Tasks and areas of responsibility

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Tasks of Air traffic controllers

Air Traffic Controllers (ATCOs) are responsible for providing the Air Traffic Control Service according to ICAO Document 4444 (Air Traffic Management - something like the bible of air traffic control, setting international standards) and ICAO Annex 11 (Air Navigation Service). Annex 11 defines this as follows:

> *Air traffic control service is a service provided for the purpose of:*
>
> - *preventing collisions:*
>   - *between aircraft, and*
>   - *on the manoeuvring area between aircraft and obstructions; and*
> - *expediting and maintaining an safe, orderly and expeditious flow of air traffic.*

The first bullet point can be summarized with the term ***Safety***. This point, of course, has the highest priority. As you will learn in one of the following chapters, within the framework of the Air Traffic Control Service, we prevent collisions between aircraft by establishing and ensuring separation. To prevent collisions on the ground, we issue safe taxi instructions.

The second bullet point can be summarized with the term ***Efficiency***. According to the mentioned regulations, the air traffic controller is also obliged to handle traffic not only safely but also *efficiently* and *orderly*.

At the beginning of the training, the focus is of course on Safety first, but we want to train you to become an efficient controller as quickly as possible. It will be very important for you to correctly prioritize the many tasks as a controller, to demonstrate good preplanning, and to use your frequency efficiently.

However, the topic of Efficiency is extremely difficult to describe as a theoretical topic, which is why your mentors will primarily work on it with you during the practical sessions.

Tasks Delivery

The Delivery position is often massively underestimated and dismissed as a mere talking station without the need for critical thinking. If you’ve thought this way, we can tell you: Delivery is much more than that. In reality, Delivery controllers are also called ground coordinators. This designation indicates more accurately that delivery is not just about speaking, but is responsible for the fundamental coordination of all departures and thus also capacity management.

Tasks

Checking Flight Plans

Before a pilot receives their enroute clearance, the flight plan should be checked for accuracy. Particular attention should be paid to:

- Correct callsign (e.g., DLH instead of LH)
- Correct flight rule
- Valid flight plan - depending on SOPs, the first waypoints must be checked for restrictions. Add-ons like the Flight Plan Checker, which are pre-installed in the Euroscope packages of the FIRs, help with this.

Issuing Enroute Clearances to IFR Departures According to Local Procedures

Perhaps the most well-known task of the delivery controller is issuing enroute clearances for IFR, where the pilot, in addition to being assigned a transponder code and initial climb, also receives their clearance for the departure route and the flight route itself. This can be done via voice or DCL (Datalink Clearance). Generally, the departure route is a SID according to local procedures. Under certain circumstances (e.g., for a local IFR flight or if the pilot’s navigation database is outdated), a so-called vectored departure may also be assigned.

Details on enroute clearance can be found in this article.

Issuing Startup Clearances

A peculiarity in Germany is that the delivery controller also issues the startup clearance with the phrase “startup approved,” which permits engine start. However, the pilot must still coordinate the actual starting of the engines with the ground crew. Therefore, engines often only start during pushback. For the controller, this makes no difference.

Startup clearance is only issued if the flight can expect pushback soon. At non-ACDM airports, startup clearance should not be given if the expected delay exceeds 20 minutes. At ACDM airports (Airport Collaborative Decision Making), startup clearance is given at TSAT (Target Startup Approval Time) +/- 5 minutes. At some airports, VFR traffic also requires explicit startup clearance from the delivery controller.

Details can be found in the local procedures of the respective airport.

Monitoring Departure Capacities in Coordination with the Tower

Especially during heavy traffic, the delivery controller, even on Vatsim, is responsible for managing departure capacities. They are the first link in the long chain of controllers who can manage traffic flow at an airport. By withholding startup clearances during high traffic volumes, they ensure that airport capacity is not exceeded by too many planes on the ground.

Details on capacity values and departure management can be found in the delivery section of the respective tower SOP. Furthermore, close coordination between delivery and tower is helpful, as the tower, as the “receiving unit,” has the final say on how many departures it can handle.

> For events, there may also be a delivery coordinator. Details on the tasks can be found in this article.

