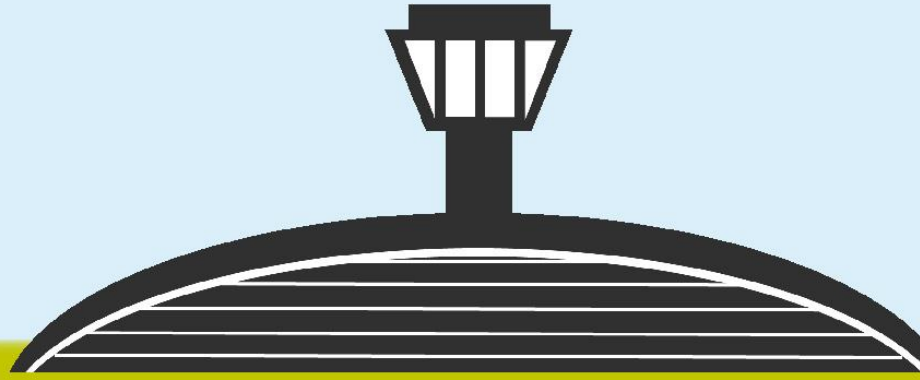
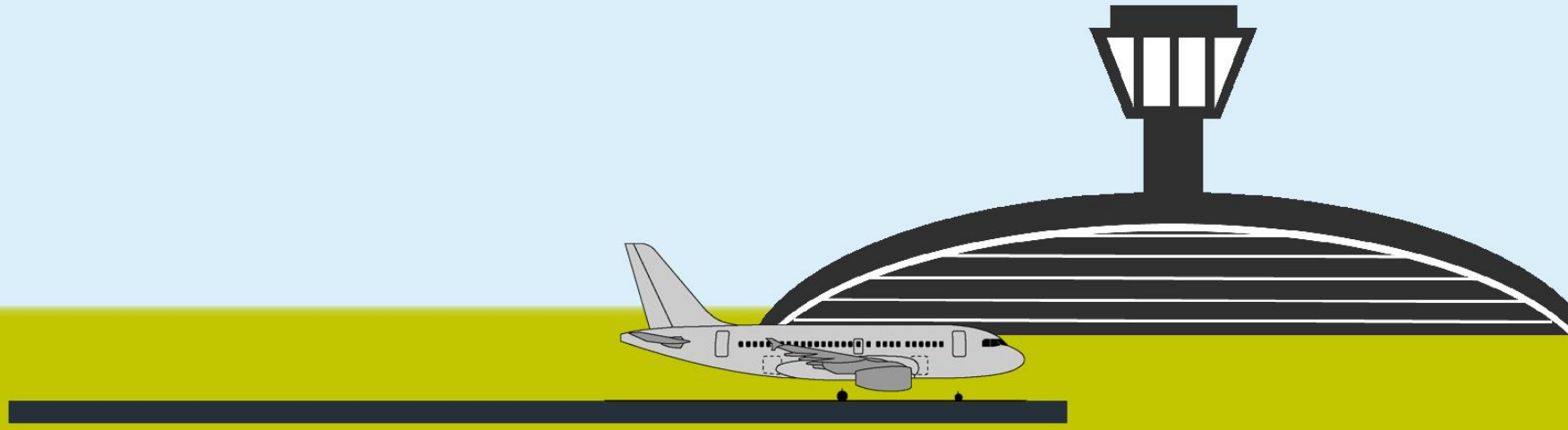
Phases of a departure



