1. General Service

Center provides ATC services to aircraft operating on IFR flight plans within the Boston ARTCC airspace and may optionally provide services to VFR aircraft on a workload-permitting basis. The entire Boston ARTCC airspace not controlled by other positions belongs to Boston Center; and for this reason Center controllers must understand the entire IFR system.

Center can easily (and quickly) become the busiest position. Center controllers work more planes over more airspace, encompassing a wider set of procedures and airports. Center controllers need a working knowledge and/or quick reference to the procedures for all of the major satellite airports in Boston as well as the coordination procedures with New York ARTCC, Washington ARTCC, Cleveland ARTCC, Moncton FIR, and the Montreal FIR.

As the Center controller, you do not need to have an ATIS. Set ASRC's Visibility Range to at least 475 nm (in ASRC's Options->Settings) to ensure that you can hand off to Cleveland Center.

As Center, you never operate a control tower. You may provide weather information to inquiring pilots, but it is the pilot's responsibility to pick active runways and an approach at uncontrolled airports. The one exception to this rule is that you may act as Boston Approach, Tower, Ground and Delivery while logged on as Boston Center.

1.1. Airspace and Procedures

Before continuing with the procedures used on Boston Center, a brief review of airspace:

1.1.1. Class A Airspace

All airspace from 18,000 MSL to FL600 is Class A airspace over the Continental U.S. and the immediate coastal vicinity. Only IFR aircraft are permitted in Class A airspace. All Class A airspace is controlled by Boston Center. Provide separation services between IFR flights in Class A airspace.

1.1.2. Class B and C Airspace

Class B and C airspace surround airports with an operating approach control. When the approach control is not on duty, the Class B and C airspaces do not exist. Because of this, you will not control aircraft in Class B or C airspace as a Center controller. **Note:** the one exception is that when acting as Boston Approach while on Center you may provide Class B services in the Boston Class B (Bravo) airspace.

1.1.3. Class D Airspace

Class D airspace extends from the surface to 2,500 AGL over the surface area of an airport with an operating control tower that is not Class B or C airspace. This airspace is typically delegated to the control tower and reverts to Class E or G if the tower is not on duty so, as with Class B and C airspace, you will not provide Class D services.

1.1.4. Class E Airspace

All remaining controlled airspace in the U.S. is Class E. This includes:

- The airspace from 1,200 AGL to 18,000 MSL surrounding the Federal Airways ("Victor" airways).
- All airspace in our sector above 14,500 MSL.
- Airspace above 700 AGL around airports without an operating control tower.
- Some surface areas up to 700 AGL around airports without a control tower.

All airports with instrument approach procedures and without a tower are Class E starting at either 700 AGL or starting at the surface; however, the procedures for such airports are the same for us regardless of what altitude Class E starts at.

Provide separation services between IFR aircraft and separate IFR aircraft from all known VFR aircraft in Class E.

1.1.5. Class G Airspace

Class G airspace is airspace that is not under the authority of ATC. In the Boston ARTCC (ZBW), Class G airspace is all airspace from the surface to 1200 AGL except for the surface areas under Class B, C and D airspace and as described in section 1.1.4 above.

You may not provide any air traffic services to aircraft in Class G airspace. This means no vectors, no radar services, no separation services. While they are still regulated by U.S. aviation regulations (CFRs) they are not in ATC's jurisdiction.

1.2. Federal Airways and Jetways

Center's airspace is traversed by Federal Airways (called Victor airways, e.g., V141) between 1200 AGL and 18,000 MSL and jet airways (J-ways, e.g., J21) from 18,000 MSL to FL600. Ideally aircraft use the V-ways and J-ways to plan their flights. This has a few advantages:

- In the event of a radio communications failure, these routes provide safe obstacle clearance and a transition to an approach into the destination airport that will be clear of obstructions.
- These routes tend to go *through* sectors and not along their borders.
- These routes avoid busy air traffic areas (like the Boston TRACON) and military airspace.
- These routes are defined by VORs for ease of navigation and holding.

Since VATSIM is always a guaranteed radar environment, it is not necessary for aircraft to fly on published routes. Some pilots will want random routes, vectors or GPS direct. As Center, you may accommodate these flights, but if it becomes necessary for separation, do not hesitate to reroute direct or random routes or otherwise give priority to pilots who have filed airways.

2. Center ASRC Usage

Use ASRC in DSR mode for the Center position. The DSR data block is designed to aid the Center controller. Pilots who are within 300 feet of their cruise altitude will show an altitude with a 'C' in the datablock; this provides a quick indication that the pilot is at his filed cruising altitude. The DSR target will change from a diamond to a triangle to indicate whether the pilot is on or off course.

