FLY 8MA

2020
Instrument Pilot Syllabus

Welcome to the FLY8MA Instrument Syllabus!

Let's briefly go over how you can maximize the use of your new IFR syllabus.

Grading System:

We use a simple 1-3 grading system to assess student performance. These grades are:
1 = Below standards, lesson must be repeated.
2 = Meets standards, but review is required.
3 = Satisfactory performance.

We've included an example below of how the grading sheet is filled out:

Lesson & Topic	Page #	Est. Ground	Est. Flight	Act. Ground	Act. Flight	Score (1-3)
1. Introduction to the IFR Rating & Instrument Flight	X	1.0	1.2	0.8	1.3	3
Notes:	*Cumulative:*	1.0	1.2	0.8	1.3	3/3
Student understands presented concepts						
2. IFR Aeronautical Decision Making & Aeromedical Factors	X	1.0	1.2	1.1	1.3	2
Notes:	*Cumulative:*	2.0	2.4	1.9	2.6	5/6
Student met ACS standards, but medical factors needs review.						

The columns on the left (estimated ground and estimated flight) are a given estimation of the amount of time (in hours) required to complete the lesson. These estimates are shown both for the specified lesson, and cumulatively in the second row. As you proceed through the syllabus, keep track of actual ground and actual flight times in the columns located on the right. You may cumulatively track the hours of instruction given similar to a logbook.

Let's briefly touch on non-IFR abbreviations used in this syllabus :

***PHAK*:** Pilot's Handbook of Aeronautical Knowledge
***IPH*:** Instrument Procedures Handbook
***POH*:** Pilot's Operating Handbook
***ACS*:** Airman Certification Standards
***FAR/AIM*:** Federal Aviation Regulations / Aeronautical Information Manual
***FLY8MA IFR / Instrument Course**:* A full Instrument Ground School accessible through our website, fly8ma.com, that can be used in combination with this syllabus to prepare the student for their IFR checkride.
***FLY8MA Instructor Kit*:** A kit we specifically designed to aid CFI's in teaching, including demonstration model aircraft, passenger safety briefing cards, safety release lanyards, course information cards, and instrument panel posters.
***FLY8MA CFI Course*:** Courses located in our CFI Learning portal including the fundamentals of instruction, the CFI practical test standards, and CFI oral preparation.

Maximizing your student's learning

We encourage you to use this instrument syllabus as a guide to maximize your student's learning. An example of this may be to include some of your own instrument flying experiences as you progress through the lessons to provide relevancy to real world flying, or presenting one of our scenario-based flights under multiple weather conditions. Put your student in situations where *higher order thinking skills* are required.

It's our job to do our best in preparing this individual for real world IFR flying, an environment where the amount of knowledge required is vast and the room for error is even more so marginal as compared to VFR flying. Keep it interesting, change it up, and keep your student on their toes once they have an understanding of the subject area.

As always, if you have any questions in regard to our syllabus or courses, you can always reach out to our staff at 234-738-2582 or email us at cfi@fly8ma.com

Cheers!

Jon Kotwicki
Chief Flight Instructor
FLY8MA Flight Training

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Attention / Motivation : In order to become a proficient instrument pilot, you first need to have an in-depth understanding of the instrument rating; inclusive of its components, privileges, and limitations. This is an essential first step that will provide you the fundamental building blocks necessary to be successful in your training and pass your instrument checkride.

Lesson Objective(s): The student will be exposed to becoming acquainted with flight solely by reference to instruments. The student will gain an understanding of a basic instrument scan, instrument interpretation, and be introduced to maneuvers by reference solely to instruments.

Equipment Needed:

- **iPad/FLY8MA CFI and IFR Course**
- **FLY8MA Instructor Kit (view limiting device)**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- Ask the student questions that encourages them to teach the material back to you.

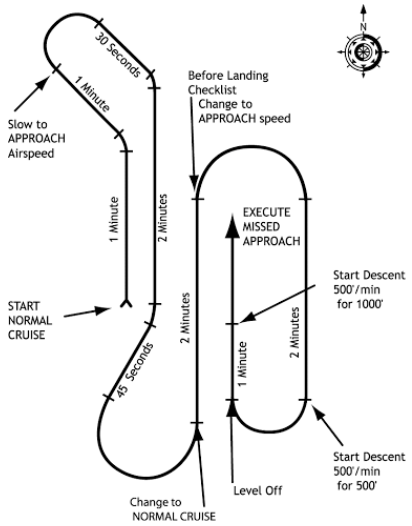
Student Actions:

- Review Instrument Flying Handbook Introduction and Chapters 5 through 7.
- Review FLY8MA IFR Course Lesson: Starting Your Instrument Rating Right & IFR Flight Instruments: Looking Through the Glass.
- **Prior to lesson write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Choose one topic from 3 separate tasks within ACS, SECTION I-IV.



Lesson Introduction Items

_ Checklist Usage, Pre/Postflight Procedures
_ Types of Altitude
_ Flight Instruments, Associated errors, and Preflight Cockpit Check
_ Primary vs Supporting Instruments
_ Basic Attitude Instrument Flying Skills
_ IFR Takeoff Minimums
_ Constant Rate/Airspeed Climbs
_ Level Off from Climb / Descent
_ Importance of Proper Trim Usage
_ Straight-and-level Flight
_ Standard Rate Turns
_ Steep Turns
_ Level Speed Changes
_ Constant Rate/Airspeed Descents
_ Bravo Pattern (see diagram)

Completion Standards:

The student shows an understanding of the theoretical knowledge of flight instruments. The student can conduct an Instrument Preflight and Cockpit Check as well as maintain good instrument scanning technique and airplane control.
Altitude +/-200 feet | Airspeed +/-20 Knots | Bank +/- 15 degrees | Heading +/- 20 degrees.

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Disorientation and inadequate aircraft control when flying by reference solely to flight instruments.
- Cross-checking too rapidly, looking at the instruments without knowing what to look for.
- Fixation at a single instrument or omission of an instrument from a cross-check.

Debrief / Remotivation

The IFR rating is technically challenging. The initial experience of flying without reference to a visual horizon can be disorienting and overwhelming. Good instruction from a CFII, an emphasis on structured cockpit flow, and continued experience flying under simulated or actual instrument conditions generally results in improved instrument proficiency. **The stronger your instrument scan, the easier the rest of your instrument will be.**

Oral Eval Questions:

What are the aeronautical experience requirements to obtain an instrument rating, and when is an instrument rating required?

What are the required qualifications for a person to act as a safety pilot?

What information must a PIC be familiar with before an IFR flight?

What aircraft instruments/equipment is required for IFR operations?

What instruments operate from the pitot/static system? What instruments contain gyroscopes and how do they operate?

How do the altimeter and VSI work?

What are the various magnetic compass errors?

Describe the Primary vs Supporting and Control and Performance Methods.

What is a standard and half standard rate of turn? How do you calculate the bank angle required for a given airspeed?

