

# Identification

Aircraft identification is a fundamental task in air traffic control, ensuring accurate tracking, communication, and coordination between controllers and pilots. Before issuing any ATC clearance in a **Surveillance Services** environment, an aircraft **must be positively identified**.

## Methods of Identification

Aircraft can be identified using various methods:

- **Unique Call Signs** – Each aircraft has a unique identifier associated with its flight plan.
- **Transponder Codes (SSR)** – Squawk codes assigned by ATC for tracking and separation.
- **Aircraft Type & Registration** – Helps verify aircraft identity, especially in mixed traffic environments.
- **ADS-B Data** – Automatic Dependent Surveillance–Broadcast, providing real-time aircraft information.

If a pilot selects an incorrect **SSR code or transponder mode**, ATC must instruct them to correct it.

## Radar Identification

Surveillance radar systems provide **position, altitude, and speed data**, allowing controllers to track and correlate aircraft targets accurately. Radar identification is required **before providing ATC services**.

When an aircraft leaves **radar coverage or enters uncontrolled airspace**, controllers must **terminate radar service** and inform the pilot accordingly.

## Level Verification

- Controllers must **verify the displayed level information** at least once on initial contact.
- The tolerance for verifying accuracy:
  - **±200 FT in RVSM airspace**
  - **±300 FT in non-RVSM airspace**

If the displayed altitude **exceeds tolerance values**:

- ✓ **Ask the pilot to confirm the correct altimeter setting (QNH)**
- ✓ **If necessary, instruct the pilot to disable Mode C altitude reporting**

Unlike **tower controllers**, who can visually observe aircraft, **radar controllers rely entirely on surveillance data** from various systems.

# Primary Surveillance Radar (PSR)

## How PSR Works

- PSR transmits **electromagnetic waves** and displays reflections on the radar screen.
- Each reflection represents an aircraft, but PSR does **not transmit aircraft identity information**.
- Identification must be performed manually using **position correlation or maneuver-based methods**.

## Methods of Identifying Aircraft Using PSR

1. **Position Reports** – Correlating a radar target with a pilot's position report (distance & bearing from a known point).
2. **Departing Aircraft** – Assigning a radar target to an aircraft departing within **1 NM of the runway end**.
3. **Turn Method** – Instructing an aircraft to **turn by 30° or more** and observing the corresponding radar movement.
4. **Transfer of Identification** – Another controller transfers a positively identified aircraft to your control.

# Secondary Surveillance Radar (SSR)

## How SSR Works

- Unlike PSR, **SSR actively interrogates aircraft transponders**, which reply with encoded data.
- **Provides enhanced aircraft identification**, reducing workload and increasing accuracy.

## SSR Interrogation Modes

Mode	Transmitted Data
A	4-digit squawk code
C	Pressure altitude
S	Callsign, 24-bit aircraft address, selected altitude, speed, etc.

Modes **A** and **C** are often combined as **Mode 3A/C**.

## Methods of Identifying Aircraft Using SSR

- ✓ **Recognition of aircraft callsign in an SSR label**
- ✓ **Recognition of an assigned discrete squawk code**
- ✓ **Observation of a pilot-acknowledged squawk IDENT activation**
- ✓ **Transfer of identification from another controller**

The most **common method of identification on VATSIM** is **recognizing the aircraft ID (callsign) in an SSR label**. If a pilot is unable to activate their transponder, they can be identified using **PSR methods**.

# Reading and Deviations of Transponder Values

While transponder deviations are **less relevant in a simulated environment** than in real life, controllers should still monitor transponder readouts for accuracy.

- A flight level is considered "**reached**," "**maintained**," or "**left**" based on the transponder reading.
- A **200-foot tolerance** is generally applied on VATSIM.
- Any deviation beyond tolerance should be addressed with the pilot.

Pilots should be reminded to **check their QNH settings** if an altitude discrepancy is detected.

# SSR & ADS-B in ATC Operations

## SSR (Secondary Surveillance Radar) vs. ADS-B

SSR and **ADS-B (Automatic Dependent Surveillance-Broadcast)** are **complementary technologies** enhancing ATC surveillance:

Technology	Function
SSR	Interrogates aircraft transponders to receive replies
ADS-B	Aircraft broadcasts its own position and data automatically

## Transponder Use in Ground Operations

- **Before takeoff:** The transponder should be turned on before departure.
- **At airports with ground movement radar (SMGCS):** The **correct squawk code** should be set before taxiing.

For more details on **Surface Movement Guidance and Control Systems (SMGCS)**, refer to [Skybrary](#).

# Controller Responsibilities in Identification

## Before Providing ATC Services

- ✓ Aircraft **must be positively identified**.
- ✓ Identification must be confirmed **before issuing clearances**.
- ✓ Inform the pilot of radar identification **unless the previous sector already identified them**.

## If Transponder Issues Occur

- ✓ **Instruct the pilot to check transponder settings.**
- ✓ **If Mode C data is unreliable, request them to disable altitude reporting.**

## Loss of Radar Contact

- ✓ **If an aircraft leaves radar coverage**, radar service must be **terminated** and the pilot **must be informed**.
- ✓ **Procedural separation** may be required if radar service is lost.

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