2.1. Filing and Amending Flight Plans

If a pilot does not file a flight plan but requests IFR clearance, file one for him using the .fp command. File a VFR flight plan using the .vp command for all VFR aircraft receiving flight following services.

Use the .am command and the F5 function to amend any incorrect altitudes or routes such that the flight strip is fully accurate for all traffic at all times. It is the pilot's responsibility to copy clearance via radio, but not to refile the flight plan. You should amend the pilot's flight strip and advise the pilot that you are doing so.

2.2. Flight Strip Updating

Maintain flight strips such that if you were to be disconnected from the network and another controller logged on, that controller would be able to derive exactly what clearances you issued from flight progress strips.

Update the flight strip as the pilot progresses:

- Use F8 to record any assigned temporary altitudes.
- Use the .am rte command to update the flight plan for reroutes.
- Use the .am rte command to chop off intermediate waypoints if you give a pilot a direct clearance such that a waypoint would be skipped.

2.3. Uncontrolled Airports

When an aircraft calls for clearance from an unmanned airport, use the radio select function and a partial callsign to determine the exact text callsign of that aircraft. Then use the .ss command (F6) to pull up the flight strip, amend it as appropriate (or file a plan with .fp or .vp) and use F9 to assign a squawk code. When the pilot departs, the pilot's datablock will "tag up" automatically if the pilot squawks the right code. If the pilot does not tag up or the expanded block indicates a code error, check the transponder code with the pilot.

2.4. Radar Identification of VFR Aircraft

For a VFR aircraft, first use the radio-select function to find the aircraft's callsign. Then use .ss (F6) to check for a flight plan, .vp to file one if necessary, and F9 to assign a squawk code. (If you need to use the .vp command, a squawk code will be assigned automatically.) When the VFR target tags up, you have radar identification. (An observed change of beacon code counts as radar identification.)

See also: 5-3-1, 5-3-3 Radar Identification, Beacon Identification Methods

3. Separation and Traffic Management

Your primary task as Center is to separate airborne traffic. This is more complicated than for an approach controller because of the size of the airspace and diversity of routes.

3.1. En Route Service

En route service to aircraft can be very simple. A simple acknowledgement of radio communications may be all that is necessary for overflights:

DAL211: Boston Center, Delta two eleven, flight level two niner zero.

BOS_V_CTR: Delta two eleven, Boston Center, roger.

3.1.1. Altimeter and Altitude

You must verify an aircraft's altitude reporting for any handoff not received from another Boston Center controller (this includes from all other centers and all Boston and other TRACONs), as well as any aircraft you establish radar contact with. Typically pilots will state altitude when they call in. If they do not, solicit an altitude response.

DAL211: Boston Center, Delta two eleven over Syracuse.

BOS_V_CTR: Delta two eleven, Boston Center, say altitude.

DAL211: Delta two eleven, one seven thousand.

For aircraft in Class E airspace, issue a local altimeter at least once every one hundred miles and once upon initial call-up.

DAL211: Delta two eleven, Burlington altimeter two niner niner three.

If safe to do so, climb aircraft to their cruise altitude upon receiving them from a TRACON or Tower. Make sure no separation issues exist or will exist in the climb.

DAL211: Boston Center, Delta two eleven out of one one thousand for one four thousand.

BOS_V_CTR: Delta two eleven, Boston Center, climb and maintain flight level two two zero.

The TRACON will not have entered a temporary altitude if the aircraft has been climbed to the usual 14,000 MSL as specified by the Boston Approach SOP.

See Also: 2-7-2 Altimeter Setting Issuance Below Lowset Usable FL

3.1.2. Climbing and Descending Aircraft

Descend aircraft in time to reach the crossing restrictions appropriate for their destination (as specified by an Approach SOP, the LOAs with other ARTCCs/FIRs, or based on their destination). As a rule of thumb, an aircraft can descend one thousand feet for every four miles. So if an aircraft is at FL330 and must reach BRONC at 11,000, they must descend 22,000 feet and need approximately 88 miles to descend. Issue a descent before this limit is reached. You may do this by issuing a crossing restriction:

BOS_V_CTR: Delta two eleven, cross BRONC at and maintain one one thousand and two five zero knots.

Or you may issue an immediate descent if it is necessary to separate traffic.

BOS_V_CTR: Delta two eleven, descend and maintain one six thousand, cross BRONC at one one thousand and two five zero knots.