Close (Additional Study):

Listen to and Review the FLY8MA course lesson: “IFR Flight Instruments: Looking Through the Glass”, “IFR Mid Games”, and **Review** Lesson 2 – FLY8MA IFR Syllabus.

Attention / Motivation : It is important that you develop good IFR aeronautical decision making (ADM) skills, and have a comprehensive understanding of aeromedical factors as they relate to IFR flight. As compared to flying in visual meteorlogoical conditions, the margin of safety is now much slimmer, which means the consequences of poor decisions are much greater. Good decisions equals no accidents.

Lesson Objective(s): The student will further develop their ADM skillset (inclusive of both crew and single pilot resource management), develop an understanding of aeromedical factors and how they relate to IFR flight, learn the cues of spatial disorientation, and review airspace basics if necessary.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit (view limiting device)**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Within the ACS, review risk management objectives pertaining to ADM and aeromedical factors.
- Formulate scenarios that test the student's knowledge level.
- Ask the student questions that encourages them to teach the material back to you.

Student Actions:

- Review Instrument Flying Handbook Chapters 1, 3, and 5.
- Review FLY8MA IFR Course Lesson: IFR Mind Games.
- **Prior to lesson write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Choose at least one topic of discussion from Chapters 1, 3 and 5 from the Instrument Flying Handbook.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight Procedures
_ Any items needing work from Lesson 1

Lesson Introduction Items

_ Personal Minimums (fill out worksheet)
_ Risk Management
_ Fuel Planning
_ Go / No-Go Decision
_ Aeromedical Factors
_ Spatial Disorientation
_ Illusions as they Pertain to Night or IMC
_ Procedures for Disorientation/Illusions
_ ADM, SRM and CRM
_ Traffic Advisories / See and Avoid
_ VFR On-Top
_ Filing an IFR flight plan (depart IFR, cancel in the air).

Completion Standards:

The student demonstrates a theoretical and practical understanding of ADM, aeromedical factors, spatial disorientation, and the national airspace system. They are able to identify and explain the risk factors of spatial disorientation, including appropriate management techniques in the context of a CRM or SRM environment. The student should also demonstrate an understanding of human physiology and the risk factors of certain medications or existing conditions when acting as PIC to be mitigated through the use of a personal checklist. The student should be able to file an IFR flight plan with the help of the CFII and depart under IFR.

Altitude +/-200 feet | Airspeed +/-20 Knots | Bank +/- 15 degrees | Heading +/- 20 degrees.

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Failing to react at the onset of spatial disorientation (from instrumentation failure or an underdeveloped instrument scan/cross-check), hypoxia, or carbon monoxide poisoning.
- Lack of emphasis on personal checklists such as 'IMSAFE' or the 'DECIDE' model.
- Lack of adherence to CRM or SRM, resulting in rushed or poorly made decisions.

Debrief / Remotivation

Good ADM is a critical component of any flight, and promotes accident avoidance. Good ADM is particularly important in the context of IFR operations where careful planning is required. A working knowledge of aeromedical factors and spatial disorientation are equally as important to mitigate the risk of an accident in all aspects of flying.

Oral Eval Questions:

Discuss and review your preferred checklist/model to determine if you are fit to act as PIC.

Define the terms SRM and CRM? How do you incorporate this into your flying?

Name several factors that can reduce situational awareness and what procedures can be used to mitigate the risk factors of spatial disorientation and maintain situational awareness.

Can you hang a piece of string from the cockpit ceiling to tell if you are in a bank, climb, or descent in actual instrument flying conditions if the attitude indicator fails?

How can you increase or decrease your personal minimums?

What is hypoxia and what factors make a pilot more susceptible to it?

Where can you find a list of medications that can/can't be taken when acting as PIC?

Close (Additional Study):

Review the FLY8MA IFR Course lesson: IFR Mind Games. **Take** the ADM quiz.

Review the FLY8MA IFR Course lesson: Nav Instruments

Review Lesson 3 Navigation in the World of IFR FLY8MA IFR Syllabus.

Attention / Motivation : It is important that you have an in-depth understanding of your aircraft's navigation systems, and that you maintain proficiency in operating this equipment. There is no time this holds more true than when operating in the national airspace system under IFR. Navigation system knowledge and operating proficiency are critical components to navigating safely in the NAS.

Lesson Objective(s): The student will be exposed to and questioned on electronic/radio navigation equipment, portable navigation devices, and radio waves. They will bolster their knowledge about how these various forms of navigation operate, including VOR usage, GPS, and new and emerging tools available to the Instrument-rated pilot.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit (view limiting device)**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Review and apply ACS items located under Lesson Review Items.
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review Instrument Flying Handbook, Chapter 9.
- Review FLY8MA IFR Course Lesson: "NAV Instruments: Siri, Go Direct the Airport".
- Study your navigation systems on your aircraft, lacking basic knowledge on the operation of your GPS or panel will cause this to become a very long lesson.
- **Prior to lesson write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Review ACS Sections II, V, and VI as they apply to navigation equipment.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight Procedures
_ Any items needing work from lesson 2

Lesson Introduction Items

_ Filing & Closing an IFR Flight Plan
_ Review of Radio Waves
_ Review of Magnetic Compass & Compass Turns
_ Fly departure vectors to filed route.
_ IFR Navigation via GPS, including RAIM/WAAS, Course intercept and tracking, CDI Scaling, Waypoints, Nearest Function, and Passage/Sequencing.

Lesson Introduction Items (Cont'd)

_ IFR Navigation via VOR, including receiver check, station identification, determination of radial from VOR, radial tracking, wind correction, and identification of station passage.
_ Patterns tracking to or from a specific radial, and common VOR errors/irregularities.
_ Use of Portable Navigation as a Tool
_ IFR Alternate Planning & Minimums

Completion Standards:

The student demonstrates a working knowledge with navigation systems to include the use of GPS, VOR, NDB (if applicable), and ILS equipment.

Altitude +/-200 feet | Airspeed +/-20 Knots | Bank +/- 15 degrees | Heading +/- 20 degrees.

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Neglecting to tune into and verify that a VOR is operational.
- Confusion when adjusting the OBS to fly either to or from a VOR on a designated radial.
- Neglecting to verify RAIM coverage for non-WAAS GPS' on an IFR flight plan.

Debrief / Remotivation

Besides when operating in a radar environment with ATC vectors, navigation system familiarity is critical to ensure the safety of the flight, and is therefore nothing less than mandatory knowledge. Knowing how your system works, and how it might fail will keep you safe.

Oral Eval Questions:

What is a high and low frequency radio wave, and which travels a further distance over the surface of the earth?

Give a brief description of the function of GPS, WAAS, RAIM, and fault exclusion.

Give a brief description of VOR and DME.

What is meant by the term slant range distance and why is it important?

What is reverse sensing? Discuss the risks of navigating by way of reverse sensing.

What are the four essential components of all VOR indicator instruments?

How does a localizer and glideslope work, and what is a marker beacon?

