philosophy

- The FMGS manages the flight **only if correctly programmed**
- Pilots must always **verify inputs**
- Never rely blindly on automation

# 6.2 INIT A Page

Used for basic flight initialization.

## Required Entries:

- FROM / TO → Departure & Destination
  - FLT NBR → Flight Number
  - COST INDEX → Airline value
  - CRZ FL → Planned cruise level
- 

## Key Rule

**All entries must be cross-checked by PM**

# 6.3 Flight Plan Page

## Route Input:

- Insert waypoints / airways
  - Select SID and runway
  - Insert STAR and approach
- 

## Important:

- Remove all discontinuities
  - Verify route against briefing
  - Check for incorrect turns
- 

## Core Rule

**“No discontinuities without reason.”**

# 6.4 INIT B Page

## Fuel & Weight:

- Block Fuel → INSERT
  - Zero Fuel Weight → INSERT
- 

## Importance:

Incorrect values will result in:

- Wrong fuel prediction
- Incorrect performance

# 6.5 Performance Pages

## Takeoff (PERF TO)

- V1 / VR / V2 → INSERT
  - FLEX Temperature → SET
  - Thrust Reduction Altitude → SET
  - Acceleration Altitude → SET
- 

## Climb (PERF CLB)

- Managed speed profile active
  - Monitor climb performance
- 

## Cruise (PERF CRZ)

- Mach mode active
  - Fuel predictions monitored
- 

## Descent (PERF DES)

- Managed descent profile available
  - Used mainly for constraints
- 

## Approach (PERF APPR)

- VAPP → CHECK / INSERT
- Wind → INSERT
- Minimums → SET

# 6.6 Key Pilot Tasks and common errors

## Key Pilot Tasks

During all phases:

- Monitor flight plan
  - Check for route deviations
  - Verify altitude and speed constraints
- 

## Common Errors

- Missing discontinuities
- Incorrect SID/STAR selection
- Wrong performance data
- Not updating approach

# 6.7 Crosscheck Concept

Every critical input must be:

1. Entered by PF
  2. Verified by PM
- 

## Core Rule

**“Garbage in → Garbage out.”**

---

## Key Principle

The MCDU is a tool:

- It supports the pilot
  - It does not replace decision-making
- 

## Outcome

A correctly programmed MCDU ensures:

- Accurate navigation
- Efficient flight profile
- Reduced workload

# 7. Flight Handling & Airbus Philosophy

# 7.1 Objective and Philosophy

## Objective

To understand how to properly control and manage the Airbus A320 using automation, while maintaining full situational awareness.

---

## Core Philosophy

The Airbus is designed around one key concept:

☐ **“Manage the flight path, monitor the automation.”**

Pilots do NOT “fly the aircraft” in the traditional sense:

- They manage modes
- They supervise systems
- They intervene when necessary

# 7.2 Managed vs Selected Mode

This is the most important concept in Airbus operations.

---

## Managed Mode

- Aircraft follows FMGS flight plan
- Speed, altitude and path are automated

### Used when:

- Normal operations
  - Following SID / STAR
  - Cruise and climb
- 

## Selected Mode

- Pilot manually selects values (speed, heading, vertical speed)

### Used when:

- ATC instructions
  - Tactical corrections
  - Specific energy management
- 

## Core Rule

**“Managed by default - Selected when required.”**

# 7.3 Flight Director (FD)

The Flight Director provides guidance via crossbars on the PFD.

---

## Key Rule

☐ The aircraft must **follow the FD crossbars**

---

## Autopilot Engagement Rule

The autopilot may only be engaged if:

- Aircraft is stable
  - **FD crossbars are aligned**
  - Aircraft is already following FD commands
- 

## Core Principle

**“First fly the FD - then engage the autopilot.”**

# 7.4 Flight Mode Annunciator (FMA)

Located at the top of the PFD.