This requires DAL211 to descend to 16,000 immediately and then descend at the pilot's discretion to reach BRONC at 11,000 and 250 KIAS. To be clear: a crossing restriction always gives the pilot the option of when to start the descent. An altitude requires the aircraft to begin the climb or descent immediately unless the phrase "pilot's discretion" is explicitly used. When a speed restriction is issued, it stays in effect until a new one is issued or the pilot is cleared for an approach, so pilots with 250 KIAS on a STAR must maintain that speed until approach control slows them down or clears them for an approach.

If a descent will bring an aircraft into Class E airspace, issue a local altimeter before the aircraft reaches the transition altitude of 18,000 feet MSL. You may either issue the altimeter when you observe the aircraft descending, or ask the aircraft to report passing through an altitude. Note that pilots are required to report vacating an altitude but very few VATSIM pilots actually do so.

BOS_V_CTR: Delta two eleven, cross Providence V-O-R at and maintain one one thousand, report leaving flight level two three zero.

DAL211: Delta two eleven, out of flight level two three zero for one one thousand.

BOS_V_CTR: Delta two eleven, Providence altimeter three zero zero two.

3.1.3. Rerouting Aircraft

You may need to reroute aircraft. For example, you may receive an aircraft from another ARTCC such that the aircraft has an illegal route to Boston. Clear the aircraft using a new route, for example, a STAR.

BOS_V_CTR: Delta two eleven, cleared to Boston via direct Norwich, Norwich Three Arrival, cross Providence V-O-R at and maintain one one thousand and two five zero knots.

or

BOS_V_CTR: Delta two eleven, cleared to Boston via direct Gardner V-O-R, Gardner Three Arrival, cross BRONC at and maintain one one thousand and two five zero knots.

You can also clear an aircraft "direct" to a fix, navaid, or other position on their route. This clearance implies that they continue their original route.

BOS_V_CTR: Delta two eleven, cleared direct Syracuse V-O-R.

BOS_V_CTR: Delta two eleven, turn left direct Manchester.

(DAL211 now flies directly from present position to Syracuse, then continues the previous route. Syracuse must be a VOR on DAL211's previously cleared route.)

For reroutes other than direct clearances you must state "rest of route unchanged" – see 7110.65 Section 4-2-5 for details, but most Center route changes are in the forms of assigning STARs or providing direct clearances. If you clear an aircraft to a waypoint using the "direct" phrase and that waypoint is not on the aircraft's route, the aircraft is only cleared to that waypoint.

See Also: 4-2-5 Route or Altitude Amendments, 4-4 Route Assignment.

3.1.4. Greater Than 1x Simulation Rate (e.g., 2x, 4x, etc.)

Allow aircraft to fly at simulation speeds faster than 1x when traffic conditions permit, but slow aircraft down to 1x before handing them off to adjacent sectors and other Boston controllers.

3.2. Separation Standards

Separate aircraft via radar separation or altitude separation. Altitude is the easiest way to separate aircraft, and the DSR datablock is structured to make this easy by showing aircraft as "cruising" when they are at their assigned altitude.

On Approach, radar separation is the easiest way to separate a lot of aircraft, but be careful about separating aircraft with radar on Center because the airspace is much larger and scanning 20+ aircraft over the entire sector for conflicts can be too time consuming.

When working Boston TRACON (A90) as an Approach proxy, approach standards apply.

3.2.1. IFR from IFR

Separate IFR aircraft from IFR aircraft by one of the following methods:

- 5 nm horizontally via radar separation
- 1000 feet (2000 ft. above FL290) vertically via either radar or pilot reports
- Visual separation below 18,000 MSL (via pilots seeing other pilots).

If you have two aircraft holding 1000 feet apart and you descend the lower one, you may descend the higher one to the lower one's altitude even if you do not have 1000 feet vertical separation as observed on the data block, as long as the lower aircraft has acknowledged the new assigned altitude and reported leaving the old altitude. This is non-radar separation and can be used to descend aircraft in holding patterns more efficiently.

3.2.2. IFR from VFR

Traffic advisories to IFR aircraft about VFR aircraft are to be provided on a workload-permitting basis.

Important: These services are not optional if you have the knowledge and time to provide them. There is no IFR-VFR minimum in Class E airspace.

3.2.3. VFR from Other Aircraft.

Separate VFR aircraft receiving flight following from other aircraft by providing traffic advisories on a workload-permitting basis. Separation of IFR aircraft is higher priority than service to VFR aircraft.