Discuss the checks available for onboard VOR equipment to ensure it is compliant for IFR.

Can your destination and alternate only have GPS approaches available? How is that legal?

Close (Additional Study):

Review the FLY8MA IFR Course Lesson: "Nav Instruments" and "How the system works". **Take** the Electronic Navigation Quiz.

Review Lesson 4 The National Airspace System in FLY8MA IFR Syllabus

Attention / Motivation: It is important that you understand the national airspace system; both the components involved, and how they operate. There are many different navigational aids, facilities, and services available for IFR flight. The more familiar you become with these components, the more options you will have in your routing (getting places faster).

Lesson Objective(s): To review the student's knowledge of the national airspace system as it pertains to IFR flight, including air navigation facilities, equipment services, airspace classification of airports, aeronautical charts, services available, regulations, procedures, technical information, and material. Furthermore, the purpose of the lesson is a general review of communication procedures with ATC and the facilities and services available.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit (view limiting device)**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Review and apply ACS items located under Lesson Review Items.
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review Instrument Flying Handbook Chapters 1 and 2.
- Review FLY8MA IFR Course: "How the System Works: NAS under IFR"
- Identify and review the airspace you will be operating in during training and any planned trips after your training.
- **Prior to lesson write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Review ACS Section Section I, task C & Section III Task A.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight Procedures
_ Any items needing work from lesson 3

Lesson Introduction Items

_ IFR Frequencies & Frequency Location (Clearance, Ground, Tower, Departure, Center, and Approach)
_ Communications with ATC for IFR
_ Elements of and copying an IFR Clearance
_ IFR Clearance compliance, limits, and void times
_ Flying ATC assigned vetors, routes, waypoints, altitudes, and airspeeds
_ Air Traffic Service route system
_ Regulations of airspace/special use airspace

Lesson Introduction Items (Cont'd)

_ IFR Separation Standards

_ Uncontrolled Airspace under IFR

Completion Standards:

The student demonstrates the ability to apply the knowledge and principals of the NAS into practice. The student establishes ATC contact, obtains an IFR clearance, responds to and executes ATC assignments, and shows confidence communicating with ATC particularly in congested airspace. The student successfully applies a comprehensive knowledge of airspace for the planning, execution, and completion of an IFR flight.

Altitude +/-200 feet | Airspeed +/-20 Knots | Bank +/- 15 degrees | Heading +/- 20 degrees.

Common Errors:

- Difficulty in copying/understanding IFR clearances or failing on ATC instructions.
- Maintaining aircraft control while copying ATC instructions and inputting data into navigation equipment in actual or simulated instrument conditions.

Debrief / Remotivation:

The purpose of obtaining an IFR rating is to allow you to fly in less than VFR weather. Aviating in the absence of a visual horizon clearly increases the importance of a good Instrument scan, but also familiarity with airspace and ATC procedures. Obtaining clearances and working with the system might seem overwhelming at first, but through practice, your proficiency will improve.

Oral Eval Questions:

Discuss the role that Clearance Delivery, Ground Control, Tower and Approach/Departure play.

What are the methods available to obtain IFR clearance? Define CRAFT.

What is a pop-up IFR clearance? Describe a scenario where this might prove useful?

What does clearance void time mean and explain the purpose of the term hold for release?

What is meant by ARTCC? What is its function and how many are in the US?

What is meant by TRACON? What airspace does it control including lateral/vertical dimensions?

What is TEC and when may it be beneficial?

What is Class A, B, C, D, E, and G airspace? What are the typical lateral/vertical dimensions, speed restrictions, equipment and communication requirements for each?

What is the definition of controlled vs uncontrolled airspace? Why is this important?

What is special use airspace? Provide at least three examples.

Close (Additional Study):

Review the FLY8MA course How the System Works: NAS under IFR. **Take the** NAS Quiz.

Review Lesson 5 Holding Patterns in FLY8MA IFR Syllabus

Attention / Motivation : Being able to fly a proper holding pattern is an essential component of instrument flying. Depending on weather and traffic conditions, you may be issued a hold by ATC for aircraft separation, or until the airspace/weather clears up. Being able to successfully perform a hold ensures both a safe and smooth flight.

Lesson Objective(s): Develop the student's understanding of holding entries and procedures. As a basic foundation of IFR flight, the objective is to familiarize the student with their purpose; interpreting holding instructions from ATC, what entry is appropriate, and the specifics of an ATC assigned hold or one which is depicted on an instrument approach plate.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit (view limiting device)**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Review and apply ACS items located under Lesson Review Items.
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review Instrument Flying Handbook Chapter 10.
- Review FLY8MA IFR Course: "Holding Patterns".
- **Prior to lesson write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Review ACS Section III, Task B
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight procedures
_ Any items needing work from lesson 4

Lesson Instruction Items

_ Purpose of holding; holding airspace, speeds, and legs
_ Copying Hold Instructions from ATC
_ Pilot / Controller Hold Responsibilities
_ Hold Entry Procedure
_ Fix Crossing Check (5 T's)
_ Intersection Holds
_ Standard Rate & Timed Turns in a Hold
_ Wind Correction Angles in a Hold
_ DME Hold from a VOR
_ Hold on a GPS Waypoint
_ Partial Panel Holds
_ Holding to climb higher

Completion Standards:

The student demonstrates the ability to interpret and execute a hold when as assigned by ATC or as depicted on the missed approach portion of an instrument approach. Determines an appropriate entry into a hold in a timely manner. The student is able to execute a holding pattern, taking into account wind drift, airspeed, timing or distance of each leg, and remaining on the protected side of the hold/airspace.

Altitude +/-150 feet | Airspeed +/-15 Knots | Bank +/- 15 degrees | Heading +/- 15 degrees.

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Failing to remain on the protected side of a hold, accounting for wind drift (with a crab).
- Not using a timer on the two legs of a hold, rushing the entry and racecourse pattern.
- Failing to maintain aircraft control when entering or during the legs of a hold.

Debrief / Remotivation

Determining the appropriate entry to a hold can feel like an overwhelming task at first, especially in the context of early IFR training. It is easy to fall behind the airplane if the hold is entered improperly. Take it slow and ensure you understand the entry procedure. As you become proficient, the act of flying a hold will become second nature. You can always ask ATC for help if overwhelmed, or ask for a heading and altitude to fly instead.

Oral Eval Questions:

What is a holding pattern, and discuss the three suggested entries. Are they mandatory?

What are the holding pattern limitation speeds for 0-6,000 ft MSL, 6,001-14,000 ft MSL, and > 14,000 ft MSL?

When assigned a holding by ATC, and you're flying faster than the maximum holding speed when should you start reducing your speed?

What are the four items ATC will always give when issuing holding instructions?

If you arrive at a clearance limit before receiving clearance beyond the fix, what does ATC expect from you?

Are you required to report entering a hold in a radar environment? What about non-radar?

When would be a time you would hold in order to gain altitude?

