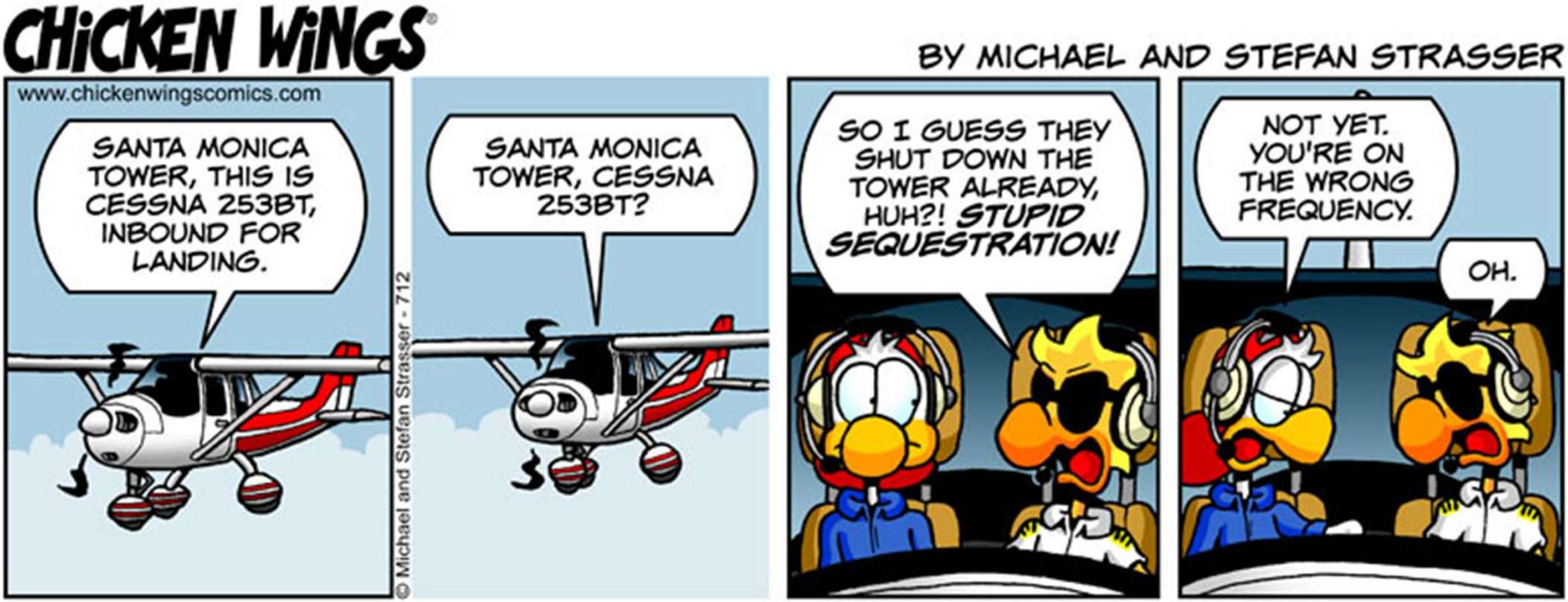
Air Traffic Control (ATC) Clearances and Procedures

Updated April 2025


CHICKEN WINGS
BY MICHAEL AND STEFAN STRASSER
www.chickenwingscomics.com
SANTA MONICA TOWER, THIS IS CESSNA 253BT, INBOUND FOR LANDING.
SANTA MONICA TOWER, CESSNA 253BT?
© Michael and Stefan Strasser - 712
SO I GUESS THEY SHUT DOWN THE TOWER ALREADY, HUH?! STUPID SEQUESTRATION!
NOT YET. YOU'RE ON THE WRONG FREQUENCY.
OH.

ATC Clearances

- Pilot Responsibilities
  - See and Avoid, IFR Climb Considerations
- IFR Flight Plan and ATC Clearance
  - Elements of an IFR Clearance
- VFR on Top
- Climb to VFR on Top
- Approach Clearances
- VFR Restrictions to IFR Clearance
- Composite Flight Plan
- Clearance Read back
- Clearance Shorthand


YOU ARE CLEAR TO DO WHATEVER...
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Air Traffic Control Clearances