3.2.4. Traffic Pointouts

Occasionally, you will need to issue traffic pointouts to aircraft, for example, merging IFR targets (section 5.1.8 of the .65) or IFR from VFR around a terminal other than Logan. Report the following information:

- Direction of the traffic;
- Distance;
- Direction of travel;
- Aircraft type; and
- Altitude

BOS_V_CTR: Delta two eleven, traffic one o'clock, 8 miles, eastbound, Airbus 319, out of four thousand for one four thousand

In this case, DAL211 may request vectors such that the targets do not merge. Issue the vectors if you are able, but remember you are responsible for getting the aircraft back on their flightplan.

3.3. Techniques for Separation of IFR Aircraft

Like Approach, your three friends for separation are still altitude, speed restrictions and vectors. But due to the increased workload on Center you may want to prefer them in a different order.

When possible, clear an aircraft to an altitude where it will not conflict with other aircraft for the duration of its flight. This is straightforward for en route aircraft, but may not be possible for aircraft climbing out of or descending into an airport.

Assign routes that provide lateral separation. For example, if aircraft inbound to Boston from the northwest fly ALB.GDM3 and aircraft departing to the northwest fly MHT.CAM.SYR then these aircraft will not conflict with each other, regardless of their altitudes.

Issue speed restrictions to maintain spacing along a route, but do not use speed restrictions to try to resolve an immediate conflict. Scan the ground speeds in the DSR data-block to find aircraft that are converging on the aircraft ahead of them. Issue a speed restriction or a new altitude to these aircraft. If two aircraft are on a converging course, issue a vector or altitude change; speed restrictions act slowly over time and may not provide adequate separation quickly.

Remember that a climbing aircraft will have a slower ground speed than a descending one and ground speed will be higher for a given indicated airspeed when altitude is higher. Also take into consideration aircraft performance when assigning airspeeds.

You can give an aircraft a short cut on its route to provide spacing. This works well because the aircraft does not need additional vectors and ends up at its destination faster. For example, if two aircraft are coming out of Boston both with MHT.CAM.SYR and the second aircraft is overtaking the first aircraft, clear the second aircraft direct CAM. The second aircraft will fly one side of a triangle while the first aircraft flies the two other sides. The result is the faster second aircraft shortcutting around the slower first aircraft. Now you have separation and the faster aircraft is in front.

Use vectors to provide separation. For example, by giving an aircraft a vector 30 degrees off-route, you decrease its effective speed along that route by 30%. But remember: any time you issue vectors, you are responsible for getting that aircraft back onto its route in a way compatible with its navigation facilities. (If an aircraft does not have FMS or RNAV capabilities, you must vector it to a VOR radial or some other route it can find.)

For some aircraft with /F (FMS) capabilities, the pilot may be able to fly a route offset a few miles east or west. Use this to allow an aircraft to pass another aircraft.

Issue restrictions on TRACONs or other sectors (including miles-in-trail or timing restrictions on departures) to limit aircraft arriving into the sector if necessary.

3.4. VFR Flight Following

VFR aircraft may request flight following services (also called radar services or radar advisories); provide such service on a workload-permitting basis. When providing flight following, provide traffic advisories for the VFR aircraft for all known traffic. It is the pilot's responsibility to see and avoid traffic; provide vectors around traffic if the pilot requests them.

Before you can provide flight following, you must radar identify the aircraft. You may need to use the radio-select command with a partial callsign to determine the full callsign of a VFR aircraft that calls in. Once radio-selected, you can assign a flight plan, if necessary, using the .vp command (e.g. .vp TYP RTE <enter>). In the case of the .vp command, a squawk code will be assigned automatically. Otherwise, you will need to assign a squawk code using <F9>.

N172B: Boston Center, Cessna one seven two bravo VFR two five miles west of Bradley at 3000 is a Cessna one seventy two slant uniform, request flight following.

BOS_V_CTR: Cessna one seven two bravo squawk four six one one.

Once the aircraft sets the correct transponder code, their datablock will pop up. Start track (F3) and begin radar services:

BOS_V_CTR: Cessna one seven two bravo, radar contact twenty five miles west of Bradley V-O-R, Bradley altimeter two niner niner three. Maintain VFR at all times.

If you do not have time to provide flight following you may refuse the aircraft.

BOS_V_CTR: Cessna one seven two bravo, unable flight following.

If a VFR aircraft cancels flight following, drop track and assign them the VFR squawk code:

BOS_V_CTR: Cessna one seven two bravo, radar service terminated, squawk VFR, frequency change approved.

See Also: 7-6-1 Basic Radar Services to VFR Aircraft-Terminal

3.5. Holding

If traffic conditions become too heavy it may be necessary to put aircraft into holding patterns. Holds are necessary when the next sector cannot take a handoff, you cannot

provide the required in-trail spacing to a sector, or you cannot clear an aircraft for an approach (see arrivals to fields with a tower at the end of this document).

