Tower Controller

Start-up

A start-up clearance is permission from ATC for an aircraft to start its engines, confirming that the airport can accommodate the resulting noise. This clearance indicates that the controller has assessed the surrounding airspace, verified the flight plan, and deemed it safe for the aircraft to begin its departure process. Pilots must request start-up clearance from ATC before starting their engines.

DEL also issues the start-up clearance with the phrase "start-up approved," which permits engine start. However, the pilot must still coordinate the actual starting of the engines with the ground crew. Engine start is not permitted while on stand but may occur after pushback or when the ground crew has deemed it safe on a remote stand. Start-up clearance is only issued if the flight can expect pushback soon.

During heavy traffic scenarios, DEL manages departure capacities by withholding start-up clearances when necessary. This prevents airport capacity from being exceeded by too many aircraft maneuvering on the surfaces of the airport. Effective coordination between all aerodrome controllers is critical for managing departures efficiently.

In many cases, the aircraft will also require pushback to taxi to the departure runway. Start-up and pushback clearances are often issued together, especially when no delays are anticipated. Controllers should ensure that pilots have received the latest ATIS broadcast and the current local QNH before departure. Providing the QNH with the start-up or pushback clearance is often a good practice.

Pushback

After or during start-up clearance, aircraft parked in positions requiring pushback are typically moved onto a taxiway by a tug. Smaller aircraft may use a procedure called "power back," enabling them to push back and taxi out under their own power without the need for a tug.

ATC must specify the pushback procedure, including the direction (e.g., "facing south"). Aircraft handed over from the Ground Controller (GND) should be ready for pushback, having reached their Target Off-Block Time (TOBT). If no obstructions are present, pushback clearance is issued immediately.

Station	Phraseology

Pilot	Marrakech Tower, TVF67MM, stand 7, request pushback.
ATC	TVF67MM, Marrakech Tower, pushback approved, face west runway 10.
Pilot	Pushback approved, face west runway 10, TVF67MM.

The pushback direction depends on the aircraft's location, runway configuration, and apron traffic flow. Pushbacks temporarily block taxiways, so controllers must proactively manage traffic, especially at large airports. If a pushback cannot occur immediately (e.g., due to another aircraft or an inbound taxiing), the pilot should be informed with a "hold position" instruction and, if possible, given a brief explanation of the delay.

In cases where multiple aircraft are ready for pushback, controllers may deviate from the "first come, first served" rule to optimize overall traffic flow. Conditional pushback instructions can also be issued during high traffic volumes, such as when an aircraft must wait for another to pass behind it before pushing back. This approach improves taxiway coordination and efficiency.

Conditional pushback transfers some responsibility to pilots and is particularly helpful when managing multiple aircraft pushing back in close proximity. However, controllers must ensure that all instructions are clear and unambiguous to avoid misunderstandings. Simpler instructions are preferable if there is any uncertainty about pilot comprehension.

Advanced procedures, such as "push and pull," can be used to manage complex scenarios, such as clearing a taxiway quickly or coordinating pushbacks for adjacent aircraft. Controllers should only use advanced techniques if they are comfortable and confident in their ability to manage the situation effectively.

Station	Phraseology
Pilot	Mohammed V ground, RAM800F, stand C8, request pushback.
ATC	RAM800F, Mohammed V ground, short pushback approved face south to finish abeam stand C6, runway 35R.
Pilot	Short pushback approved face south to finish abeam stand C6, runway 35R, RAM800F.

Clearance delivery

The aerodrome controller is responsible for issuing an en-route clearance to a departing IFR aircraft before departure. Typically, pilots request en-route clearance prior to start-up.

Standard clearances for departing aircraft must include the following elements:
a) Aircraft callsign
b) Clearance limit, usually the destination aerodrome

c) Designator of the assigned Standard Instrument Departure (SID), if applicable

d) Initial level, unless specified in the SID description

e) Assigned SSR code

f) Additional instructions or information not included in the SID, such as frequency changes

Station	Phraseology
Pilot	Tunis ground, TUX1758, AT72 stand P26, information F, requesting en-route clearance to Palermo.
ATC	TUX1758, Tunis ground, cleared to Palermo, CBN3A departure, climb initially altitude 4000ft, squawk 4661.
Pilot	Cleared to Palermo, CBN3A departure, climb initially altitude 4000ft, squawk 4661, TUX1758.
ATC	TUX1758, correct.

Taxi

Taxi clearances must include clear and concise instructions to safely guide pilots to the holding point of the departure runway. If a taxi clearance involves crossing a runway, it must explicitly include either a clearance to cross or an instruction to hold short of the runway.