Objectives

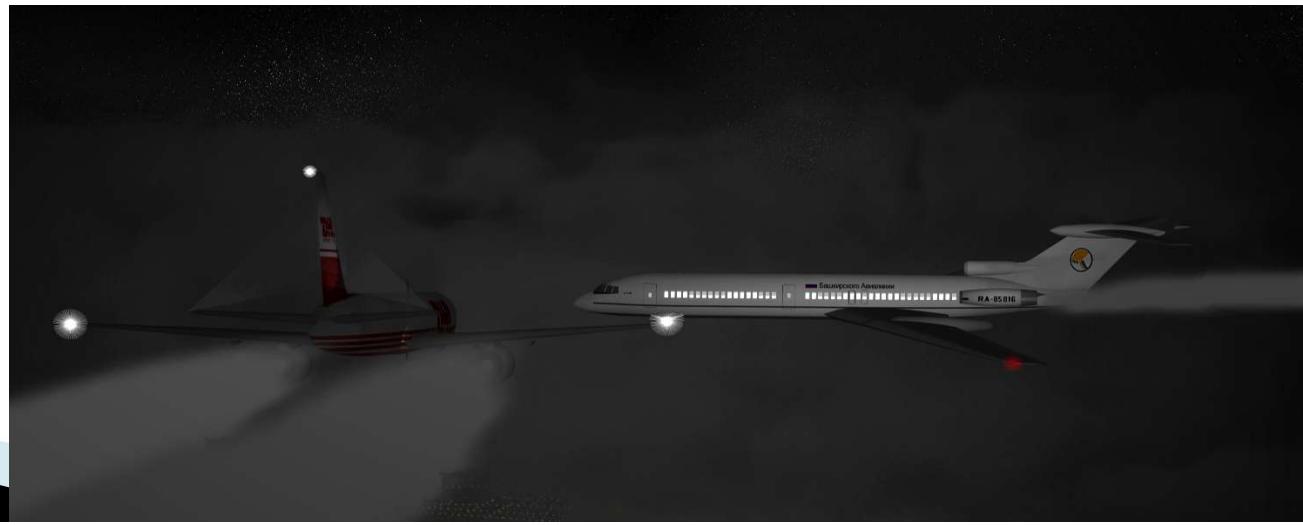
- Exhibit adequate knowledge of the elements related to ATC clearances and pilot/controller responsibilities to include tower en route control and clearance void times
- Be able to copy correctly, in a timely manner, the ATC clearance as issued
- Determine that it is possible to comply with ATC clearance
- Interpret correctly the ATC clearance received and, when necessary, requests clarification, verification, or change
- Read back correctly, in a timely manner, the ATC clearance in the sequence received
- Uses standard phraseology as contained in the Aeronautical Information Manual when reading back clearances and communicating with ATC
- Sets the appropriate communication and navigation systems and transponder codes in compliance with the ATC clearance
- Demonstrates an appropriate level of single-pilot resource management skills

Pilot Responsibilities - IFR

- You may not deviate from ATC clearances, deviate from assigned altitudes or headings
- If you deviate for emergency, you must notify ATC as soon as possible
- If given priority, due to emergency, you may be requested to submit written report in 48 hours
- See and Avoid rules in place if you are in VFR – VMC
- IFR Climb considerations – At least 500 fpm to assigned altitude (optimal rate until within 1000 ft assigned)
  - "At pilots discretion"

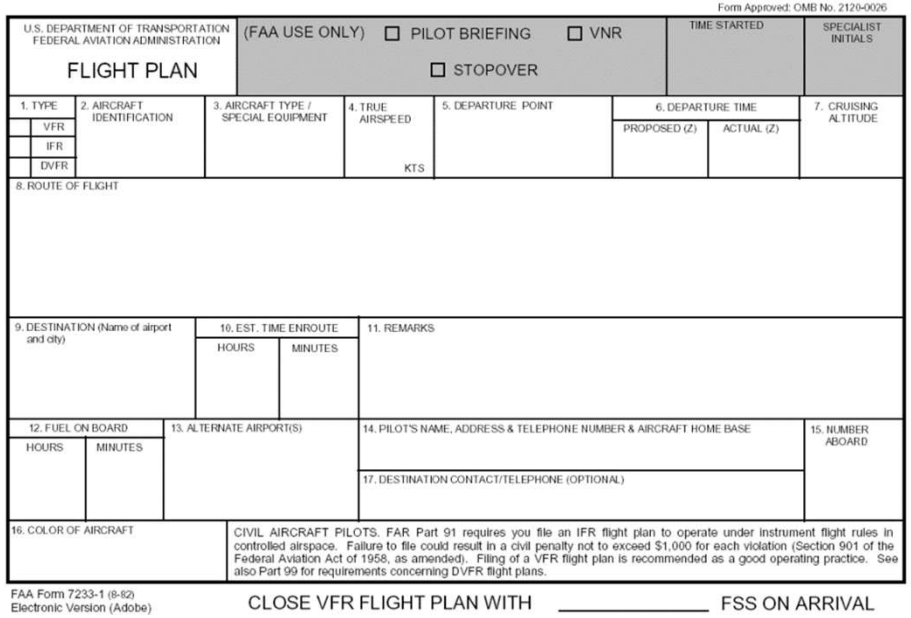
Traffic Alert and Collision Avoidance System (TCAS)

- A resolution advisory (RA) issued by TCAS supersedes any ATC clearance
- 1 July 2002 Überlingen mid-air collision – DHL Flight 611 and BAL Bashkirian Airlines Flight 2937 received TCAS RAs, but the controller gave contradictory information to BAL2937
  - Both aircraft ended up descending into each other



The Flight Plan

- The clearance starts with the filing of a flight plan
  - FSS
  - Online Service – e.g. Foreflight
  - Pop-up with ATC
- Be sure that you accurately calculate the time of flight as this can impact other aspects of the flight – e.g. lost communications, approach, fuel, timing, etc.



Form Approved: OMB No. 2120-0026

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION FLIGHT PLAN	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE / SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
☐ VFR ☐ IFR ☐ DVFR			KTS		PROPOSED (Z)	ACTUAL (Z)	

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	MINUTES	11. REMARKS

12. FUEL ON BOARD HOURS	MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
			17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	