To hold an aircraft you must provide the aircraft with:
- A fix to hold over. For VATSIM, use a VOR because this is easiest for pilots.
- A direction to hold and radial to hold on.
- The length of each leg.
- A turn direction for the holding pattern.
- An altitude to maintain.
- A time to expect further clearance ("EFC time").

BOS_V_CTR: Delta two eleven, hold west of the Gardner V-O-R on the Gardner two eight zero radial, left turns, ten mile legs. Maintain one three thousand. Expect further clearance at two three four zero, time now two three one zero.

[cz: ALL times are Zulu, all the time. You never need to say it.] The fix to hold is distinct from the route to hold from; while in this case the hold is easier (since the aircraft is holding over GDM on a GDM radial), you could ask a plane to hold west of BRONC on the GDM-110 radial.

Start holding pilots over a VOR close to their destination, then work backward. For example, if you must hold arrivals to KJFK, hold them over CCC first, then use other local VORs in Boston airspace (like HTO, SEY, TMU, etc.).

Assign each aircraft in the holding pattern a separate altitude, with new arrivals arriving on the top. As you are able to clear an aircraft out of the holding pattern, descend each aircraft down 1000 feet.

BOS_V_CTR: Delta two eleven depart Providence V-O-R heading zero six zero, report crossing Providence V-O-R.

DAL211: Delta two eleven departing Providence.

BOS_V_CTR: Delta two eleven, contact Boston Approach one two zero point six.

DAL211: One two zero point six, Delta two eleven.

BOS_V_CTR: Green Mountain three fourteen, descend and maintain one one thousand.

GMA314: Out of one two thousand for one one thousand, Green Mountain three fourteen.

BOS_V_CTR: United two twenty five heavy, descend and maintain one two thousand.

See Also: 4-6 Holding Aircraft

4. Coordination with Other Positions

Use ASRC's track feature (F3 and F4) to track all aircraft that are under your control and radar identified in your airspace.

Initiate an electronic handoff to other radar positions (APP, CTR). Hand off an aircraft early enough that the receiving controller may accept the handoff and you can instruct the aircraft to change frequency well before the aircraft leaves your airspace. Initiating handoffs 10 miles in advance of a handoff point is a good idea.

When transferring an aircraft to a control tower, do not initiate an electronic handoff; instead, drop track on the aircraft (F4), coordinate with the tower via text, prior coordination or voice override, and instruct the aircraft to contact the tower.

Any aircraft you receive from another radar controller is already 'radar contact'; you do not need to restate this. Confirm altitudes on aircraft from other facilities. Radar identify any aircraft that come from a tower or unmanned/uncontrolled airspace.
Note: You may not use a target popping up within 1 nm of the runway to radar identify an aircraft if the tower is not manned.

4.1. Splitting Boston Center

Boston Center's airspace may be split using a variety of schemes. In each scheme, the continuous airspace of each position becomes a single sector; follow the same coordination guidelines as if handing off to another Center. Typical split schemes include north-south, three-or-four way, or high and low altitude sectors. Notify adjacent ARTCCs and FIRs which Boston Center controllers should accept handoffs.

4.2. Coordination with Approach Controls

Handoff aircraft to Approach Control based on standard operating procedures or coordination. For Boston Approach, hand off aircraft at GDM with a restriction of BRONC at 11,000, before PVD with PVD at 11,000KIAS, before SCUPP at 11,000, etc, with speed restrictions as necessary.

Departure Control will hand off aircraft to you cleared on course or direct to their initial fix with a climb to 10,000 or 14,000, depending on their airspace. They should coordinate with you if unable to issue that climb instruction.

4.3. Coordination with Control Towers

Handoff aircraft to control towers when established on the final approach course. Always hand off aircraft to Tower before the final approach fix (usually around 5 nm from the runway). Do not use electronic handoffs for tower.

4.4. Coordination with Other ARTCCs/FIRs

Initiate handoffs early enough that other Centers have time to receive the handoff and the aircraft can change frequencies before reaching a coordination point. Make sure all aircraft are at 1x. Various Letters of Agreement (LOA's) specify additional procedures for each airport.

4.4.1. New York

The Letter of Agreement with New York is the most complicated one for ZBW. Boston Center acts as a feeder for New York Approach for all flights from the northeast. Carefully review the New York LOA and arrival procedures.

- Aircraft departing New York may not be cleared up to their cruise altitude.
- Aircraft arriving New York need a descent in time to meet crossing restrictions.
- Many restrictions require the use of the fix. Use ASRC's ".ff" command to show this fix and/or shift-F6 to view the pilot's flight path and estimate when to descend the pilot.
- New York may have multiple approach controllers for different airports. Check the New York ATIS's or coordinate with New York Approach to figure out who is serving which airport.