Close (Additional Study):

Review the FLY8MA IFR Course Lesson: “Holding Patterns”. **Take** the Holding Quiz.

Review the FLY8MA IFR Course Lesson: “IFR FARs”

Review Lesson 6 – FARs in FLY8MA IFR Syllabus.

Attention / Motivation : Unfortunately, many aviation regulations were written due to grave accidents. Knowing the FARs as they apply to Instrument flight is not only important to ensure adherence, and therefore, no certificate action; but also to keep you, your passengers, and those around you safe. Generally, following the rules is a really easy way to stay safe.

Lesson Objective(s): The student commits to memory important regulations for IFR operations as specified in the FAR/AIM. While it is near impossible to remember each and every regulation set out by the FAA, the objective of this lesson is to review the student's ability to look up a regulation when needed and recall those which are most important. The end goal being to incorporate a hypothetical cross country scenario that draws upon IFR regulations.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit**
- **Marker/Whiteboard**
- **2020 FAR/AIM**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Explain/apply the FAR/AIM as required.
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Become familiar with FARS in Part 1, 43, 61, 91, and 97 as applicable for IFR flight. (Refer to Instrument/CFII suggested study list near front cover of FAR/AIM) .
- Become familiar with AIM Chapters 1 through 7.
- Review FLY8MA IFR Course Lesson: FARS.
- **Prior to lesson write down 1 question from each Part of the FARs mentioned above.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Choose one topic from 3 separate tasks within FAR/AIM Parts 61 & 91.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight procedures
_ Any items needing work from lesson 5

Lesson Introduction Items

_ Review FAR Parts 1, 43, 61, 91, and 97 as applicable for IFR flight.
_ Review AIM Chapters 1 through 7 as applicable to IFR flight.
_ Compliance with PIC, aircraft and equipment regulations, and requirements as specified in the FAR/AIM
_ Transponder Usage
_ NTSB 830

Completion Standards:

The student demonstrates a sound knowledge of the basic regulations pertaining to IFR operations, and when in no doubt is able to utilize official resources available to verify the requirements of a regulation. They should also be able to demonstrate proficiency with the use of the aircraft's transponder, be it for IFR operations or when transitioning airspace (including special use and TFRs) requiring the use of a discrete squawk code.

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Failure to adhere the regulations for IFR operations as stipulated by the FAA.

Debrief / Remotivation

Regulations play an important role for IFR flight, just as they do for VFR. Committing to memory the most important/common regulations should be the goal of any aspiring instrument pilot. As is the case for the private pilot certification, the use of acronyms/mnemonics is useful in remembering key aspects of IFR regulations. You will need to be able to talk your way through these regulations somewhat smoothly during your checkride.

Oral Eval Questions:

When must a pilot file an IFR flight plan? (AIM 5-1-8)

What are the recency of experience requirements to act as PIC under IFR? (FAR 61.57)

What are the requirements to act as a safety pilot? (FAR 61.3, 61.23, 91.109)

What aircraft instruments and equipment are required under IFR? (FAR 91.205)

When are you required to file an alternate airport as PIC under IFR? (FAR 91.169)

When can you descend below the MDA and DA/DH as PIC under IFR? (FAR 91.175)

Discuss lost communications procedures when operating under IFR? (FAR 91.185)

When may the PIC deviate from an ATC clearance? (FAR 91.123)

What regulations apply concerning supplemental oxygen? (FAR 91.211)

What are the four squawk codes that should be committed to memory?

When are you required to have a transponder?

Close (Additional Study):

Review the FLY8MA Course Lesson: IFR FARS. **Take** the IFR Regs Quiz

Review Lesson 7 – IFR Charts in the FLY8MA IFR Syllabus

Review the FLY8MA Course Lesson: IFR Enroute Charts

Attention / Motivation : As with driving or boating, maps are a critical component of navigation that allow you to get safely from point A to point B. Consider enroute charts as being highway maps and points of interest in the sky for IFR flying; They exist to establish courses to be flown, obstacle clearance criteria, minimum altitudes, navigation requirements, and communications. Similarly, airport diagrams give an overview of an airport including runways, taxiways, and depending on the field, self-serve fuel and FBO locations. Understanding how to effectively use these resources is a critical component of being able to navigate both efficiently and safely.

Lesson Objective(s): Demonstrates proficiency with airport diagrams and chart supplements, which should be considered as a review from the Private Pilot certification process. To demonstrate an understanding of IFR enroute charts and apply the knowledge with respect to the planning for and execution of a flight under IFR. Plan a IFR flight to another airport 20-50nm away under IFR and complete two practice approaches with instructor guidance or demonstration.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit (view limiting device)**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Review and apply ACS items located under Lesson Review Items.
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review Instrument Flying Handbook, Chapter 10 .
- Review Instrument Procedures Handbook, Chapter 2.
- Review FLY8MA IFR Course Lesson: Enroute Charts and Approach Charts.
- **Prior to lesson write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Choose one topic from 3 separate tasks within ACS SECTION I, Task C & SECTION V, Task B.
_ Checklist Usage
_ Any items needing work from lesson 6

Lesson Introduction Items

_ Airport Diagrams & Hot Spots
_ VFR Chart Review
_ IFR Charts & Symbology
_ Navigation to an Airport 25-50nm
_ Partial Panel Navigation
_ Diversion Procedures
_ Airway Navigation (VOR, GPS)

Lesson Introduction Items (Cont'd)

_ Airport Lighting at Night
_ Minimum safe altitude
_ Compulsory Reporting Points
_ Safety Alerts

Completion Standards:

The student discusses the stages of a planned IFR cross country flight. They are familiar with the standard terms and symbols on the enroute charts, with a particular focus on airways systems using VOR facilities and GPS (RNAV) equipment. Successful review of Airport Diagrams and the Chart Supplement Guide.
Altitude +/-150 feet | Airspeed +/-15 Knots | Bank +/- 15 degrees | Heading +/- 15 degrees.

Common Errors:

- Falling "behind the aircraft" during practice approaches.
- Drifting off course or failing to maintain assigned altitudes/airspeeds.
- Misidentification of IFR enroute chart symbols.

Debrief / Remotivation

While filing IFR, receiving a clearance, departing IFR, flying an approach, and returning to the departure airport may seem overwhelming at this point in your training, what you experienced today is very similar to a real IFR flight. Things will not get much more complicated than this, and with a few more practice flights, planning routes and flying approaches will come easier. Continue to practice your IFR scan every chance you get to make the flying easier.

Oral Eval Questions:

What is a low enroute chart and how often is updated? How does it differ from a high enroute?

Define the following: MEA, MOCA, MCA, MRA, MAA, and OROCA.

What are Victor, GPS, and Oceanic airways? What are the benefits of flying an airway vs direct?

What is an unpublished GPS (RNAV) route, and when can you fly it?

What minimum altitudes apply for IFR in Mountainous and other than Mountainous terrain?

What is a preferred route? Where can a list of preferred routes be found?

What reports should be made to ATC without a request when in radar and non-radar contact?