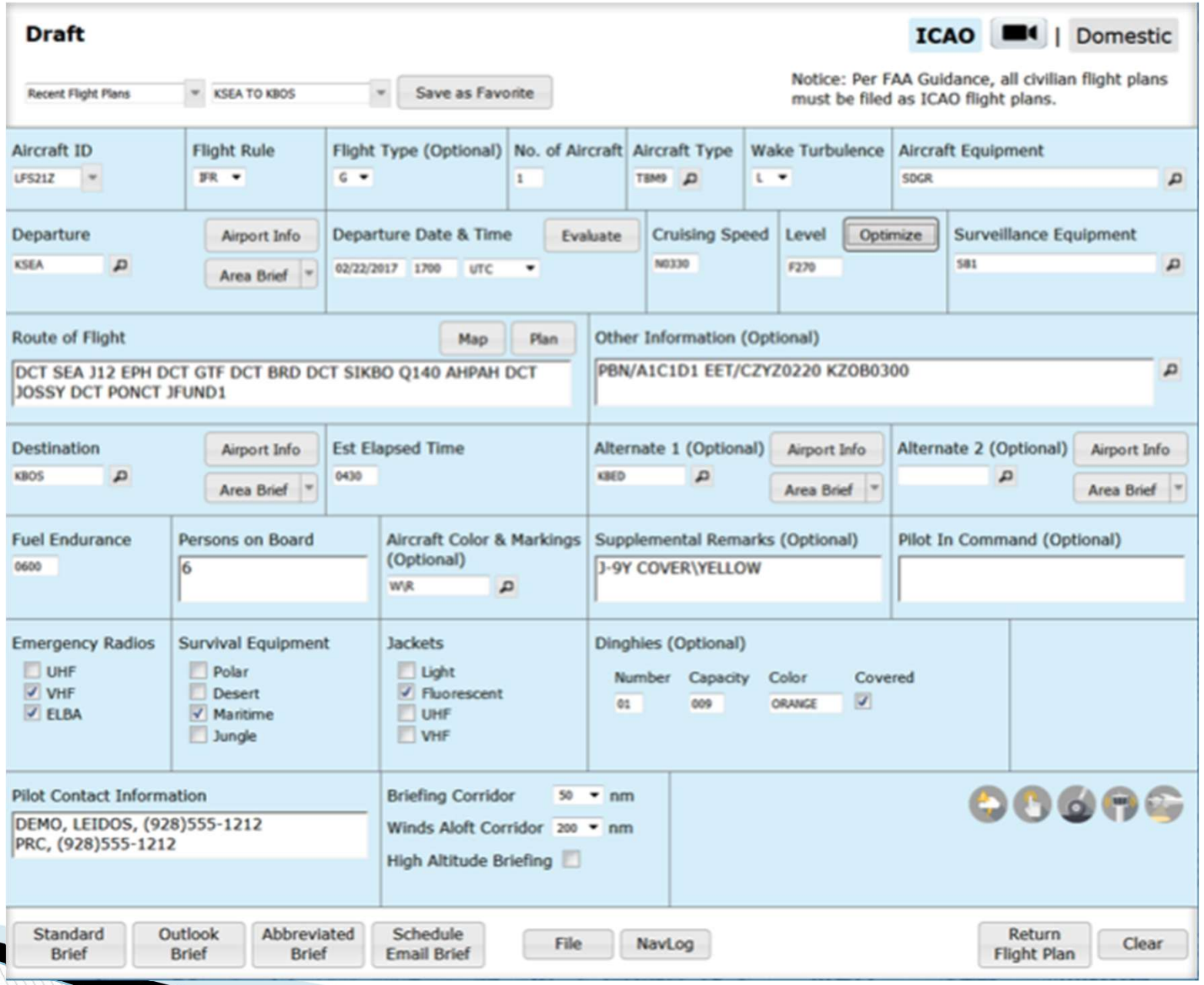
16. COLOR OF AIRCRAFT	CIVIL AIRCRAFT PILOTS. FAR Part 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed $1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.

FAA Form 7233-1 (8-82)
Electronic Version (Adobe)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

FAA Form 7233-1 is still used for domestic flights that don't require the International Civil Aviation Organization (ICAO) format