Delivery Coordinator

With the increasing number of flights on the network, especially during events and online days, the role of Delivery is becoming increasingly important, and the workload is rising immensely. To handle departing traffic most efficiently, it is advisable to staff Delivery with two controllers: an operator and a coordinator.

Operator: The operator is responsible for all voice communication with pilots on the frequency (enroute and startup clearance). They are responsible for setting the clearance received flag and the startup status.

Coordinator: The coordinator has the following tasks:

- Checking and Editing Flight Plans (setting SID, initial climb, squawk, etc.)
- Datalink Clearances (via Topsky)
- Text Communication (e.g., with text pilots in the frequency chat and via private message)
- Coordination with Other Stations (e.g., with tower, arrival)
- Monitoring Traffic Flow at the Entire Airport

Editing the Flight Plan: If there are errors in the flight plan that need correction (depending on SOPs - incorrect SID, FL, route), the coordinator should address this with the pilot via private message before the clearance request, not on the frequency! Only when the flight plan is checked, edited, and possibly corrected, should the squawk be set. This signals to the operator that the clearance can be issued.

Startup Clearance: When using the CDM plugin, the operator is responsible for setting the TOBT and working with the resulting TSAT. When using manual slots (without the CDM plugin), the coordinator is responsible for entering the TSAT into the remarks field and monitoring the traffic situation at the airport.

Request List: If the route clearance cannot be given immediately (e.g., because other pilots are still waiting), the request function of the VCH plugin should be used. The same applies to startup clearance if it cannot be given immediately.

Tasks Apron / Ground

Difference Apron vs. Ground

Apron and Ground, two terms that seem similar at first glance: Even upon closer inspection, the differences between the two remain subtle.

Ground is responsible only for taxiing traffic in all areas outside the apron (the area with parking positions).

Apron is responsible for all taxiing movements and pushbacks on the apron.

Smaller airports like Bremen, Nuremberg, Stuttgart, or Leipzig do not have a designated Apron working position, so Ground is responsible for all taxiing movements on the aprons and taxiways at these locations.

> If there is an apron position at the airport, it is usually staffed by controllers from the airport operator, whereas Ground is controlled by controllers from DFS.

Tasks

The main tasks of an apron/ground controller on Vatsim include:

Pushback clearances for departing traffic

Depending on the parking position, aircraft may need a pushback before they can taxi to the runway. Details can be found in this article.

Taxi clearances for aircraft from the parking position to the runway or to the designated handover point according to SOPs, and vice versa:

The core task of a ground controller is undoubtedly issuing taxi clearances. Departing aircraft need to be sent to the runway, and arriving aircraft need to be directed from the runway to the parking position. Aircraft should not stop unnecessarily but should keep moving whenever possible. This saves time, fuel, and thus also benefits the environment. The general controller principle is: "Safe, orderly, and expeditious," meaning a safe, orderly, and swift flow of traffic.

Depending on the SOPs or airport charts, there are spatially clearly separated areas of responsibility between Tower, Ground, and Apron.

Efficient pre-planning of ground traffic:

A key characteristic of a good controller is their ability to pre-plan traffic. Without pre-planning, aircraft may have to wait unnecessarily long because a taxiway is blocked, or there may be taxi conflicts. More information on efficient pre-planning of pushbacks and taxi clearances can be found in this article.

Timely recognition and solving of taxi conflicts:

Aircraft come closer to each other at the airport than anywhere else. Therefore, it is all the more important to identify potential conflicts between moving traffic (pushbacks and taxiing aircraft) early on. This goes hand in hand with timely pre-planning. Under no circumstances should two aircraft end up blocking each other's way because neither knows who is number one and who is number two. An "opposite," where two aircraft face each other with no way to avoid, is also unacceptable. Methods for resolving potential conflicts are described in this article.

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.

Tasks Arrival

The Approach/Arrival position oversees the vicinity around larger airports. It is typically responsible for all arrivals and departures from the respective airports. The main task is to merge the different traffic flows coming from various directions and guide them with the necessary separation into the final approach.