4.4.2. Montreal

ZBW also must begin descents for arrivals into Montreal. See the LOA and arrival procedures for appropriate restrictions.

4.4.3. Cleveland

Cleveland arrivals into ROC or BUF may require descents; coordinate with Cleveland Center and read the Cleveland LOA to give these pilots adequate descent.

4.4.4. Washington

ZBW connects with ZDC through a narrow strip of airspace; southbound aircraft for DC or Florida may be handed directly to ZDC.

4.4.5. Moncton

Aircraft to or from Moncton FIR may have oceanic altitudes. Clear them to a temporary altitude that conforms with NEODD-SWEVEN while in ZBW airspace, but allow their final altitude to be Oceanic. (Reduced Vertical Separation Minima may apply to North Atlantic Route flights.)

4.5. Procedures When Other ARTCCs/FIRs Are Not Online

When the adjacent ARTCC/FIR is not online, radar identify an aircraft entering your airspace by assigning a squawk code and observing the beacon tag up.

DAL211: Boston Center, Delta two eleven five miles west of Syracuse at FL370.

BOS_V_CTR: Delta two eleven, Boston Center, squawk four six two two.

BOS_V_CTR: Delta two eleven, radar contact nine miles west of Syracuse V-O-R.

When an aircraft leaves your airspace and no other ARTCC/FIR is online, terminate radar service but do not instruct the pilot to change transponder code.

BOS_V_CTR: Delta two eleven, leaving my airspace, New York Center is not online,radar service terminated, frequency change to advisory approved, good day.

5. Arrivals and Departures

When no approach control is online, you will need to provide service into and out of airports. These procedures are different from working Boston Approach.

5.1. Clearance Delivery Issues as Center

Provide IFR clearances to aircraft anywhere in the Boston ARTCC airspace that is not serviced by another controller.

A note about departure procedures: there are two kinds of departure procedures. Graphical departure procedures are listed in the TERPs books; these are like the LOGAN2, HANSCOM6, etc. These procedures may provide the pilot with complete navigation or require vectors from ATC. Obstacle Departure Procedures are also in the TERPs book and provide obstruction clearance for an aircraft departing IFR. (For example, the procedures for Boston runway 22R say climb to at least 600 AGL before turning right past heading 180.)

You may assign an aircraft a graphical departure or clear an aircraft on a graphical departure if the aircraft files for one.

Example: an aircraft files out of KBED with HANSCOM6.MHT.CAM. Hanscom6 is a vector departure so you would clear this aircraft:

BOS_V_CTR: Learjet two mike bravo cleared to Chicago O'Hare via the Hanscom six departure, radar vectors Manchester, then as filed...

Example: An aircraft files out of KSYR with SYR.ALB.GDM3. The aircraft has not filed a graphical departure procedure; simply clear the aircraft on route:

BOS_V_CTR: Learjet two mike bravo, cleared to Boston as filed...

An aircraft is responsible for avoiding obstructions on departure using one of three methods:

- A graphical DP if assigned or filed
- An obstacle-clearance DP (the pilot will not necessarily tell you that they will fly this)
- Depart in VMC (and visually avoid obstructions).

Do not assign a runway or initial heading on departure except by assigning a graphical SID. There are several reasons for this:

- If the field has no control tower (this is why the pilot is talking to you) then the pilot will be traversing Class G airspace for the first 700 feet of departure; you have no authority to assign a heading.
- The pilot is responsible for maintaining obstacle clearance, and your heading could be contrary to this.
-

When you assign a graphical DP, the DP is structured to provide obstruction clearance, doesn't take effect until the pilot is in Class E airspace, or is not applicable when there is no tower or approach control.

Each aircraft needs a way onto his route. A well-structured flight plan will provide a transition from the departure procedure (whether graphical or obstacle clearance) to the filed route, but you may have to provide vectors if the plan does not have this.

Example: A pilot files KSYR to KBOS via SYR.ALB.GDM3. This pilot can easily transition from the field to the initial fix (SYR) because the VOR is on or near the field.

BOS_V_CTR: Options niner two two, cleared to Boston as filed...

Example: A pilot files KSYR to KBOS with ALB.GDM3. This pilot cannot transition to his route from the airport. Clear the aircraft with vectors to ALB.

BOS_V_CTR: Options niner two two, cleared to Boston via radar vectors Albany then as filed...