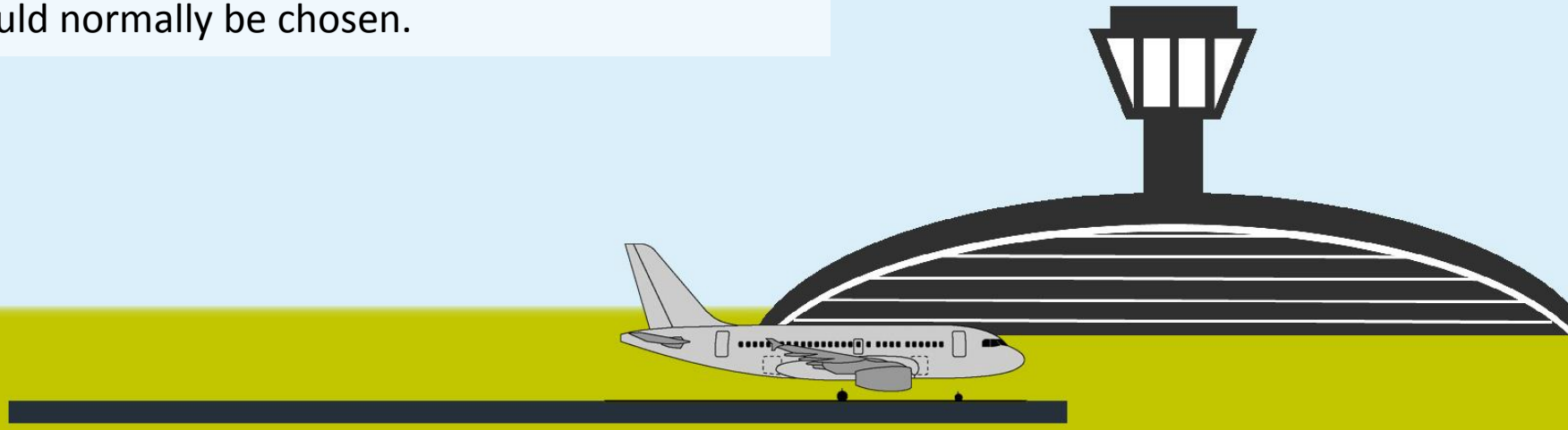
Prior to departure

Hours, days or even months prior, an airline will submit a flight plan to NATS (the UK Air Traffic Control provider) requesting an air traffic routing to its destination.



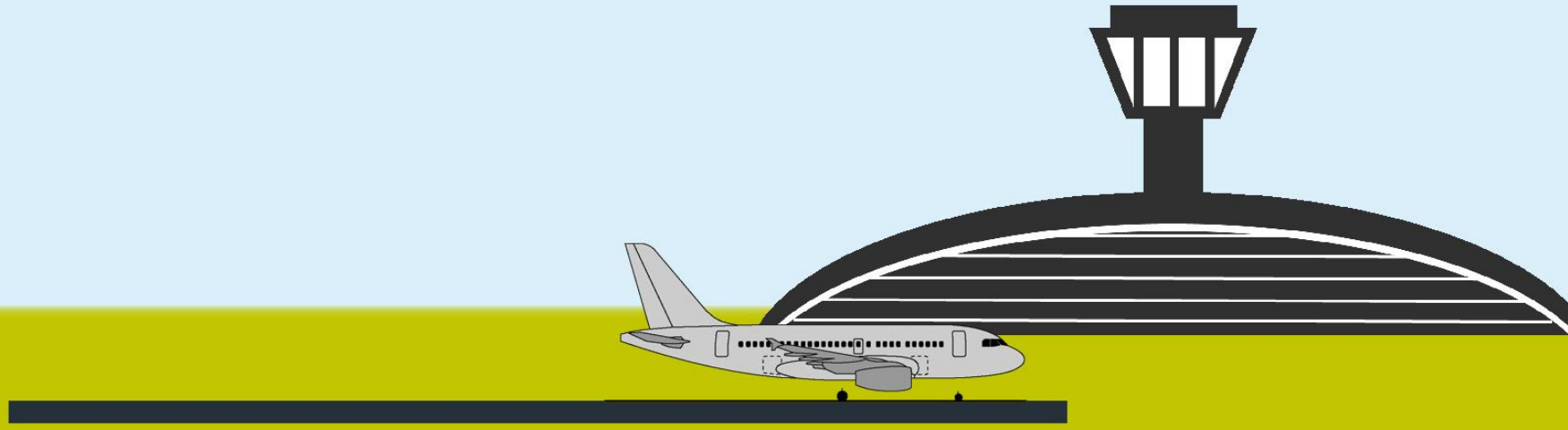
Prior to departure

The filed route to be flown will include the designated SID that will be part of the departure. E.g. if routing towards a north-easterly destination such as Copenhagen, the requested SID from Heathrow would normally be “Brookmans Park (BPK)”, if routing to the south east such as Paris the Midhurst (MID) routing would normally be chosen.