The ICAO Flight Plan



Getting Your Clearance

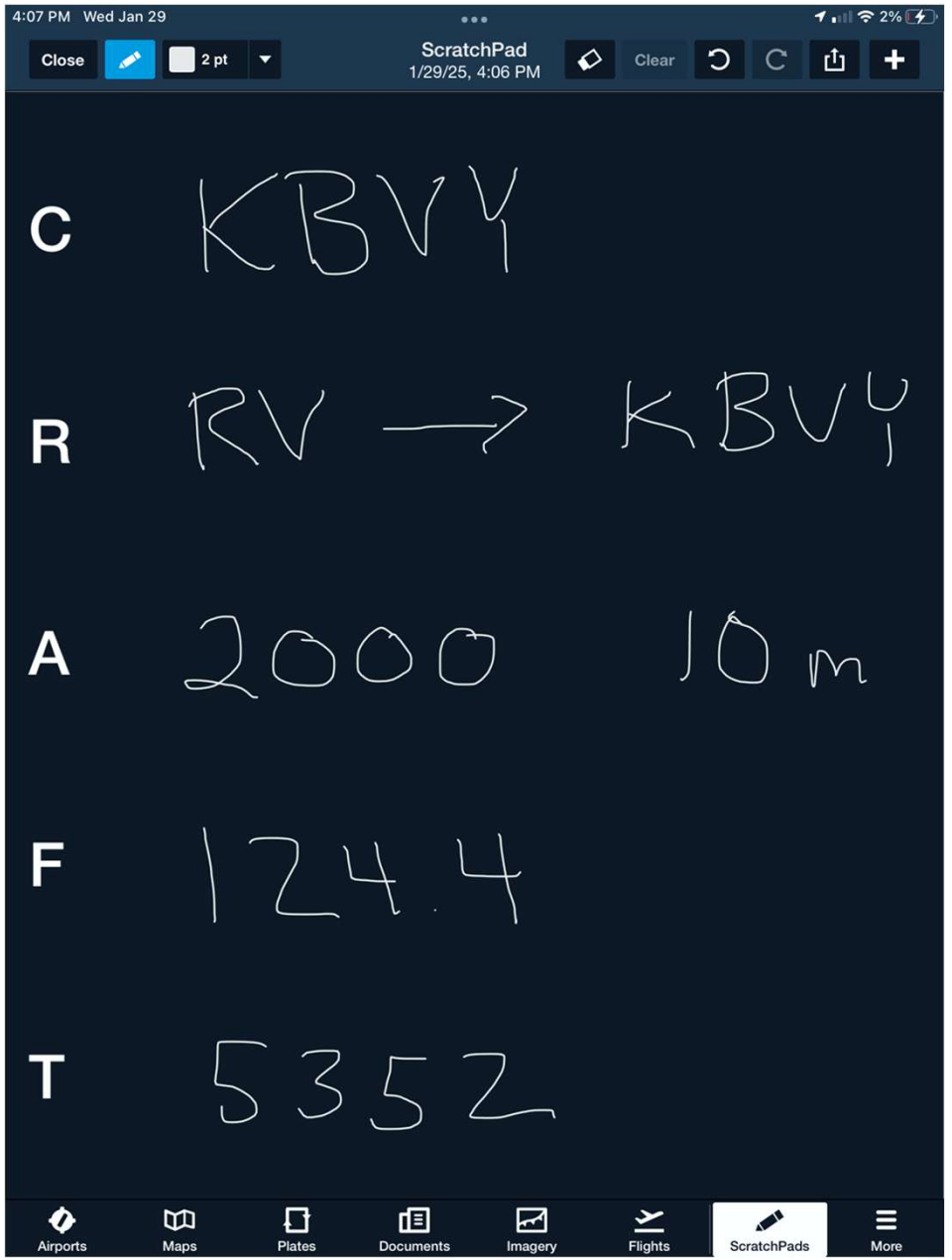
- How
  - Clearance delivery
  - Control tower
  - By radio with FSS – e.g., dedicated remote communications frequency outlet
  - By phone with FSS or applicable ATC facility
    - FSS specialist will relay the clearance from the TRACON or Center
  - By radio with approach or center – can be difficult to copy and more complex.
    - Some facilities do not like to tie up the frequency with clearances.
- On the radio to clearance delivery "**Clearance, Warrior 3021C, IFR to KALB**"
  - If it is ground or tower you are talking to substitute Clearance for Ground or Tower
- Be ready with pen in hand to write your clearance down
  - Copy the clearance first, then try to decipher it, and then, if parts of it don't make sense, query the controller for clarification

ATC Clearance Elements and Order IFR – C R A F T

- Aircraft Identification
- **C**learance limit - where you are cleared to.
  - Generally, clearance limit is the destination airport; can be closer location for expediency
- Departure procedure
- **R**oute of flight
- **A**ltitudes (or Flight Levels)
  - Initial and expected altitude and time
- Holding instructions
- Special instructions / information
  - Usually not used - When used typically it is about a composite flight plan, e.g., "Maintain VFR on top, if not VFR on top maintain 5,000 and advise“
- **F**requency and **T**ransponder code information

ATC Clearance Elements and Order

IFR – C R A F T



Clearance Limit

- Limit of the IFR clearance, beyond which you **cannot** fly IMC, unless you either receive a further clearance, or choose to terminate your IFR flight plan

- Limit is almost always your destination airport, however, it can also be a fix, VOR, etc. prior to the destination airport

Route

- You proposed a route when you filed your flight plan
- ATC will try to issue a clearance that is close to that route; but, the route may differ based upon traffic flow, controller workload and other factors
- Think of the route as a contract with the controller
- If the route is the same as you filed, the clearance may be “as filed” or “as filed except”
- May include a SID and/or STAR or a Tower Enroute Control clearance

Altitude

- Each IFR clearance needs to have altitude information included.
- How high you can climb and when
  - Generally done by assigning an initial altitude and then a time or place when/where you can expect higher
  - Also given, as with many ATC instructions, so that in the event of lost communications, pilots know how to proceed with their flight
- May receive a "climb via" SID instructions

Frequency

- Departure Frequency for an airport is the frequency of the controller that the aircraft will contact immediately after takeoff

- From KBED airport, it is typically Boston Departure 124.4

Transponder

- You will be assigned a specific squawk code
- It will NOT be 1200
- Enter your squawk code after you receive it into your transponder
- Transponder should be set to ALT on the ground

(HNSCM5.BED) 22363 AL-626 (FAA)

LAURENCE G HANSCOM FLD (BED)
BEDFORD, MASSACHUSETTS

HANSCOM FIVE DEPARTURE

DEPARTURE ROUTE DESCRIPTION

TAKEOFF ALL RUNWAYS: Climb on heading as assigned by ATC, thence....

....expect RADAR vectors to assigned route/navaid/fix. Maintain 2000. Expect clearance to filed altitude/flight level within ten (10) minutes after departure.

NOTE: Non-RNAV equipped aircraft can expect vectors on assigned route.
NOTE: BLZZR DEPARTURES expect vectors on BOS R-273, DME required.
NOTE: BRUWN DEPARTURES expect vectors on BOS R-159, DME required.
NOTE: CELTK DEPARTURES expect vectors on BOS R-114.
NOTE: HYLND DEPARTURES expect vectors on BOS R-350, DME required.
NOTE: PATSS DEPARTURES expect vectors on BOS R-260, DME required.
NOTE: REVSS DEPARTURES expect vectors on BOS R-285, DME required.
NOTE: SSOXS DEPARTURES expect vectors on BOS R-177.