See Also: 4-2 Clearances, 4-3 Departure Procedures

5.2. Departures From Uncontrolled Airports

When an aircraft will depart IFR from an uncontrolled field, clear the aircraft to their destination. Issue an intermediate altitude that is at or above the off-route obstruction clearance altitude (OROCA) if necessary for traffic. There are three ways to limit the time in which the departure may take off:

- Provide a clearance void time. The aircraft must depart by this time.
- Ask the aircraft to hold for departure. The aircraft may not depart yet. Release the aircraft when conditions permit.
- Provide a release time. The aircraft may not be released before that time.
-

You can also use a combination. Always issue a time check when using void times or release times.

Example: OPT922 is cleared from SYR to BOS. He may not depart until 14:15 and then has only five minutes to depart.

> **BOS_V_CTR: Options niner two two, cleared to Boston as filed, maintain flight level one niner zero. Departure one three four point seven, squawk four six zero two. Released for departure at one four one five. Clearance void if not off by one four two zero. Time now: one four zero four.**

Example: OPT922 is cleared from BDL to BOS. He may not yet depart.

> **Options niner two two, cleared to Boston via radar vectors Gardner, Gardner Three Arrival, maintain 5000, expect flight level one niner zero one zero minutes after departure, departure frequency one three four point seven, squawk four six zero three, hold for release.**

Once you are ready to release OPT922 and want him off in 10 minutes, you say:

> **BOS_V_CTR: Options niner two two released for departure, clearance void if not off by zero one one five, time is now zero one zero five.**

A few important notes about this:

- Once you release an airplane at an uncontrolled field, he switches to UNICOM and calls you back on frequency when airborne.
- You do not clear the aircraft for taxi or takeoff.
- The pilot picks the active runway to depart from.

For uncontrolled fields, the **one-in-one-out** rule applies: you can only have one IFR aircraft released for departure, cleared for approach, or on a missed approach at a time. The reason for this is separation. Since the aircraft must be on UNICOM (to find out

about local VFR traffic), he cannot be on your frequency, which prevents you from using radar or visual separation. Remember that some missed approach procedures conflict with either the approach course or the obstacle departure procedure, and some approach courses double-back on each other via a procedure turn, so it can be very unsafe to have more than one in or out at a time.

An aircraft can also depart VFR and then call you while airborne for an IFR clearance. This lets him leave without the one-in-one-out rule applying. You would assign a squawk code, clear the aircraft and make radar contact with the pilot after he calls you airborne. Remember that if the aircraft is VFR and filing for IFR clearance, you need to provide him with a way to get to his course (e.g., "direct GDM" or "join V141") if he is not already on course when you radar identify him.

See Also: 4-3-4 Departure Restrictions, Clearance Void Times, Hold for Release, and Release Times

5.3. Arrivals to Fields With No Approach Control

If there is no approach controller for a given airport that an IFR flight is arriving at, you must provide approach services.

You are **not** required to provide vectors to the final approach course, either for a precision (ILS) or a non-precision (e.g., VOR, NDB) approach. Do not provide vectors if:

- You are too busy to provide them. *Separation of airborne aircraft is your first priority.* It is better to provide the full approach than poor vectors to the localizer and have a deal.
- The final approach course is not visible in ASRC (either by turning on runways or loading an approach sector file). Some airports do not have runway extended centerlines in the Center file; do not provide vectors to the final approach course because you cannot see where it is.

Offer pilots the full approach, a visual approach (if in VMC) or, if in VMC, the option to cancel IFR and land VFR.

A procedure turn is a maneuver by which the aircraft reverses direction. This is necessary when the aircraft flies to the initial approach fix in the opposite direction of the final approach course. Procedure turns are mandatory for course reversals from some directions and not allowed from others (typically straight-in approaches).

An approach clearance without vectors to the final approach course is actually quite simple:

- If an Initial Approach Fix (IAF) or a VOR that has a transition to the approach is not part of the aircraft's current route, you must clear the aircraft to that location. (Otherwise how would the aircraft get to the VOR or IAF?)
- You must provide the aircraft with an altitude to maintain until on an established segment of the approach course.

- You must clear the aircraft for the approach. If no tower is online, restate the airport name.

Some examples may help clarify this. For our examples, we will use the KBTV ILS 15 approach. This approach has two possible initial approach fixes: the Plattsburg VOR (PLB) for a straight-in approach and the HERRO NDB with a procedure turn. From PLB or HERRO an aircraft must maintain 2,000. There is also a transition from BTV to HERRO with a minimum of 2,700.

Example 1: An aircraft's route ends with LEB.BTV and the aircraft is between LEB and BTV on V141. The MEA for this segment is 6,000.