Pilots may be cleared to taxi even if another aircraft ahead of them is not yet ready to taxi. In such cases, the pilot must stop behind the preceding aircraft and only proceed once it moves. For complex taxi routes, dividing the clearance into smaller sections simplifies the pilot's readback and reduces errors, ensuring active ATC monitoring throughout.

Hold short and give-way instructions must be issued to resolve potential ground conflicts, depending on the traffic situation. However, if two aircraft are not in immediate conflict (e.g., sufficient separation at crossing taxiways), explicit instructions may not be necessary but require close monitoring with intervention if needed.

To maintain efficient ground movement and minimize frequency congestion, controllers should use give-way instructions and conditional clearances. Intersection departures can improve sequencing efficiency for Tower controllers. If a pilot is taxiing to a runway intersection, they should be asked if they are able to accept the intersection departure.

Pilots should be handed over to the next position (e.g., TWR) once:

1. They are cleared to the handover point (e.g., runway holding point).
2. They are free of conflicts (e.g., no unresolved intersections with other aircraft).
3. No further instructions are required from the current controller.

Unnecessary stops due to delays in handovers should be avoided. Controllers should regularly scan the airport to identify aircraft ready for handoff.

For unfamiliar pilots or expedited movement, it is helpful to specify directions (e.g., "Turn left onto taxiway Bravo").

Backtrack Procedure:
Backtracking involves an aircraft entering a runway from an intersection, taxiing in the opposite direction of the runway, and proceeding to the runway's beginning. At the end, the aircraft turns around to utilize the full runway length for takeoff. This procedure is often used when no designated taxiway leads to the runway's beginning or when the taxiway is unsuitable for certain aircraft types.

Line-up

A line-up clearance must be issued to departing aircraft before giving a take-off clearance. Line-up clearances can also be issued as conditional clearances, allowing aircraft to line up behind other traffic when appropriate. Efficient use of the frequency is critical, as only one instruction can be given at a time. Controllers must prioritize transmissions to maintain efficiency and reduce delays.

Aircraft must not be permitted to line up and hold on the approach end of a runway-in-use while another aircraft is landing, until the landing aircraft has passed the holding point. Conditional line-up clearances delegate responsibility to the pilot by instructing them to line up behind specific traffic. For this, good visibility is essential, and the pilot must be advised of the traffic involved. If visibility is poor or the intersection angle is too acute (less than 90 degrees), the pilot must first confirm that they can see the relevant traffic.

Conditional clearances can improve frequency efficiency by filling gaps but often take longer to issue than standard line-up clearances. For example, if a landing aircraft is already near the runway threshold or another aircraft has started its take-off run, a standard line-up clearance is usually more appropriate. Multiple simultaneous conditional clearances are only feasible if the restricting aircraft is directly involved in the sequence (e.g., the next aircraft taxiing past the restricted one).

Departures are typically cleared in the order they are ready, but adjustments may be made to optimize efficiency and minimize delays. Factors influencing the sequence include:

- Aircraft type and performance (e.g., jets vs. turboprops)
- Wake turbulence separation requirements (e.g., departing a medium aircraft before a heavy to avoid delays)
- Routes after takeoff (e.g., aircraft on the same SID requiring separation)
- Priority flights (e.g., medical, SAR, or state flights)

Controllers must aim to maintain minimum separation between aircraft to avoid unnecessarily large gaps, as even small delays can significantly reduce departure capacity. Using intersection departures and conditional line-up clearances can further optimize sequencing and frequency usage.

Take-off clearance

Take-off clearance may be issued when there is reasonable assurance that required separation will exist when the aircraft begins its takeoff. Typically, a departing aircraft will not be cleared for takeoff until the preceding aircraft has either crossed the runway end, started a turn, or until all landing traffic is clear of the runway.

Tower controllers are responsible for ensuring that separation is maintained after departure. At aerodromes with procedural approach control, additional separation requirements may apply. The term "takeoff" should only be used in radiotelephony when clearing an aircraft for takeoff or when canceling a take-off clearance.

In certain situations, take-off or landing clearances can be issued even if the runway is not yet clear. However, there must be a high degree of confidence that the runway will be clear when the clearance takes effect. This procedure can reduce frequency load and improve efficiency, especially in high-traffic situations, but requires significant experience and situational awareness.