Define and describe the following: REIL, MALSR, ALSFR, ODALS, VASI, TDZ/CL.

What colors are touchdown zone, runway centerline/edge, and taxiway centerline/edge lights?

What are Runway Status Lights? At what airports would you typically find them?

What type of pertinent airport information can you find in the chart supplement guide?

Why is it a good idea to have a copy of an airport diagram? What is an airport hotspot?

Close (Additional Study):

Review and Watch the FLY8MA course IFR Enroute Charts, Chart Supplement Guide and the FAA Aeronautical Chart User's Guide. **Take** the Quiz.

Review Lesson 8 – Approach Charts in the FLY8MA IFR Syllabus.

Attention / Motivation : You should begin preparation for an IFR approach well before the descent phase of the flight. Early planning leaves you free to focus on aircraft control, and better equipped to respond to any abnormalities. Executing an instrument approach under IFR in less than VFR weather calls for careful planning and execution. It is critical to know the different types of approaches, how to fly them, and the guidelines / regulations associated with each. Greater knowledge and proficiency in this area equals a safer and smoother approach.

Lesson Objective(s): The purpose of this lesson is to develop student understanding and proficiency in flying Instrument approach procedures. It will review approach planning, descent, and landing in context to IFR operations. Precision vs non-precision approaches will also be discussed in relation to navigation equipment, which were already discussed in Lesson 3. The student will fly multiple practice approaches with instructor guidance and limited instructor demonstration and intervention.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- **Review and apply ACS items located under Lesson Review Items.**
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review Instrument Procedures Handbook Chapters 3 and 4.
- Review Instrument Flying Handbook Chapter 10.
- Review FLY8MA IFR Course Lesson: "Approach Charts".
- **Prior to lesson, write down 3 questions from the above mentioned preparation**

Discussion or Activity Elements (content):

Lesson Review Items

_ Review ACS Sections I & VI as they apply to approach charts.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight Procedures
_ Enroute Charts
_ Reporting Points
_ Any items needing work from Lesson 7

Lesson Introduction Items

_ Approach Charts & Aircraft Categories
_ Approach Briefing
_ Terminal Arrival Area Approaches
_ Navigation/Radar Vectors to Approaches
_ ILS Components, Errors, and Critical Areas
_ ILS, LOC, RNAV, VOR Approaches
_ Timed Approaches
_ Visual Approaches & VDP
_ DME Arcs
_ Partial Panel Approach Procedures
_ Back-course Approach Procedures

Lesson Introduction Items (Cont'd)

_ Missed/Circling Approach Procedures
_ Visibility Minimums
_ Land & Hold Short Operations
_ Wake Turbulence Separation

Completion Standards:

The student successfully briefs and executes Instrument Approaches. They are able to manage the high workload under simulated or actual Instrument conditions. The student adheres to ATC instructions and responds appropriately to unpredictable variables such as partial panel.

Altitude +/-100 feet | Airspeed +/-10 Knots | Bank +/- 10 degrees | Heading +/- 10 degrees | CDI/Glideslope < Half Full Scale Deflection

Common Errors:

- Disorientation/inadequate aircraft control aviating solely by reference to instruments.
- Cross-checking too rapidly, looking at the instruments without knowing what to look for.
- Fixation/staring at a single instrument or omission of an instrument from a cross-check.
- Falling behind, and letting the aircraft get in front of where the pilot believes it to be.

Debrief / Remotivation

Instrument approaches are challenging to master at first. They require continued practice during IFR training and even thereafter through recency of experience requirements and proficiency checks. Like many aspects of Instrument training, the ability to master approaches won't come straight away, but through recurring practice and good instruction from a CFII.
It is common to repeat this lesson to gain more practice with approaches, and you will continue to have opportunities to practice approaches throughout the rest of this syllabus.

Oral Eval Questions:

What is a precision approach? How does it differ from a non-precision approach? Examples?

What are the 5 main sections of an IAP plate/chart? Discuss each in detail.

What is the meaning of an upside down black triangle with a 'T' and black triangle with an 'A'?

What is the terminal arrival area?

Define the following – initial approach segment, intermediate approach segment, final approach segment, and the missed approach segment. Point to them on a IAP plate?

Define the following – TDZE, VDP, VDA, LNAV, LP, LNAV/VNAV, LPV, MDA, DA, and DH.

What obstacle clearance are you guaranteed during a circling approach maneuver?

Close (Additional Study):

Review and **Watch** the FLY8MA IFR Course Lesson: "Approach Charts", **Take** the Approach Plate Quiz. **Review** the FLY8MA IFR Course Lesson: "SIDs and STARs"

Review Stage Check 1 – Complete Student actions listed in Stage Check 1

Attention / Motivation : You're over halfway done with your instrument training at this point and may be worried if you'll be ready for your checkride in time. This stage check is designed to give you a clear picture of where you stand in your training, and also give you and your CFII a clear understanding of what items you have mastered and what items you will need to focus on to move forward. Ultimately checks like these should not be stressful. This is an opportunity to see where you stand and get a picture of the time and money remaining that it will take to make you an instrument rated pilot.

Lesson Objective(s): The CFII will present a scenario testing the skills practiced up to this point on the ground and in the air. No new material is to be added. This is a chance to evaluate all of the material learned to this point and put it to practical use. A second CFII may be preferred to conduct this check. The student should be able to complete the majority of the stage check without instructional intervention from the CFII. The CFII should grade everything in accordance with completion standards as well as with respect to SRM/CRM.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit**
- **Marker/Whiteboard**
- **2020 FAR/AIM**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **View Limiting Device**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Explain/apply the FAR/AIM as required.
- **Formulate a scenario encompassing and summarizing the material covered thus far in the student's IFR training.**
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review all items that were graded a 2 or below on prior lessons.
- Use the IFR course, FAR/AIM, and other resources to review prior topics.
- **Prior to lesson write down 5 questions from the material you review.**

Discussion or Activity Elements (content):

_ Any items from prior lessons should be included, general topics are listed below:
_ Pilot Qualifications (currency)
_ Weather Theory and Planning
_ IFR Instrument Check
_ Holding Procedures
_ Alpha or Bravo Pattern
_ Departing IFR
_ Filing IFR while Airborne
_ Diverting while airborne
_ Alternate requirements
_ Autopilot usage and failure modes (if app)
_ IFR Required Equipment
_ Inoperative Equipment Procedures
_ 3 types of practice approaches (at least two with missed approaches and at least one with a full published missed to a holding pattern, at least one turn, then exiting the hold)
_ Review IFR FARs
_ Circling Approach and DME arc (DME arc may be discussed in lieu of flying it)
_ Cross-Country Planning
_ Airplane Systems (point to everything on the panel, how does it work, why is it there, what is the failure mode of it?)

Completion Standards:

The student files IFR, flies under IFR to another airport, completes practice approaches within tolerances and with minimum intervention on the controls or radios from the CFII, and returns to the original airport under IFR. The flight should include published missed approaches and published holds, as well as a procedure turn to begin an approach.