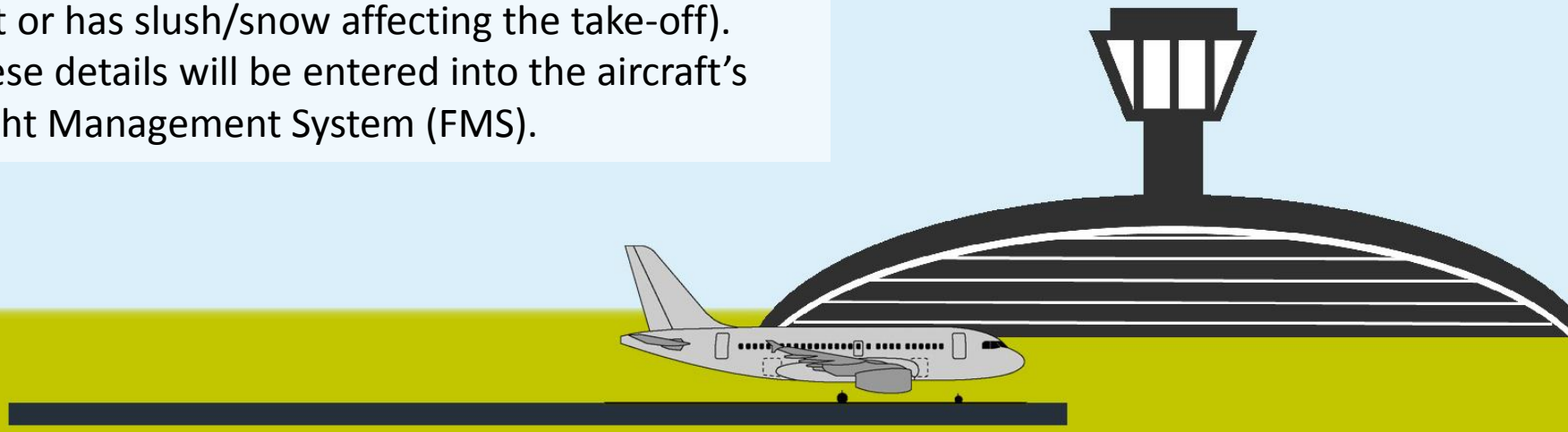
Prior to departure

Once the load of passengers, cargo and fuel is known, the take-off mass of the aircraft for the flight will be calculated by the airline and passed to the pilots.