BOS_V_CTR: Cessna 234 Bravo, cross Burlington V-O-R at or above 6000, cleared ILS one-five approach.

The aircraft continues on V141, maintaining at least 6,000 to BTV, then can descend to 2,700 to HERRO and then maintains 2,000 until crossing HERRO again inbound.

Example 2: An aircraft's route ends with BTV.HERRO and the aircraft is at 5,000 between BTV and HERRO.

BOS_V_CTR: Cessna 234 Bravo, cleared ILS one-five approach.

The aircraft is already on a published segment of the approach, so no altitude restriction is necessary.

Example 3: An aircraft's route ends with CON.LEB and the aircraft is between CON and LEB.

BOS_V_CTR: Cessna 234 bravo, cleared direct Burlington V-O-R, cross Burlington at or above 6,000, cleared ILS one-five approach.

The aircraft now has a new route from its present position to BTV, maintaining 6,000 to BTV. After BTV the aircraft can descend to 2,700 on the transition to the ILS 15 approach.

Since a procedure turn can take a while, you may want to ask the pilot to call you to remind you when you need to send them to the tower or UNICOM frequency. Hand aircraft off to tower before they reach the final approach fix.

BOS_V_CTR: Cessna 234 bravo, cleared approach, report procedure turn inbound.

Remember, you are not required to provide vectors to the final approach course. Do not let pilots pressure you into providing this service when you do not have time. Offer them a visual approach, a full approach, or the option to hold until you can provide vectors.

BOS_V_CTR: Cessna 234 bravo, field is at your one o'clock, niner miles, report it in sight.

N234B: Boston Center, Cessna two three four bravo has the field.

BOS_V_CTR: Cessna 234 bravo cleared visual approach to the Burlington Airport.

or

N234B: Boston Center, Cessna 234 Bravo, we'd like to cancel IFR.

BOS_V_CTR: Cessna 234 Bravo, radar service terminated, squawk VFR, , contact the tower on 128.3, good day.

Sometimes an approach will have a holding pattern denoted instead of a procedure turn. If cleared for the approach, the pilot will only fly over the inbound fix once. [cz: actually, it means no such thing. If a holding pattern is depicted in lieu of a procedure turn, all aircraft must execute a hold entry. A hold entry is defined as completed the first time the aircraft crosses the holding fix inbound. If you're approaching the fix from the sectors where the normal entry is a direct entry, the entry is simply navigating directly to the holding fix. It is still, technically, a hold entry. The effect is as described in the sentence I deleted but the description is incorrect.]
When providing approach service to a field with a tower and no approach control, you may apply radar separation, visual separation, or even timed approaches, but radar and visual separation are probably best.
See Also: 4-8-1 Approach Clearance

5.4. Arrivals to Fields With No Approach Control *or* Tower

Approach control services to a field without a tower are almost the same as to a field with a tower but no TRACON, but with a few important exceptions:

- The 1-in-1-out rule applies. You may not have more than one aircraft cleared for approach, released for departure, or flying a missed approach.
- Transfer aircraft to UNICOM as early as practical (and certainly by the final approach fix inbound) so they can communicate with VFR aircraft in the area.

Because the 1-in-1-out rule can clog a local airport, you may want to encourage aircraft to cancel IFR (if in VMC); once VFR, they can enter the local traffic pattern at their discretion.

BOS_V_CTR: Cessna 234 Bravo, report the procedure turn inbound.

N234B: Cessna 234 Bravo, procedure turn inbound.

BOS_V_CTR: Radar service terminated, frequency change to advisory approved, report down or missed approach this frequency.

See Also: 4-8-1c Approach Clearance, 6-2 Initial Sepration of Successive Departing Aircraft

6. Summary

There is a lot to learn about Center; once working Center you can see the entire Air Traffic Control system at work. Some basic tips for survival:

- *Prioritize, prioritize, prioritize.* Provide separation of airborne aircraft first. Provide vectors to final approach and VFR flight following only if you have time.
- Have convenient access to the LOAs for New York and Montreal and summaries for the full approaches to all sector airports (available on the web site).
- Take time to explore the New York arrival procedures carefully; Boston center acts as a feeder for New York Approach. Know where aircraft have to be routed and descended to make it into New York (N90 TRACON).
- If possible, pick up the local TERPs books for New York and New England, as well as some IFR low altitude en route charts.
- Practice the phraseology for full approach clearances and departure clearances for unmanned airports.
- Use radio select and squawk code assignment to clear aircraft in airports where you may not be able to see them. You are not responsible for movement-area operations (ground control) for unmanned airports.