TAKEOFF MINIMUMS:
Rwys 5, 29: Standard.
Rwy 11: 300-1 or Standard with minimum climb of 258' per NM to 400.
Rwy 23: 300-1⅞ or Standard with minimum climb of 439' per NM to 400.

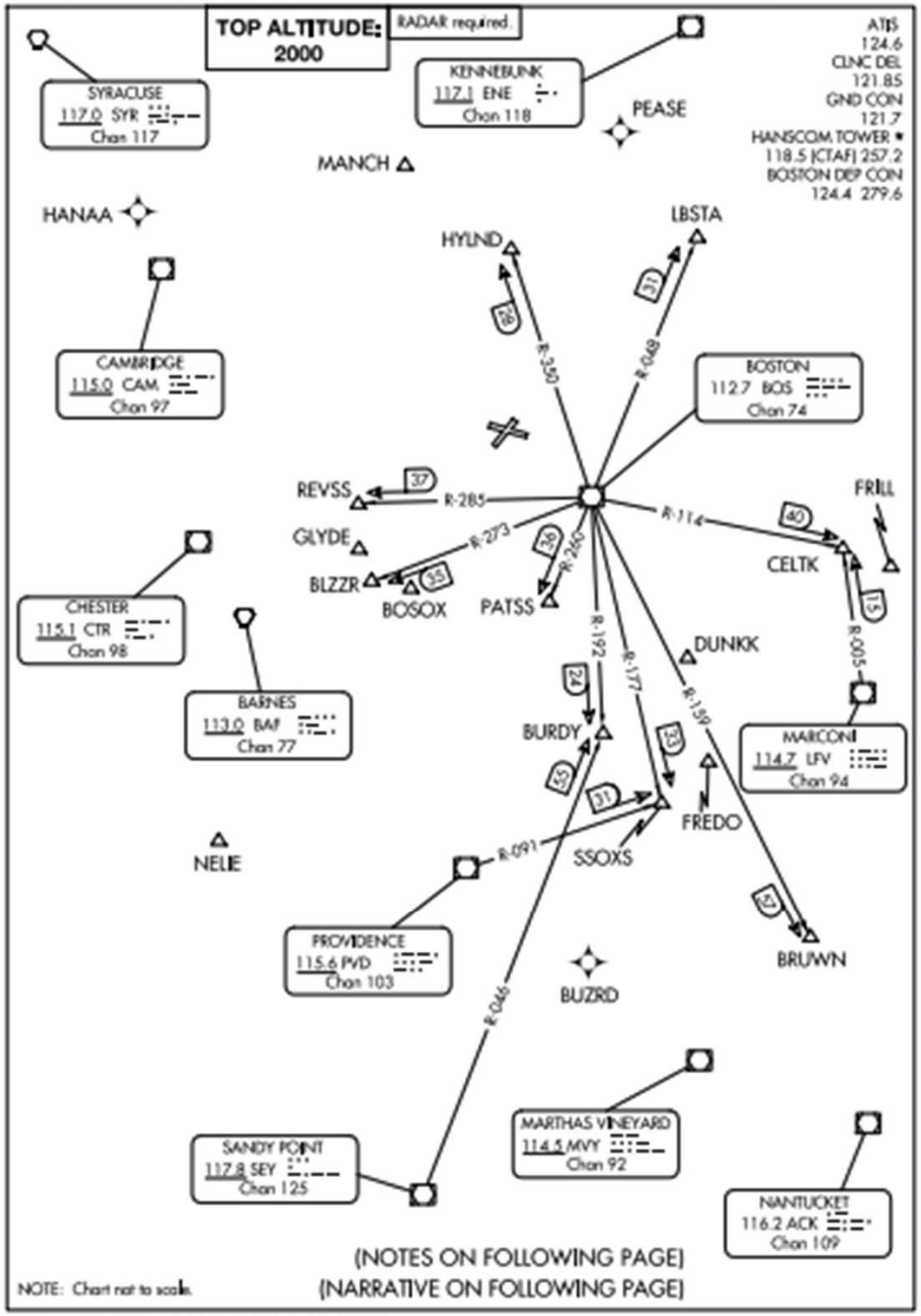
NE-1, 23 JAN 2025 to 20 FEB 2025

NE-1, 23 JAN 2025 to 20 FEB 2025

(HNSCM5.BED) 24193 AL-626 (FAA)

LAURENCE G HANSCOM FLD (BED)
BEDFORD, MASSACHUSETTS

HANSCOM FIVE DEPARTURE



HANSCOM FIVE DEPARTURE
(HNSCM5.BED) 29DEC22

BEDFORD, MASSACHUSETTS
LAURENCE G HANSCOM FLD (BED)

NE-1, 23 JAN 2025 to 20 FEB 2025

NE-1, 23 JAN 2025 to 20 FEB 2025

Standard Instrument Departure (SID)

Correct and Timely Copying of an ATC Clearance

- Many systems exist to copy ATC clearances
  - Specific abbreviations / shorthand
  - Specific forms
- Key is to be ready to copy
  - Know expected route and navaids
  - Have pen and paper ready when requesting clearance
- Copy clearance as it is being read by controller
- Use clearance shorthand that works for you

Clearance Form

- Sample clearance form
- CRAFT on ForeFlight

Cleared to: _____

VIA ODP/ SID: _____

Initial Heading: _____ ☐ Runway heading ☐ Radar vectors

Route: ☐ As filed or

_____

_____

_____

☐ Then as filed

Altitude: _____

Maintain: _____

Expect _____ in ___ minutes / miles

Departure frequency: _____

Squawk: _____

Center Freq: _____

Uncontrolled field:

Void if not off by: _____
Release time: _____
Call if not off by: _____

Clearance Shorthand

A	Altitude
F	Flight Level
B	Beacon
C	Cleared
CT	Circuit
CW	Crosswind
DW	Downwind
BL	Base
FIN	Final

↗	Climb
↘	Descend
←	Turn Left
→	Turn Right
‖	Restriction Applied by ATC
○	Maintain
XXXX	Not Above
XXXX	Not Below

EAT	Expected Approach Time
FP	Flight Plan
H	Hold
ILS	ILS Approach
NDB	NDB Approach
HD	Heading
TK	Track
IN	Inbound
OUT	Outbound
LA	Land
T/O	Take Off
X	Not (or Do Not)
R	Report
RP	Report Passing
RR	Report Reaching
RL	Report Leaving
RV	Radar Vectors
SMA	Standard Missed Approach
CAS	Controlled Airspace

Examples

↗ A20	Climb not above altitude 2000ft
F50	Maintain flight level 50
C ILS, R BO	Cleared for the ILS, report beacon outbound
HD ‖ A20 →	Maintain heading until passing altitude 2000ft then turn right
‖ CAS	Remain clear of controlled airspace

FP Nice, Thred N866 Ortac, A20 ‖ F80 135.05, 3615

Cleared flight plan route to Nice, THRED N866 ORTAC, cleared altitude 2000ft, when cleared by radar flight level 80, contact frequency will be 135.05, squawk 3615

Read Back of Clearance

- Controllers expect you to read back all relevant information that affects the direction, speed, and altitude of your flight:
  - Heading assignments;
  - Altitude assignments;
  - Speed assignments;
  - Altimeter settings (because altimeter accuracy influences your aircraft's altitude;)
  - Rate of climb or descent assignments;
  - Route, route changes, including holding pattern instructions;
  - Approach and landing clearances;
  - Takeoff and departure clearances;
  - Taxi instructions
  - Frequency changes should always be read-back in full
- Neither the FARs nor the AIM state exactly what must be included in your read-back, but a strong recommendation to acknowledge instructions from ATC

Read Back of Clearance

- Read back the clearance
  - Correctly
  - In a prompt manner
  - In the sequence received
  - Using standard terminology
- Pilots of airborne aircraft should read back those parts of ATC clearances and instructions containing altitude assignments or vectors as a means of mutual verification
  - Read back of the "numbers" serves as a double check and reduces communication errors
- Include the aircraft identification in all read-backs and acknowledgments

Clearance Read Back

- Inform ATC of any items you missed
- Correct any errors and read-back those items again for controller confirmation
- Anticipate and note "read-back correct" confirmation from controller
- Reading back of initial clearance does not imply acceptance
- Study pilot/controller glossary for standard terminology

Validation of Clearance

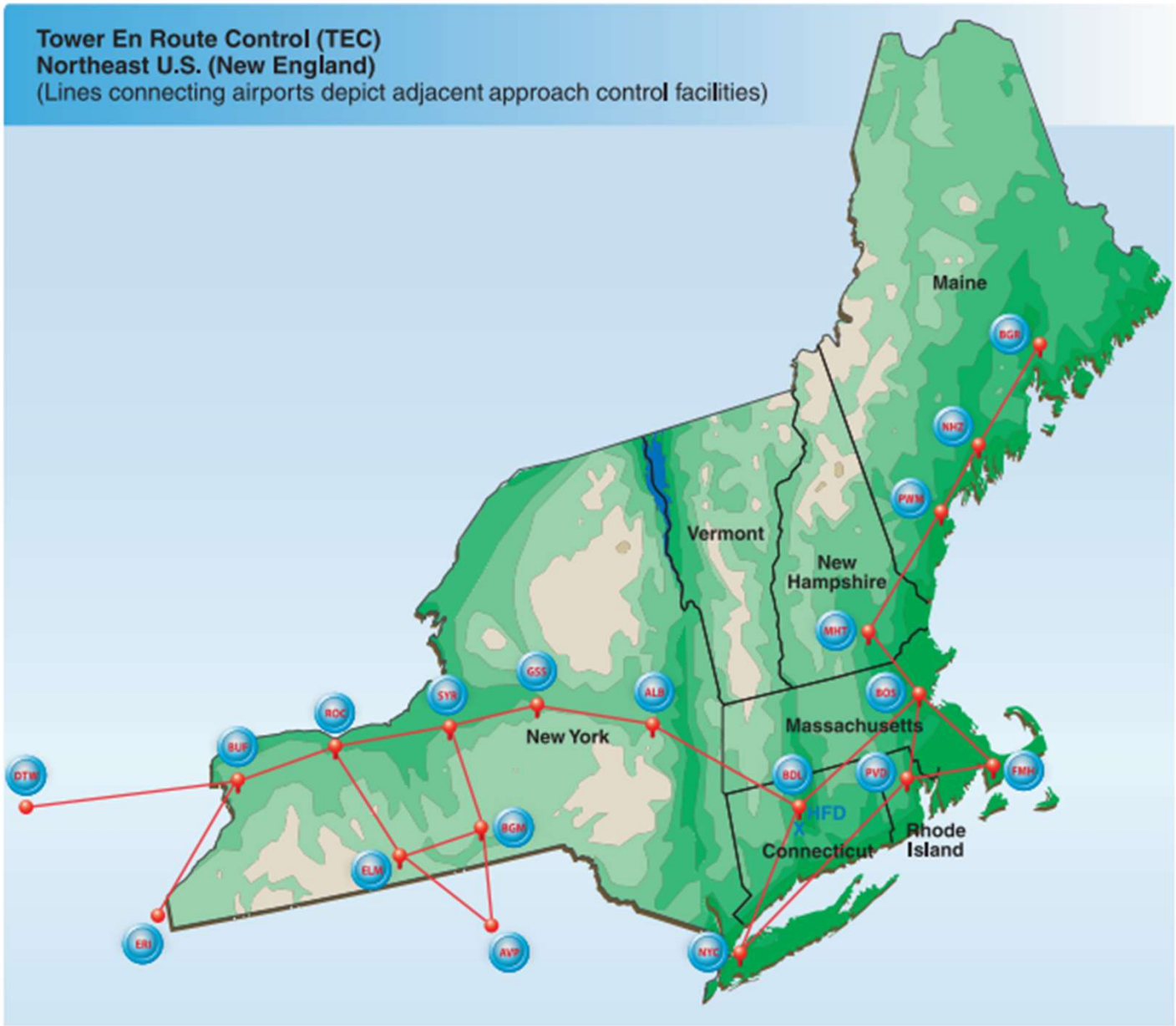
- Be certain that you confirm that is possible to comply with the clearance
  - Aircraft capabilities
  - Pilot capabilities
  - Terrain / CFIT
  - FARs
- Pilot must request an amended clearance if the clearance would cause deviation from a rule or regulation or place the aircraft in jeopardy