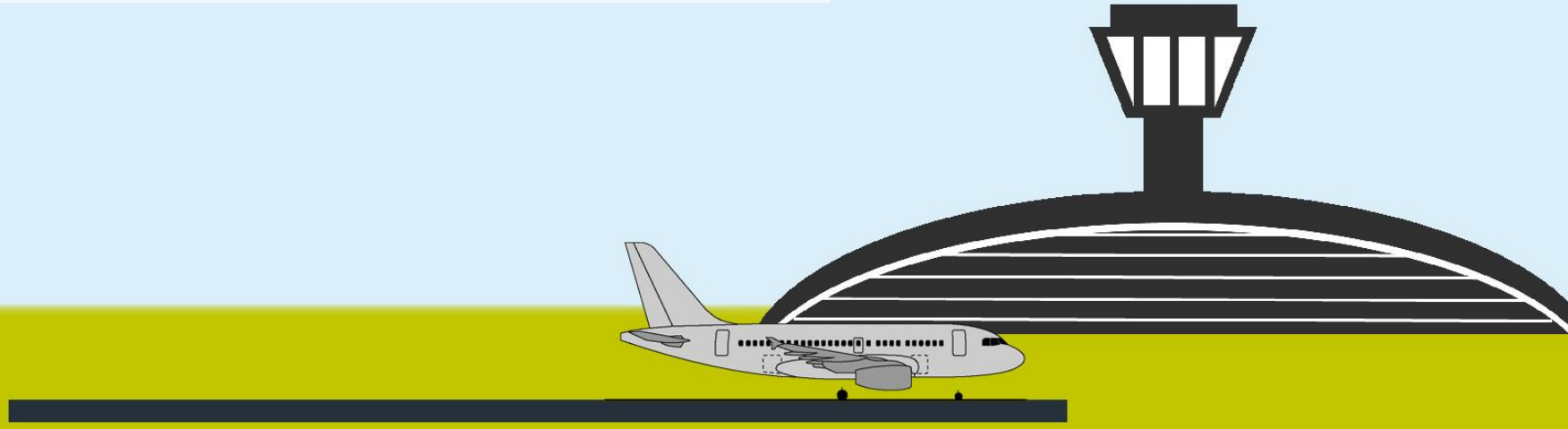
Prior to departure

For the vast majority of operations, this take-off mass will be used by the pilots to calculate the required take-off performance, taking account of the available runway length, obstacle requirements, and prevailing meteorological conditions (temperature, wind speed and direction, air pressure and whether the runway is wet or has slush/snow affecting the take-off). These details will be entered into the aircraft's Flight Management System (FMS).



Prior to departure

At this time, the flight crew will also select the take-off noise abatement departure procedure defined in their company procedures. A noise abatement departure procedure defines the height at which the flight crew will reduce engine power after take-off and the height at which acceleration from the take-off speed commences.



Prior to departure

ICAO guidance, mandated in Europe, requires that an airline has no more than two departure procedures for each aircraft type it operates, no matter where in the world that aircraft type is flown.

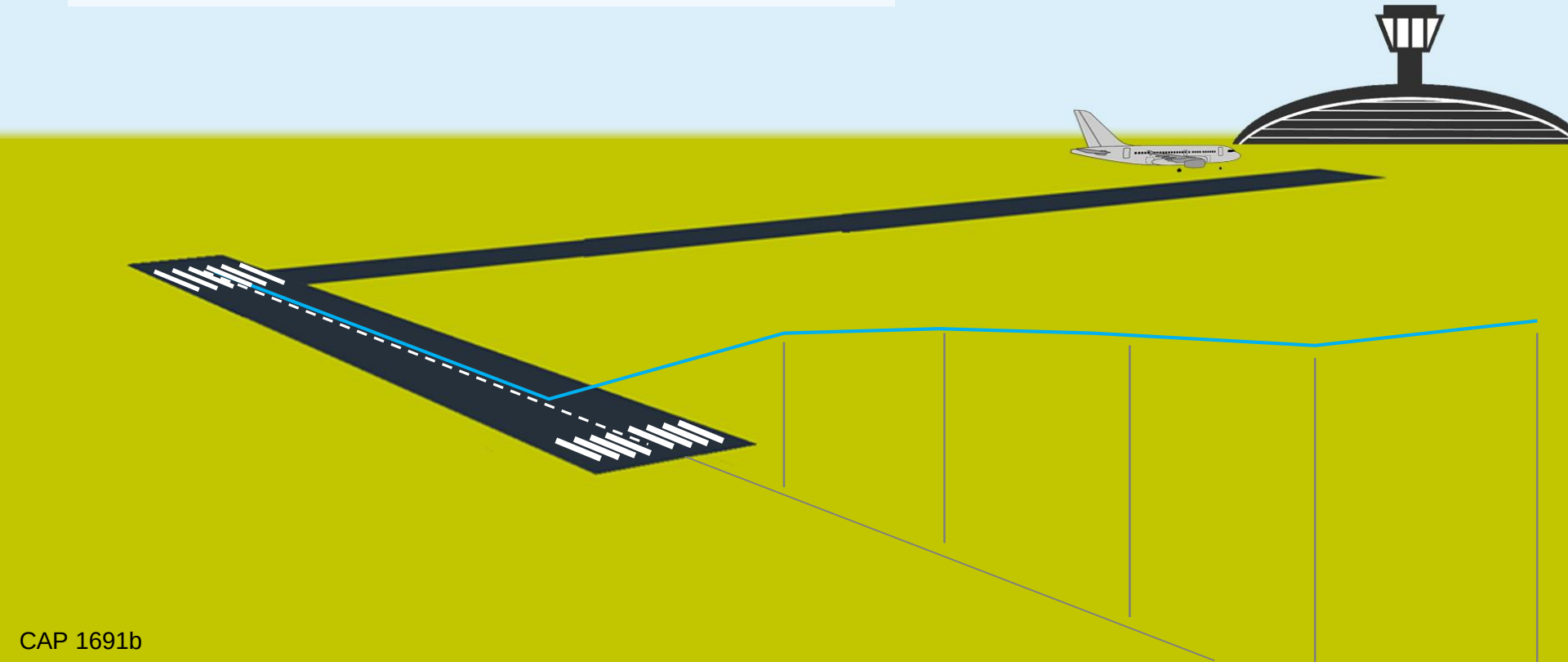
This is to ensure that a profusion of bespoke, complex departure procedures do not develop which would add to pilot workload and reduce their ability to monitor a safe take-off at what is a critical stage of flight.