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Failure to adhere the regulations for IFR operations as stipulated by the FAA.

Debrief / Remotivation

All of these tasks reviewed today are part of being an instrument rated pilot and passing your IFR checkride. Spending time reviewing what you went over today, both what you are strong on and what you are weak on is important to solidify the foundation in your instrument knowledge for the remainder of your IFR training. Without these building blocks mastered further development in your instrument skills is not possible.

Oral Eval Questions:

Please review all prior Oral Eval questions, choosing at least 3 from each prior lesson. You may also add additional questions using words such as How, What, When, Where, Why, and Describe.

Never ask the student “does that make sense”, instead ask a question that will make the student explain the topic back to you so you will know that they understand and it makes sense to them.

Close (Additional Study):

Review the FLY8MA Course Lesson: SIDs and STARs. **Take** the SIDs and STARs Quiz

Review Lesson 9 – Departure and Arrival Routes in the FLY8MA IFR Syllabus

Review items graded with a two or less, and any assigned study from your CFII. Take notes during the post flight oral questioning to get an idea of what study material would be best for you to review based on where you stand in your training.

Attention / Motivation : To reduce controller workload and accommodate higher levels of traffic, ATC relies on you to understand and use charted departure procedures. These exist to ensure terrain and obstacle avoidance during the transition from the departure to enroute phase, reduce workload, and help keep IFR traffic in sequence, reducing the risk of a mid-air. Understanding departure and arrival procedures is critical to ensure proper traffic separation and appropriate terrain/obstacle clearance.

Lesson Objective(s): The purpose of this lesson is to allow the student to become proficient in Instrument departure procedures. It will review SIDs, ODPs, DVAs, VCOAs and STARs, how to file one with ATC on an IFR flight plan and some of the rules and regulations that pertain to each including speed restrictions and obstacle notes. The student should follow CFII direction to file and depart IFR on a SID, ODP, or VCOA departure, fly away from the airport to the starting point of an arrival procedure and fly a practice approach. If no arrival or departure procedure is available an airport nearby may be used, or a FTD.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit (Hood)**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Review and apply ACS items located under Lesson Review Items.
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review Instrument Procedures Handbook Chapters 1 and 3.
- Review Instrument Flying Handbook Chapter 10.
- Review FLY8MA IFR Course: "SIDs and STARs."
- **Prior to lesson, write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Review ACS SECTION V, Task B.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Holding Procedures
_ Postflight Procedures
_ Approach Plates
_ Enroute Charts
_ Takeoff minimums
_ Any items needing work from lesson 8
_

Lesson Instruction Items

_ Climb/Descent Table
_ Navigation/Radar Vectors for Departures
_ SID/ODP Departures
_ STAR Arrivals
_ RNAV/GPS Navigation
_ Visual Separation
_ Partial Panel Departure Procedures
_ Descent Planning
_ Climb via SID Procedures
_ Descend via a STAR Clearance

Completion Standards:

The student successfully briefs and executes Instrument Departures and Standard Terminal Arrival Routes. They are able to manage the high workload under simulated or actual Instrument conditions. The student adheres to ATC instructions and responds appropriately to unpredictable variables such as partial panel.

Altitude +/-150 feet | Airspeed +/-10 Knots | Bank +/- 10 degrees | Heading +/- 15 degrees | CDI/Glideslope < Half Full Scale Deflection

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Disorientation/inadequate aircraft control aviating solely by reference to instruments.
- Cross-checking too rapidly, looking at the instruments without knowing what to look for.
- Fixation/staring at a single instrument or omission of an instrument from a cross-check.
- "Falling behind" or getting overwhelmed and not keeping pace during the procedures.

Debrief / Remotivation

Instrument departures are mutually beneficial to both you as PIC and to air traffic control. Aside from standardizing the flow of IFR traffic during the departure phase of flight to make sure we don't bump into one another, these procedures also serve to protect us from terrain and obstacle hazards. While it's less likely that as PIC of a small GA aircraft ATC will assign a STAR or SID, being familiar with their function in the IFR system is important, especially if you are interested in a professional pilot career.

Oral Eval Questions:

Discuss and describe the following – SIDs, ODPs, DVAs, VCOAs. Must a pilot accept one?

How do you file a SID? Are there situations where a SID may be specific to Turbojets only?

Are SIDs always printed graphically, what are the two types? What about ODPs?

If you accept a SID from Clearance Delivery, are they required to provide a departure frequency?

Can you file an ODP?

What minimums are necessary for IFR takeoff under Part 121, 125, 129 or 135?

What is a STAR and RNAV STAR? How do instrument rated pilots and ATC use them?

What does the clearance "descend via" authorize when navigating on a STAR?

Close (Additional Study):

Review and **Watch** the FLY8MA course SIDs and STARs, **Take** the Arrival/Departures Quiz.
Review the FLY8MA IFR Course Lesson: "IFR Weather: How it Works"

Review Lesson 10 – Weather in the FLY8MA IFR Syllabus.

Attention / Motivation: It is paramount that we understand weather and it's affects on aircraft performance and safety in the context of any planned flight, VFR or IFR. This lesson will review basic weather theory and knowledge of meteorological principals pertinent to flying. As a good pilot, particularly one who is IFR rated, you should make well thought out decisions regarding weather at the point of departure, Enroute, and destination. A the end of the day, it is YOUR decision to execute an IFR flight, or make the call to wait for more acceptable weather.

Lesson Objective(s): This lesson serves primarily as a review of weather theory from the private pilot certification process. The student should be able to recall basic concepts and demonstrate confidence in the science of weather as it relates to planning/executing IFR flight. The CFII should present the student with several different weather scenarios at departure and arrival airports and have the student make decisions for flight planning, approach types, alternates, etc. based on the given weather. One scenario for weather should be given for the local airport and the student and instructor should depart IFR and fly 2-3 practice approaches.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit**
- **Marker/Whiteboard**
- **PHAK**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives
- Explain/apply Chapters 12-13 of the PHAK
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios)
- Ask the student questions that encourages them to teach the material back to you.

Student Actions:

- Review Pilot's Handbook of Aeronautical Knowledge Chapters 12 through 13.
- Review Instrument Flying Handbook Chapter 10.
- Review FLY8MA IFR Course: "Weather: How It Works."
- **Prior to lesson, write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Choose one topic from 3 separate tasks within the Pilots Handbook of Aeronautical Knowledge Chapters 12-13.
_ Further review of Chapter 10 of the Instrument Flying Handbook is encouraged.
_ Postflight Procedures
_ Any items needing review from Lesson 9

Lesson Introduction Items

_ Obtaining a Weather Briefing
_ Go-No-Go Decision
_ Weather Fronts (Cold vs Warm)
_ Basic Cloud Types
_ Thunderstorms/Convective Activity
_ Fog (Advection, Steam, Radiation, etc.)
_ Icing (Clear, Rime Mixed)
_ Mountain Weather

Completion Standards:

The student demonstrates confidence discussing meteorology and successfully translates this skillset into the IFR planning, inflight execution, and ADM processes.