Validation / Clarification of Clearance

- Assure you correctly interpret the ATC clearance
- When necessary, request clarification, verification or change
- Study each clearance element
  - If in doubt, request clarification
  - If unable, request amendment

Tower Enroute Control

- Allows for IFR flight between Terminal areas
- Non-turbo aircraft below 10,000 MSL
- Include TEC in flight plan block



Clearance Void Time

- Provision in a clearance for that clearance to be void (automatically cancelled) if aircraft not airborne by a specified time, the clearance void time
- May be received when operating from an airport without a control tower
- If not airborne prior to the clearance void time, advise ATC as soon as possible
- ATC normally advises pilot of time allotted to notify ATC in this event (cannot exceed 30 minutes)
- If ATC in not notified within 30 minutes after aircraft misses clearance void time, then aircraft is considered overdue and search and rescue procedures are begun
- Other IFR operations are suspended until aircraft contacts ATC or until 30 minutes after clearance void time
- Prohibited to use the clearance after the void time = to no clearance

VFR on Top

- VFR-on-top is prohibited in Class A airspace
- A VFR-on-top clearance can only be assigned by ATC if it has been requested by the pilot and conditions are suitable
- Both VFR and IFR rules apply to a VFR-on-top flight however when flying VFR-on-top, altitudes are VFR altitudes only with basic VFR minimums
- A climb to VFR-on-top clearance should be requested to climb thru a cloud layer or an area of reduced visibility and then continue the flight VFR

Pilot/Controller Responsibilities

- AIM 5-5-1 sets out responsibilities more fully
- Pilot general responsibilities
  - FAR 91.3 - Pilot in command is directly responsible for, and is the final authority for the safe operation of, an aircraft. In an emergency pilots can deviate from any rule as needed
  - Acknowledge receipt and understanding of clearances
  - Responsible for questioning any heading or altitude believed to be incorrect
    - Pilot must request an amended clearance if the pilot believes that an ATC clearance would cause deviation from a rule or regulation or place the aircraft in jeopardy
  - If a pilot acknowledges traffic, the pilot is responsible to follow the leader avoid such conflicting traffic and to avoid wake turbulence
  - Pilot is always responsible to see and avoid traffic when operating in VMC
  - To operate under IFR in controlled airspace (Sec. 91.173)
    - File an IFR flight plan
    - Obtain an ATC clearance
- Pilot and controller responsibilities overlap in many areas providing redundancy

Pilot/Controller Responsibilities

- Controller responsibilities
  - First priority is for the separation of aircraft and to the issuance of radar safety alerts
  - Other functions are performed on a time-available basis
  - If pilot acknowledgements are incorrect, distorted, or incomplete, the controller will correct, as appropriate
  - Issuing appropriate clearances
    - In IFR clearances, assigning altitudes above the minimum IFR altitudes in controlled airspace
    - Minimum Vectoring Altitude

Standard Phraseology

- AIM 4-2-7 - Phonetic Alphabet
- Federal Aviation Administration Pilot / Controller Glossary (P/CG)
  - http://www.faa.gov/air_traffic/publications/ATpubs/PCG/index.htm