Prior to departure

These two procedures are incorporated into an airline's Standard Operating Procedures (SOP) manual, which is approved when an airline is issued an Airline Operating License (AOC). Thereafter, the contents of and adherence to SOPs is assessed through ongoing safety oversight. Thus, there is no requirement for a national CAA, nor an airport, to be notified of a change to an airline's SOPs. Note also that the UK CAA only has oversight of SOPs for UK airlines (UK AOC holders).

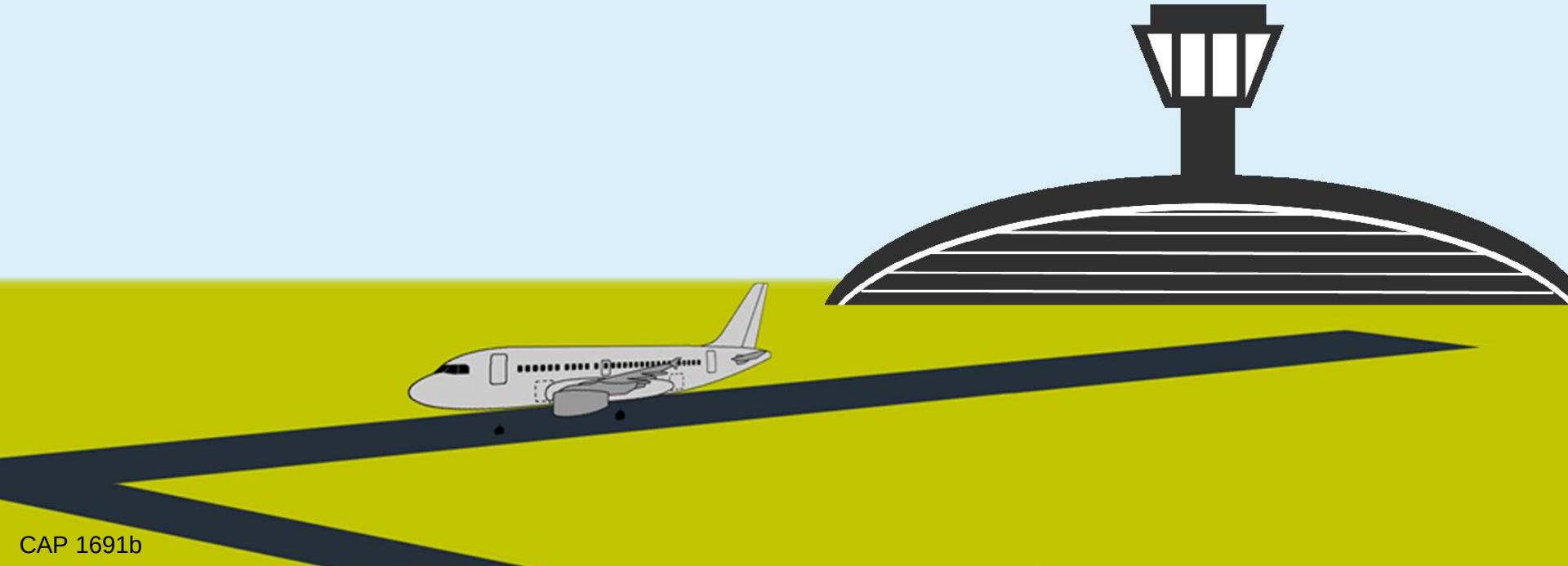
Prior to departure

The aircraft type, its take-off mass, the departure procedure used and the prevailing meteorological conditions will largely define the aircraft's height profile, although tight turns on some SIDs will have a secondary effect on climb performance.