To bring traffic safely and efficiently to the final approach, the controller has various tools at their disposal. They can use STARs, transitions, and radar vectors to achieve the necessary separation. To maintain this separation, speeds are typically used, which the pilot must adhere to. The goal of a good approach sequence is to lead the inbound aircraft to the ILS with the smallest possible separation.

If the approach controller's sector becomes too congested, causing subsequent aircraft to wait, the controller has the option to use holding patterns.

Major airports like Frankfurt or Munich often have multiple approach positions as well as dedicated controllers for departure and a feeder who exclusively manages the aircraft on the final approach (see below). At smaller airports (e.g., Frankfurt/Hahn, Dortmund), the approach controller's tasks are usually taken over by the respective center controllers in the lower airspace.

Arrival *Sector* Frankfurt

Station	Phraseology
Pilot	Langen Radar hello, CFG7HX passing FL158, descending FL130, info T.
ATC	CFG7HX, Langen Radar identified, descend FL100, expect ILS runway 25L.
Pilot	CFG7HX, descend FL100, expect ILS runway 25L.

Feeder

The position of the Feeder (callsign "Arrival") is to bring aircraft as precisely as possible to the final approach, to then hand them over to the tower. The Arrival controller descends the aircraft coming from the center, puts them on the downwind or an appropriate heading, and hands them over to the Feeder.

Both stations must harmonize well and be familiar with each other’s positions. It’s not particularly difficult when aircraft arrive continuously so that they can be guided along the transitions and handed over to the Feeder on the downwind. However, during gaps and phases with less traffic, it becomes interesting. The Pickup needs to know when it makes sense to send an aircraft to the

Feeder on a "magic heading" that brings it directly to the final approach instead of via the downwind. The Feeder must then understand what the Pickup intended with this heading.

It is important that the Pickup hands over all arrivals conflict-free. For instance, all aircraft flying behind each other and cleared to the same altitude must be set to the same speed. Two aircraft whose flight paths would eventually cross if they continued on the heading they are handed over to the Feeder **must** be handed over at different altitudes. It also makes sense to hand over aircraft on different sides of the runway at different altitudes so that the Feeder can safely turn them onto the final approach, in case one overshoots.

The Pickup can also hand over a "package" of two aircraft to the Feeder, but must ensure there is space on the final approach to achieve the necessary spacing between them. It is however normally the Pickup’s job to sequence the aircraft onto the downwind with spacing already in place. Note: When aircraft continuously arrive on both downwinds, they must always have double the spacing between them compared to what is needed later on the final approach, since the Feeder has to merge both downwinds into one final approach. This does, of course, not apply to airports like Frankfurt and Munich with two independent finals.

Experience is needed here as well to ensure good cooperation between Pickup and Feeder. We have the disadvantage that the two usually do not sit in the same room next to each other, so "elbow-coordination" is not possible. Therefore, care must be taken to work clearly with each other.

Departure

In addition to arrivals, all departures from an airport must also be managed by a radar controller once they are airborne. At many airports, this task also falls to the Arrival controller (e.g., in Munich and Hamburg), while at some airports there are dedicated positions that exclusively handle departures (e.g., in Frankfurt and Düsseldorf).

The main task of a Departure controller is to allow departures to climb between arrivals and then hand them over to the Center controller. Outbounds can be handed over to the radar by the tower with a minimum spacing of 3 NM, so the radar controller must pay particular attention to the aircraft’s performance and the necessary separation.

The exact procedures regarding transfer altitudes, noise abatement, and aircraft management are highly dependent on the airport and described in the respective SOP.

Normally, all departures follow a precisely defined departure route and climb to the altitude cleared by the SID. When deviations occur through headings or directs, the aircraft must be above the Minimum Vectoring Altitude (MVA) applicable in that area.

As a Departure controller, it is important to note that two departures on the same route must be handed over to the Center with at least 10 NM spacing. If this is not possible with the use of speeds and vectors/directs, different transfer altitudes can be coordinated as an exception to the LoA (Letter of Agreement). The handover must always be conflict-free, and releases are regulated via the LoA/SOP.

Additional links

- **Skybrary:** Structured Scan