---

## Importance

The FMA shows:

- Active modes
  - Armed modes
  - Autothrust status
- 

## Key Rule

**☐ Always confirm mode changes on the FMA**

---

## Standard Call

- “FMA checked”
-

# 7.5 Thrust Management

The A320 uses fixed thrust detents:

- IDLE
  - CL (Climb)
  - FLX/MCT
  - TOGA
- 

## Key Concept

- Thrust levers are set to detents
  - Autothrust manages thrust within limits
- 

## Core Rule

**“Set thrust - let the system manage it.”**

# 7.6 Energy Management

Energy = Speed + Altitude

---

## Good Energy State

- On profile
  - Correct speed
  - Minimal corrections required
- 

## Bad Energy State

- Too fast / too high
  - Too slow / too low
- 

## Correction Methods

- Adjust vertical speed
- Use speed brakes
- Select speed if required

# 7.7 Automation Discipline

Pilots must:

- Understand active modes
  - Anticipate aircraft behavior
  - Intervene early
- 

## Common Mistakes

- Blind trust in automation
  - Wrong mode selected
  - Late corrections
- 

## Core Rule

**“If you don’t understand the mode - you are not in control.”**

# 7.8 Manual Flying

Manual flying is required:

- During training
  - In abnormal situations
  - When automation is not appropriate
- 

## Key Principle

- Smooth inputs via sidestick
- Trust flight control laws

# 7.9 Situational Awareness

Pilots must always know:

- Where the aircraft is going
  - What the aircraft is doing
  - What will happen next
- 

## Core Rule

**“Stay ahead of the aircraft.”**

---

## Outcome

Correct application of Airbus philosophy results in:

- Smooth, efficient flights
- Proper automation usage
- High level of control and awareness

# 8. Abnormal Procedures

# 8.1 Objective and Philosophy

## Objective

To provide simplified guidance for handling non-normal situations in a safe and structured manner.

---

## General Philosophy

In all abnormal situations:

### ☐ **Aviate - Navigate - Communicate**

1. Fly the aircraft
2. Maintain situational awareness
3. Communicate when workload permits

## 8. Abnormal Procedures

# 8.2 ECAM Philosophy

The ECAM system provides:

- Automatic failure detection
- System information
- Step-by-step actions

---

## Core Rule

**“Follow ECAM - do not memorize procedures.”**

## 8.3 Engine Failure After Takeoff

- Maintain runway track
- Thrust → TOGA
- Positive climb → Gear UP

At safe altitude:

- Engage autopilot
- Follow ECAM actions

# 8.4 Unstable Approach and Go-Around

## Unstable Approach

Go-around if:

- Not stabilized (see SOP criteria)
  - Incorrect speed or configuration
  - Excessive deviation
- 

## Go-Around

- Thrust Levers → TOGA
  - Pitch → Follow FD
  - Positive climb → Gear UP
- 

## Core Rule

**“When in doubt - go around.”**

## 8. Abnormal Procedures

# 8.5 TCAS (RA)

- Follow TCAS commands immediately
- Disconnect autopilot if required

# 9. Performance & Limits

# 9.1 Objective

This chapter provides a structured understanding of the Airbus A320 performance fundamentals and operational limits required for safe and efficient flight operations.

It is not intended to replace real-world performance manuals, but to give pilots the necessary knowledge to:

- Understand key speeds
- Operate within safe limits
- Maintain stable and predictable aircraft behavior

# 9.2 Takeoff Performance

## V-Speeds Explained

Before every departure, three critical speeds must be calculated and inserted into the MCDU:

---

### V1 – Decision Speed

- The maximum speed at which a rejected takeoff can be safely initiated
  - After passing V1, the takeoff **must be continued**, even in case of failure
- 

### VR – Rotation Speed

- The speed at which the pilot initiates aircraft rotation
  - Smooth and controlled pitch input is required
- 

### V2 – Takeoff Safety Speed

- Minimum safe climb speed after liftoff
  - Ensures sufficient climb performance in case of engine failure
- 

## Operational Importance

Incorrect V-speeds can lead to:

- Unsafe takeoff performance
  - Runway overruns
  - Insufficient climb capability
- 

## Core Rule

**“Takeoff performance is calculated - never estimated.”**



# 9.3 Approach & Landing Speeds

## VAPP – Final Approach Speed

VAPP is the target speed during final approach.