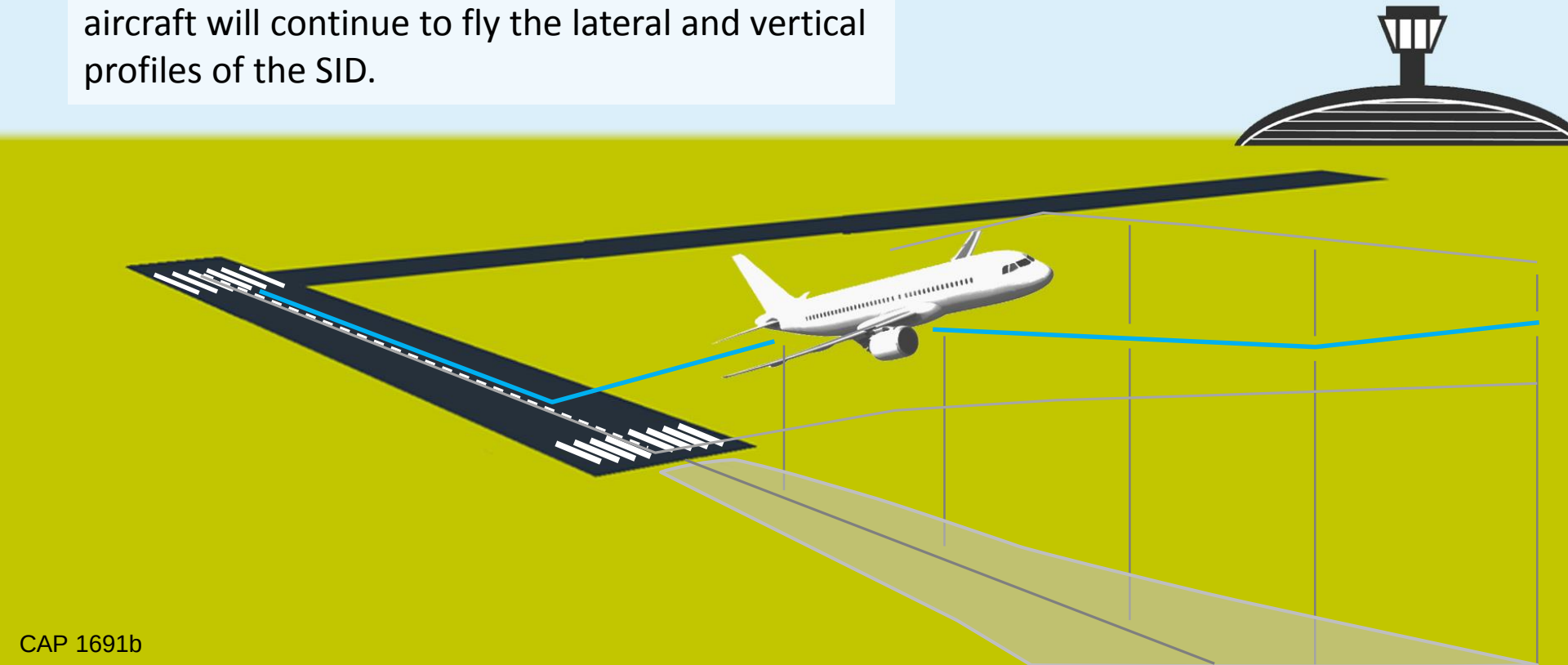
Taxi for take-off

The aircraft will taxi out to the designated departure runway



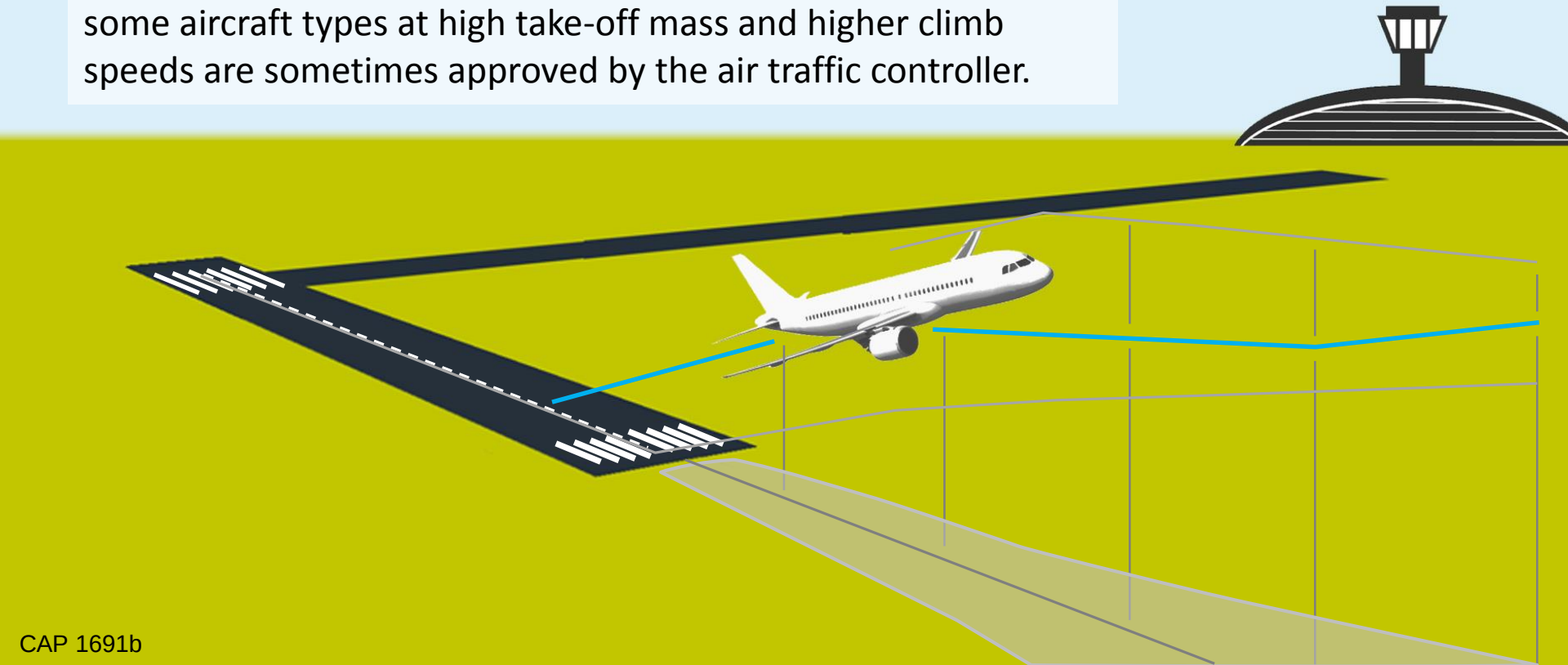
Take-off and initial climb

Once the aircraft departs the airport, the tower controller will observe the aircraft on the aerodrome traffic monitor and then transfer the departure from the tower to the radar controller (based at Swanwick) to take over control. The aircraft will continue to fly the lateral and vertical profiles of the SID.