Altitude +/-150 feet | Airspeed +/-10 Knots | Bank +/- 10 degrees | Heading +/- 15 degrees

Common Errors:

- Failing to prepare adequately a set of personal weather minimums (IE: overconfident of abilities in hazardous weather).
- Failing to apply what is discussed from a theoretical standpoint to real world flying.
- Disorientation as an IFR pilot in training from actual IMC, turbulence, winds, etc.
- Controlled flight into terrain if a pilot is in a cloud or in fog without a visual reference.
- Failing to calculate aircraft performance from high altitude airports (density altitude).

Debrief / Remotivation:

As the FAA describes "weather is at the heart of IFR flying," thus no instrument rating can be complete without ensuring you are thoroughly familiar with the topic.

Oral Eval Questions:

What is responsible for all weather patterns on Earth?

What is a front? Discuss the characteristics of a warm, cold, stationary, and occluded front.

What weather would a pilot encounter in a cold/warm front? Is it a bad idea to fly into a front?

Discuss the characteristics of both high and low pressure systems in the northern hemisphere.

Review basic cloud types – discuss stratus, cirrus and cumulus. What is meant by nimbus?

Define warm and stable air masses. List the effects on clouds, turbulence, precip, and visibility.

What are the key ingredients required for a Thunderstorm to form? What are its stages?

What is meant by lifting action? Discuss convective, frontal, and orographic lifting action.

What are the dangers of a microburst? Discuss where are found and the appropriate recovery.

When would you expect to find fog? Discuss the six most common different types.

Discuss where you would be most likely to encounter frost/icing. Discuss the different types.

Discuss operational hazards departing from high altitude airports/flying in mountainous areas.

Close (Additional Study):

Review and **Watch** the FLY8MA Course Lesson: IFR Weather: How it Works, **Take** the IFR Weather Quiz. **Review** the FLY8MA IFR Course Lesson: IFR Weather Charts / Publications

Review Lesson 11 – Weather Resources in the FLY8MA Syllabus.

Attention / Motivation: Now that you have an understanding of weather as it pertains to IFR flight, let's take a look at the tools available from the FAA and National Weather Service to better understand how weather will impact our flight, and if any route or altitude changes are needed based on weather.

Lesson Objective(s): This lesson will cover several IFR weather chart products, including how to read and interpret them, and provide an overview of the various weather services that are available for flight planning and Enroute. It will also discuss official versus unofficial sources, how to make a weather report to ATC, and a quick review of METARs and TAFs. The student should depart file and depart IFR with the CFII reviewing departures, arrivals, and approaches as necessary based on previous lessons. While airborne the CFII should ensure the flight allows time for the student to utilize in-air weather resources such as FSS.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit**
- **Marker/Whiteboard**
- **PHAK**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **View Limiting Device**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives
- Explain/apply Chapters 12-13 of the PHAK
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios)
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review Pilot's Handbook of Aeronautical Knowledge Chapter 13.
- Review Instrument Flying Handbook Chapter 10.
- Review FLY8MA IFR Course: "Weather Charts/Publications."
- **Prior to lesson, write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Choose one topic from 3 separate tasks within the Pilots Handbook of Aeronautical Knowledge Chapters 13. Further review of Chapter 10 of the Instrument Flying Handbook is encouraged.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight Procedures

Lesson Introduction Items

_ Obtain a Weather Briefing (ground and airborne)
_ Interpretation of METAR and TAF Reports
_ Interpretation of Surface Analysis, Weather Depiction, Significant Weather Prognostic, and Radar Summary Charts
_ Interpreting and Reporting a PIREP
_ Winds/Temps Aloft and Freezing Levels
_ Review of AIRMETS and SIGMETS
_ Review Aviationweather.gov

Completion Standards:

The student successfully obtains weather briefings, interprets the various weather products and reports for IFR flight planning and adjusts accordingly, reports a PIREP, and shows confidence in utilizing available resources be it on the ground or En route to appropriately plan for weather.

Altitude +/-150 feet | Airspeed +/-10 Knots | Bank +/- 5 degrees | Heading +/- 15 degrees

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Difficulty interpreting METARS and TAFs, Surface Prog Charts.
- Failing to utilize all available weather related resources when planning an IFR flight.

Debrief / Remotivation:

It's important that you take an active approach to preparation and review of this material. According to the NTSB, weather is a cause or contributing factor in 35% of GA accidents in the US. The importance of appropriately incorporating weather charts, publications, and the resources at hand in planning an IFR flight cannot be understated; study up and be prepared, as weather is also an area that is extensively covered on the IFR checkride.

Oral Eval Questions:

What is the method to obtain a weather briefing? Discuss standard, abbreviated, and outlook.

When planning an IFR flight, would weather from a third-party vendor satisfy preflight regs?

What is a METAR and discuss the two types? What is a TAF and what dimensions does it cover?

Define – Aviation Area Forecast, Graphical Forecast for Aviation, SIGMET, and AIRMET.

What are Center Weather Advisories? What are PIREPS and what's the meaning of UA/UAA?

Discuss the criteria for AIRMET Sierra, Tango and Zulu. What is a CONVECTIVE SIGMET?

What are Surface Analysis, Weather Depiction and Significant Weather Prognostic Charts?

If your intended destination has no TAF, what source of information should be referenced?

Discuss an FDC NOTAM? What information is typically contained in one that is relevant to IFR?

Where would you find the tamp stamp or "valid until" on the particular datalink weather information in the cockpit? What is NEXRAD?

Can you rely on NEXRAD information on a MFD to navigate around a thunderstorm? Why?

Close (Additional Study):

Review and **Watch** the FLY8MA IFR Course Lesson: IFR Weather Charts/Publications, **Take** the IFR Weather Charts Quiz. **Review** the FLY8MA IFR Course Lesson: IFR Flight Planning.

Review Lesson 12 – Flight Planning in the IFR FLY8MA Syllabus.

Attention / Motivation: Although it's important for you to have technical knowledge for safe IFR operations, we need to dive deeper than simply having the ability to recite rules and regulations. Scenario-based training incorporating IFR flight planning is a great way to test your knowledge in the context of real-world flying. As a proficient IFR pilot, you should be able to work through the rules and procedures related to each phase of the flight from departure to arrival, utilizing all available resources as is appropriate to mitigate hazards.

Lesson Objective(s): This lesson will review the tools available to help plan for an IFR cross country flight. As per the FAR/AIM, a pilot must become familiar with "all available information" to include weather, expected performance and equipment required, alternates, length and lighting of runways to be used, ATC traffic delays, and the amount of fuel required. The lesson will also review how to decide on a route to and from an airport. (This will count as the student's long IFR X/C 61.65.C.2.ii)
The CFII should help the student plan the required airports and approaches accordingly, with only verbal feedback once in the aircraft. Any part of the flight the CFII must jump in and take over will need repeating by the student to move on. (Note: the first airport must be at least 50nm from the point of departure.)