It includes:

- Reference landing speed (VLS)
  - Wind correction
  - Safety margin
- 

## Stability Requirement

Maintaining VAPP ensures:

- Stable descent
  - Predictable aircraft response
  - Safe landing performance
- 

## Operational Note

Excessive speed leads to:

- Long landing distance
- Unstable flare

Too low speed leads to:

- Reduced lift
  - Increased stall risk
- 

## Core Rule

**“A stable approach requires a stable speed.”**

# 9.4 Flap Configuration & Limits

The Airbus A320 uses multiple flap configurations to adapt to different flight phases.

---

## Flap Settings Overview

- Flaps 1 → Initial configuration
  - Flaps 2 → Approach phase (GS intercept SOP)
  - Flaps 3 → Intermediate landing config
  - Flaps FULL → Final landing configuration
- 

## Speed Limits (Typical)

- Flaps 1 → max ~230 kt
  - Flaps 2 → max ~200 kt
  - Flaps 3 → max ~185 kt
  - Flaps FULL → max ~177 kt
- 

## Operational Importance

Exceeding flap limits may cause:

- Structural damage
  - System warnings
  - Loss of control margin
- 

## Core Rule

**“Configuration must always match speed.”**

# 9.5 Taxi Speed Limits

Taxi speed is critical for:

- Safety
  - Passenger comfort
  - Ground operations
- 

## Standard Taxi Speeds

- Normal taxi → approx. **20 kt**
  - Outside apron → max **30 kt**
- 

## Special Cases

- High-speed exit → **40 kt (max 50 kt)**
  - Tight turns → max **15 kt**
- 

## Operational Importance

Excessive taxi speed increases:

- Brake wear
  - Risk of runway/taxiway excursions
  - Passenger discomfort
- 

## Core Rule

**“Taxi speed must always match environment.”**

# 9.6 Cruise Performance

## Typical Cruise Envelope

- Altitude: **FL320 - FL390**
  - Speed: **Mach 0.76 - 0.80**
- 

## Efficiency Considerations

- Higher altitude → lower fuel burn
  - Managed speed → optimal performance
- 

## Monitoring Requirements

Pilots must monitor:

- Fuel consumption
  - Wind conditions
  - Flight progress
- 

## Core Rule

**“Cruise is about efficiency, not speed.”**

# 9.7 Descent Performance & Energy Management

## Descent Characteristics

- Typically flown at idle thrust
  - Vertical path controlled manually (VA SOP)
  - Speed managed automatically
- 

## Energy State Awareness

Pilots must continuously assess:

- Altitude vs distance
  - Speed vs configuration
- 

## High Energy Situation

- Too fast / too high

Correction methods:

- Increase descent rate
  - Use speed brakes
- 

## Low Energy Situation

- Too slow / too low

Correction methods:

- Reduce descent rate

- Increase thrust
- 

## Core Rule

**“Energy must be managed early - not corrected late.”**

# 9.8 Operational Limits

Pilots must always respect:

- Speed limits (including flap limits)
  - Aircraft configuration limits
  - Stabilized approach criteria
  - ATC restrictions
- 

## Importance

Limits are not recommendations - they define:

- Structural safety
  - Aircraft performance
  - Operational boundaries
- 

## Core Rule

**“Limits are absolute - not optional.”**

# 9.9 Stabilized Approach as Performance Factor

A stabilized approach is the final expression of correct performance management.

---

## Requirements

- Correct speed (VAPP)
  - Correct configuration
  - Correct descent profile
- 

## Outcome

If performance is managed correctly:

- Aircraft arrives stable
  - Landing becomes predictable
  - Workload is reduced
- 

## Core Rule

**“A good landing starts with good performance management.”**

# 9.10 Summary

Performance management in the A320 is based on:

- Proper planning
  - Correct speed usage
  - Respecting aircraft limits
  - Continuous monitoring
- 

## Final Principle

**“Performance defines safety, efficiency and control.”**