Reasonable assurance means being confident that the runway will be clear at the appropriate time. For example, if a departure is scheduled to take off before a landing aircraft, the controller can predict whether the runway will be clear when the inbound aircraft reaches the runway threshold. In such cases, a landing clearance may be issued before the departing aircraft has left the runway, provided all separation requirements will be met.

This procedure can also be applied under reduced runway separation. Wake turbulence or radar separation requirements must still be adhered to. While traffic information is not mandatory in these scenarios, providing it can enhance situational awareness for both pilots and controllers.

Landing clearance

An aircraft on final approach or in the process of landing normally has priority over an aircraft intending to depart from the same or an intersecting runway. Landing aircraft will not be permitted to cross the runway threshold until preceding departing aircraft have either crossed the runway end, started a turn, or until all previous landing aircraft are clear of the runway.

The approach controller is responsible for maintaining wake turbulence separation for arriving aircraft. However, wake turbulence separation is not required for VFR traffic; in such cases, ATC should issue a warning (e.g., "Caution wake turbulence").

Landing and Roll-Out Maneuvers:
To expedite traffic, landing aircraft may be instructed to:

- Land beyond the touchdown zone ("long landing").
- Vacate the runway at a specific exit taxiway.
- Expedite vacating the runway.

When issuing roll-out instructions, controllers must consider factors such as aircraft type, runway length, exit locations, reported braking action, and weather conditions. Heavy aircraft should not be instructed to land beyond the touchdown zone.

In certain situations, such as low visibility, pilots may be asked to report when the runway has been vacated. Tower controllers typically receive approaching aircraft from the approach controller at 8–12 NM before the runway. Controllers should issue landing clearance as early as possible. If no conflicting departures exist, clearance should be given immediately upon initial contact.

A pilot must receive landing clearance before crossing the runway threshold (if advised to expect late clearance) or before reaching minimums during an instrument approach. Failure to receive clearance in time will result in the pilot initiating a go-around. The approach controller is responsible for separation until the aircraft crosses the runway threshold. If two approaches are at risk of losing separation, the tower controller must instruct one aircraft (usually the trailing one) to go around before separation is lost. Traffic information may also be provided to improve situational awareness.

Missed approaches

A missed approach must be instructed if separation (wake turbulence or radar) from preceding traffic cannot be ensured, and all other measures (e.g., speed reductions, delegating visual separation) have been exhausted or are impractical.

Reasons for Missed Approaches:

1. **Pilot-Initiated:**
   - Unstable approach.
   - Missed touchdown zone.
   - TCAS Resolution Advisory (RA).
   - Wind shear or thunderstorms on final approach.
   - Landing clearance not received.
   - Technical issues (e.g., landing gear problems).
2. **Controller-Initiated:**
   - Runway not clear (e.g., preceding aircraft still on the runway).
   - Anticipated loss of separation (e.g., simultaneous approaches too close).

Missed approaches are a standard procedure, not an emergency, and all tower controllers must be prepared to handle them calmly and professionally.

Steps to Handle Missed Approaches:

1. **Instruct Missed Approach:**
   Use clear and audible instructions, e.g., "RAM123, go around," repeating if necessary.
   Briefly explain the reason (e.g., "traffic on runway" or "separation not ensured").
2. **Acknowledge Pilot-Initiated Missed Approaches:**
   Respond with "RAM123, roger." There is no need to instruct the standard missed approach procedure, as this is part of the approach clearance. Avoid sending additional radio messages unless necessary for separation.
3. **Establish Separation and Provide Traffic Information:**
   If the missed approach conflicts with other aircraft, provide traffic information and take steps to establish separation:

- **Radar Vectors:** Issue headings to avoid conflicting tracks.
- **Altitude Restrictions:** Maintain separation by limiting climb/descent to specific altitudes (at least above MVA).
- **Visual Reference:** In good weather, a pilot can be instructed to maintain visual reference below MVA with a disclaimer (e.g., "Maintain visual reference until passing [MVA]").

4. **Coordinate with Approach or Other Stations:**
   Every missed approach must be coordinated with the approach controller, especially at airports without delegated IFR separation to the tower. If applicable, provide verbal coordination for clarity.

5. **Inquire About the Reason:**
   If the missed approach reason is unclear, request the pilot to report it (e.g., "RAM123, report reason for missed approach"). Relevant information, such as wind shear or technical issues, should be passed to following traffic and the approach controller.

6. **Handoff to Approach:**
   Once the aircraft is clear of conflicts and the immediate situation is resolved, transfer it back to the approach controller. Ensure the reason for the missed approach is communicated to prevent redundant queries.

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