Tasks Tower

The tower is generally responsible for all movements on the runways as well as within the control zone (CTR). Additionally, it determines the runway direction at the airport. Different or additional tasks are described in the respective airport SOP.

Besides ensuring the safe handling of air traffic, it is particularly important to work efficiently during high traffic volumes, as often seen on the network. The basic principle for controllers applies here: "Safe, orderly, and expeditious," meaning primarily safe, but also orderly and efficient.

Tasks

The tower controller has, among other things, the tasks listed below. Corresponding phraseology examples for the tower area can be found in a separate article.

Determining the Runway Direction

The tower decides which runway will be used at an airport. This primarily depends on the prevailing wind (direction and speed), which can be determined using METAR and TAF. If local anomalies need to be considered (e.g., maximum tailwind components for a runway), this can be found in the respective airport SOP.

Aircraft prefer to take off and land into the wind. The runway designation indicates the direction it points according to the compass rose. For instance, runway 08L in Munich points approximately 080° east. The opposite direction, runway 26R, is rotated by 180° and points to 260°, which is roughly west. The wind direction in METAR indicates where the wind is coming from. If the wind comes from 260° (west), runway 26R will be used to take off and land into the wind. If the wind is not directly from the direction the runway points, the one with the largest headwind component is used.

The active runways are then published via ATIS.

Note: The runway direction should not be confused with the operational mode. The operational mode is a term that describes how the selected runways are controlled. Each airport has multiple possibilities. Besides standard operation, an airport can be operated under Low Visibility Operations (LVO) to maintain flight operations even in bad weather.

At larger airports with parallel runways, there are several usage options. Under certain conditions, the runways can be used independently in "Parallel Independent" mode. Another possible operational mode is "Parallel Dependent," where, for example, radar separation to the parallel runway must be maintained during approach.

Details on the operational mode can be found in your airport's SOP.

Taxi Movements in the Runway Area

The runway is the sanctuary of the tower controller. They may issue clearances for lineup, crossing, backtrack, and finally for takeoff and landing. Correct runway separation must always be maintained. Besides a normal lineup clearance, conditional clearances can be used to optimize frequency efficiency. If the runway is immediately clear for departure, the lineup clearance can be skipped, and the takeoff clearance given directly (see below).

Under certain circumstances, a backtrack is necessary. Details can be found in this article.

Creating a Departure and Arrival Sequence

The tower usually receives departing aircraft from the apron/ground controller in a random order, typically shortly before reaching the holding point of the active departure runway. If another runway needs to be crossed on the way, the handover can occur earlier. The principle of "First come, first served" generally applies in air traffic control. This means the first aircraft at the runway is the first to depart. However, the tower can deviate from this to minimize average delay. There can be scenarios where it makes sense to advance the aircraft at the back to depart first. More information on this in the article Efficiency - Tower.

The arrival sequence for IFR traffic is predetermined, as aircraft in the final approach are handed over by the approach controller, and the tower cannot change this sequence. However, the tower has control over VFR traffic and can determine which VFR aircraft should fit into which IFR gap. The tower can also determine an approach sequence for multiple VFR aircraft.

Clearances for Takeoffs and Landings

The most well-known clearances in the tower area are the takeoff and landing clearances. Here too, the rules for runway separation must be ensured. In S2 training, the topic of not withholding a takeoff or landing clearance is also of interest. If necessary and conditions are met, reduced runway separation can be applied.

Takeoffs must be timed so that either radar separation, wake turbulence separation, or a certain minimum spacing is ensured in the air. Details in the article Separation in the Tower.

At most airports, the pilot contacts the radar controller automatically after takeoff, so no further communication occurs after departure. However, at some airports (e.g., Munich and Frankfurt), a separate handoff is necessary once the aircraft is airborne. Details can be found in the respective airport's SOPs.

Landing clearance can be granted once no one else has clearance for the same runway, and runway separation is guaranteed.

Handling Missed Approaches

A missed approach or go-around can be initiated by either the controller or the pilot. As a tower controller, you should not panic. Handling a missed approach is described in this article.

Control of VFR Traffic within the Control Zone

The tower controller is responsible for the entry and exit of VFR traffic in and out of the control zone and issues the necessary clearances. Since VFR traffic is not required to be separated from each other or from IFR traffic, traffic information must be provided if two aircraft are approaching each other. The tower also has the ability to delay VFR traffic within the control zone, for example, by orbits, extending the downwind leg, or setting an approach sequence. Additionally, the tower grants VFR traffic various training approaches, such as low approaches or touch-and-gos.

Everything related to VFR handling is described in this chapter.

Monitoring Separation

IFR traffic must be separated from other IFR traffic within the control zone. Therefore, the tower is responsible for ensuring separation between two IFR aircraft. This applies to departures, arrivals, and missed approaches concerning other traffic.

For departures, the tower decides when to issue takeoff clearances so that aircraft are separated.

Approaches are handed over by the approach controller in such a way that the tower controller usually does not need to intervene. However, situations may arise where a pilot unexpectedly reduces speed early, causing the following aircraft to catch up. Therefore, the tower must also monitor separation here and instruct a missed approach if there is a risk of separation being violated.

In the case of a missed approach, the tower must also ensure separation from other possible aircraft. Details are in this article.

Detailed information on separation in the tower area can be found in this article.

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