Between 800 and 3,000 feet

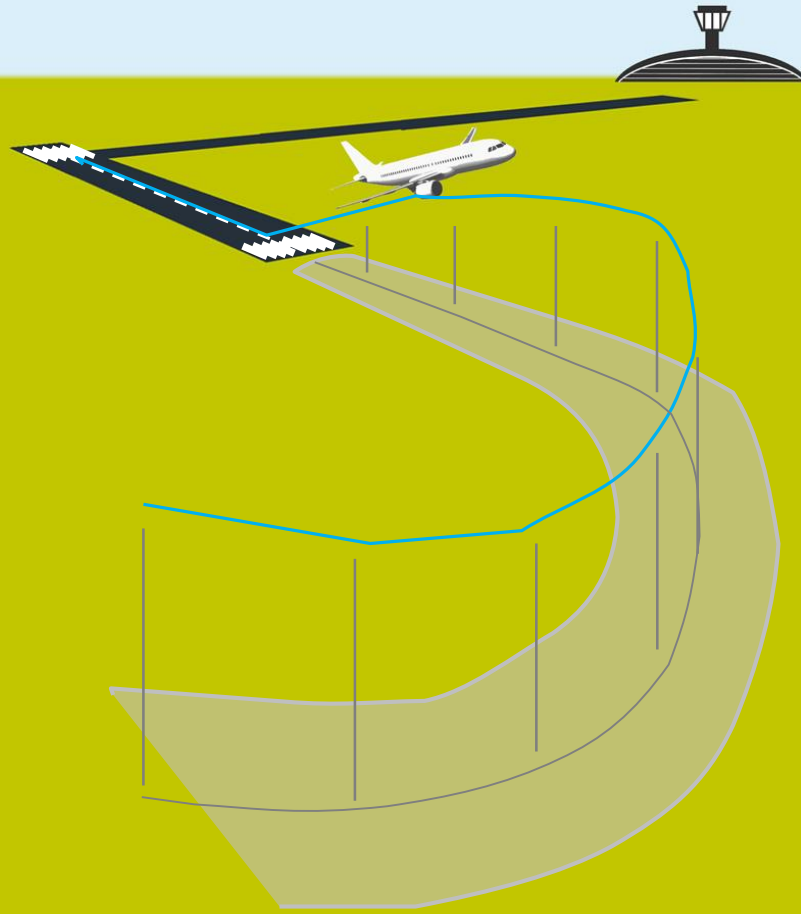
Aircraft will accelerate from their take-off speed (as low as 140 knots) to their desired climb speed (210-270 knots) and reduce engine power from the take-off setting to the climb-setting, in accordance with the airline's SOP. Although the maximum airspeed is 250 knots below 10,000 feet, this is inefficient for some aircraft types at high take-off mass and higher climb speeds are sometimes approved by the air traffic controller.



3,000 - 4,000 feet

Unless, there is a need for air traffic to intervene below the vectoring altitude of 4,000 feet[1], (intervention would generally be for weather or other air traffic avoidance) an aircraft will follow the SID departure clearance, which defines the instructions with regard to the aircraft's lateral or horizontal position.

[1] For airspace reasons, the vectoring altitude on some SIDs is 3,000 feet.



At or above 4,000 feet

At 4,000 feet and above air traffic control are permitted to intervene if required and vector the aircraft off the SID (many SIDs extend beyond 4,000 feet), in order to facilitate a continuous climb and also to separate against other aircraft in the vicinity. If ATC do not radar vector the aircraft, it will continue to follow the lateral SID profile.

At 6,000 feet

At many airports SIDs are designed to require aircraft to level out at a specific altitude between 3,000 and 7,000 feet, in order to facilitate crossing of departing and arriving traffic, though this restriction is often lifted by the air traffic controller on a flight by flight basis as and when conditions permit. Clearly any altitude restrictions applied will affect the altitude attained thereafter, at more distant locations from the airport.