CHARACTER	MORSE CODE	TELEPHONY	PHONIC (PRONUNCIATION)
A	•—	Alfa	(AL-FAH)
B	—•••	Bravo	(BRAH-VOH)
C	—•—•	Charlie	(CHAR-LEE) or (SHAR-LEE)
D	—••	Delta	(DELL-TAH)
E	•	Echo	(ECK-OH)
F	••—•	Foxtrot	(FOKS-TROT)
G	——•	Golf	(GOLF)
H	••••	Hotel	(HOH-TEL)
I	••	India	(IN-DEE-AH)
J	•———	Juliett	(JEW-LEE-ETT)
K	—•—	Kilo	(KEY-LOH)
L	•—••	Lima	(LEE-MAH)
M	——	Mike	(MIKE)
N	—•	November	(NO-VEM-BER)
O	———	Oscar	(OSS-CAH)
P	•——•	Papa	(PAH-PAH)
Q	——•—	Quebec	(KEH-BECK)
R	•—•	Romeo	(ROW-ME-OH)
S	•••	Sierra	(SEE-AIR-RAH)
T	—	Tango	(TANG-GO)
U	••—	Uniform	(YOU-NEE-FORM) or (OO-NEE-FORM)
V	•••—	Victor	(VIK-TAH)
W	•——	Whiskey	(WISS-KEY)
X	—••—	Xray	(ECKS-RAY)
Y	—•——	Yankee	(YANG-KEY)
Z	——••	Zulu	(ZOO-LOO)
1	•————	One	(WUN)
2	••———	Two	(TOO)
3	•••——	Three	(TREE)
4	••••—	Four	(FOW-ER)
5	•••••	Five	(FIFE)
6	—••••	Six	(SIX)
7	——•••	Seven	(SEV-EN)
8	———••	Eight	(AIT)
9	————•	Nine	(NIN-ER)
0	—————	Zero	(ZEE-RO)

Sets Communication and Navigation Radios and Transponder Codes

- Set communication and navigation frequencies appropriate for the ATC clearance
- Set communication and navigation equipment frequencies as much as possible during low workload periods, e.g., prior to takeoff
- Recommend left-to-right top-to-bottom approach for radio set up
  - Set heading indicator bug on initial assigned departure heading
  - Set primary COMM radio to tower or UNICOM frequency
  - Set departure frequency in standby position
  - Enter and check assigned route, all waypoints, including DP, in GPS and activate flight plan, if applicable
  - Set primary navigation system (e.g., VOR, GPS, etc.): enter, check frequency and ID (if in range) of first enroute station, and set OBS to initial assigned course
  - Set secondary COMM radio to departure frequency
  - Set secondary NAV radio to the frequency of the approach facility (e.g., ILS) that would be used in case of emergent return to departure airport in IMC
  - Set transponder to assigned code
    - Standby mode until ready for takeoff, then switch to ALT mode
    - Some airports require transponder to be on during taxi

Compliance With Clearances

You Must:

- Exhibit adequate knowledge of the elements related to ATS routes, and related pilot/controller responsibilities
- Use the current and appropriate navigation publications for the proposed flight
- Select and use the appropriate communication facilities; select and identify the navigation aids associated with the proposed flight
- Perform the appropriate aircraft checklist items relative to the phase of flight
- Establish two-way communications with the proper controlling agency, using proper phraseology
- Comply, in a timely manner, with all ATC instructions and airspace restrictions
- Exhibit adequate knowledge of communication failure procedures
- Intercept, in a timely manner, all courses, radials, and bearings appropriate to the procedure, route, or clearance
- Maintain the applicable airspeed within ±10 knots; headings within ±10°; altitude within ±100 feet; and tracks a course, radial, or bearing within ¾-scale deflection of the CDI
- Demonstrate an appropriate level of single-pilot resource management skills

How to Cancel Your IFR Flight Plan - Clearances

You can cancel an **Instrument Flight Rules (IFR) flight plan** through the following methods, depending on the phase of flight and conditions:

1. Before Departure

Contact **Flight Service (FSS)** or use an online service like ForeFlight, Leidos (1800wxbrief.com).

Request cancellation with **Clearance Delivery** or **Ground Control** before receiving your IFR clearance.

2. During Flight (Airborne Cancellation)

In VFR Conditions:

- You can cancel IFR **anytime you are in VFR conditions** and outside Class A airspace.
- Request cancellation with **ATC (Center, Approach, or Tower)** on the current frequency.
- Ensure you maintain VFR and obtain a squawk code if continuing under VFR flight following.

At Non-Towered Airports:

- Cancel IFR **with ATC** once in VFR conditions and before landing.
- If unable to cancel in the air, contact **Flight Service (FSS) by phone** or **EFB software** after landing.

3. After Landing

At a **Towered Airport**: The IFR flight plan **automatically cancels upon landing** unless instructed otherwise.

At a **Non-Towered Airport**:

- Cancel IFR with ATC **before landing if in VFR conditions**.
- After landing, cancel via **radio with FSS, ATC (if reachable), or a phone call to FSS (1-800-WX-BRIEF), EFB (ForeFlight)**.

Important Notes:

You **cannot cancel IFR in IMC**; you must be in VFR conditions.

Ensure you have a **clearance into controlled airspace** if continuing VFR after cancellation.

Always verify cancellation with ATC or FSS to avoid search and rescue activation.

FAA Questions

A. When is radar service terminated during a visual approach?
    1. Automatically when ATC instructs the pilot to contact the tower
    2. Immediately upon acceptance of the approach by the pilot.
    3. When ATC advises, “Radar service terminated; resume own navigation.”

B. Prior to which operation must an IFR flight plan be filed and an appropriate ATC clearance received?
    1. Flying by reference to instruments in controlled airspace.
    2. Entering controlled airspace when IMC exists.
    3. Takeoff when IFR weather conditions exist.

A. When may a pilot cancel the IFR flight plan prior to completing the flight?
    1. Any time.
    2. Only if an emergency occurs.
    3. Only in VFR conditions when not in Class A airspace.

ATC Clearance Video Tutorials

ATC Clearance Videos and Tutorials

Copying ATC Clearance

https://www.youtube.com/watch?v=eQrxtdKEOcM

Disclaimer

Please note that information within this presentation comes from various sources which may or may not have been validated.

Always use official FAA materials and documents for current FARs and publications.

Refer to Certified Flight Instructors for clarification and questions, as needed.