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit (Hood)**
- **Marker/Whiteboard**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Review and apply ACS items located under Lesson Review Items.
- Ask the student to form scenarios and apply these concepts (help them formulate scenarios).
- **Ask the student questions that encourages them to teach the material back to you.**

Student Actions:

- Review Instrument Procedures Handbook Chapter 2.
- Review FLY8MA IFR Flight Planning.
- **Prior to lesson, write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Review ACS SECTION I, Task C.
_ Further review of Instrument Procedures Handbook, Chapter 2, is encouraged.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight Procedures
_ Items needing review from lesson 11

Lesson Instruction Items

_ Filing a Flight Plan
_ Cruising altitudes
_ Obtaining a Weather Briefing
_ Go-No-Go Decision (Unassisted) Preferred IFR Routes
_ Copying an IFR Clearance from ATC
_ Enroute charts, Chart Supplement Guide
_ Arrival planning

_ **Lesson Instruction Items (Cont'd)**
_ Performance Calculations and Alternates
_ NOTAMS
_ Navigation Equipment (VOR vs. GPS)
_ Cold Temp Restricted Airports /Altitude Corrections.
_ Minimum Fuel Advisory

Completion Standards:

The student demonstrates confidence discussing meteorology and successfully translates this skillset into the IFR planning, inflight execution, and ADM processes.

Altitude +/-150 feet | Airspeed +/-10 Knots | Bank +/- 5 degrees | Heading +/- 15 degrees

Common Errors:

- Failing to prepare adequately with pre-study for the lesson or developing a set of personal weather minimums (IE: overconfident of abilities in hazardous weather).
- Inadequate planning for an IFR flight, particularly a long-distance cross country or in mountainous terrain where MEAs prove to be prohibitive for the type of aircraft.
- Rushing the flight planning process (for example skipping a weather briefing) or neglecting personal checklists like 'IMSAFE' (for example being subject to Get-Their-Itis).

Debrief / Remotivation:

IFR flight planning can be a fun process, and a good test of your skills incorporating knowledge of relevant charts/publications, while taking into account the bigger picture in terms of weather, airspace, and aircraft performance to determine a suitable route. Practice of different scenarios will lead to greater confidence and proficiency in IFR flight planning.

Oral Eval Questions:

Discuss your method for selecting airways when planning an IFR flight taking into account the performance of the aircraft, weather conditions, NOTAMS, airspace, and personal minimums.

Discuss alternate requirements regarding the 3-2-1 rule and for precision vs non precision approaches.

Which types of airspace are depicted on the Low En-route Chart? What about SFRAs?

What condition is guaranteed for the following – MAA, MCA, MRA, MOCA, and MEA?

How can you determine what equipment suffix is applicable to your aircraft and flight plan?

If you inadvertently encounter icing or freezing rain, what would be your escape method?

What means are available to pick up an IFR clearance at a non-towered field?

Close (Additional Study):

Review and **Watch** the FLY8MA course IFR Flight Planning, **Take** the IFR Flight Planning Quiz.
Review the FLY8MA IFR Course Lesson: Instrument Flying Emergencies

Review Lesson 13 – Instrument Flying Emergencies in FLY8MA Syllabus.

Attention / Motivation: Instrument flying can often be challenging and, at times, unpredictable. The safe outcome of a flight will largely depend on your training and capacity to manage any events while maintaining aircraft control and situational awareness. The idea here is to develop a good recognition and response skillset to allow you to best manage emergency situations such as non-forecast adverse weather, aircraft system malfunctions, communication or navigation equipment failure, or lost situational awareness.

Lesson Objective(s): This lesson will review identification and management techniques for emergency situations, drawing upon regulatory guidance from the FAA and ADM skills. There will be an emphasis on NTSB case studies from past aircraft incidents involving emergencies. The CFII should choose 3 relevant accident case studies to review with the student based on the type aircraft being flown, area of the country operating in, and type of flying the student hopes to do in the future. The CFII will also safely introduce equipment failures while in VFR conditions with the student "under the hood" while on departure, arrival, and during approaches (i.e. partial panel approaches).

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit**
- **Marker/Whiteboard**
- **PHAK**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **View Limiting Device**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Review and apply ACS items located under Lesson Review Items.
- Ask the student to form scenarios and apply these concepts.
- **Have student teach material back to you.**

Student Actions:

- Review IFH Chapter 11
- Review IPH Chapter 7 (Appendix A)
- Review FLY8MA IFR Course: Instrument Flying Emergencies.
- **Prior to lesson, write down 3 questions from the above mentioned preparation.**

Discussion or Activity Elements (content):

Lesson Review Items

_ Choose one topic from 3 separate tasks within ACS SECTION VII. Further review of Chapter 11 of the Instrument Flying Handbook and Chapter 7 (Appendix A) of the Instrument Procedures Handbook is encouraged.
_ Checklist Usage
_ Instrument Preflight/Cockpit Check
_ Postflight Procedures
_ Items needing work from Lesson 12

Lesson Instruction Items

_ NTSB Case Studies
_ ADM with an emphasis on SRM in IMC
_ Lost Navigation/Comms Procedures
_ Emergency alternatives to Magnetic Compass
_ Partial Panel Flying (Including precision and non-precision approaches)
_ Inoperative components or visual aids
_ Unusual Attitude Recovery Procedures

Lesson Instruction Items (Cont'd)

_ Adverse Weather (Inadvertent thunderstorm encounter and wind shear)

_ Skud Running and CFIT Awareness

Completion Standards:

The student successfully maintains aircraft control and utilizes available resources including ATC or other passengers onboard during an emergency. The model of Aviating, Navigating, and Communicating is successfully applied during an inflight emergency.
Altitude +/-100 feet | Airspeed +/-10 Knots | Bank +/- 10 degrees | Heading +/- 10 degrees

Common Errors:

- Failing to prepare adequately with pre-study for the lesson.
- Maintaining aircraft control and situational awareness during an emergency.
- Failing to delegate tasks to passengers during an emergency.
- Failing to recognize systems or instrumentation error in a timely fashion.
- Becoming distracted trying to resolve the problem during an emergency.
- The pilot loses situational awareness messing around with other equipment.

Debrief / Remotivation:

Inflight emergencies are serious and potentially life threatening, particularly when you are in IMC. A good way to prepare for the unexpected is to familiarize yourself with aircraft systems and equipment, regulations, and practice aircraft control through different scenarios in a simulator or under the hood with a CFII. It's also a good idea to review past incident reports or watch accident case studies to learn from past occurrences and pilot error.

Oral Eval Questions:

Discuss the importance of the Aviate, Navigate, and Communicate model in an emergency.

If you have a non-pilot passenger, would you delegate tasks to them in an emergency?

Should a pilot ever hesitate to declare an emergency, especially in IMC?

What would be the effect on the Airspeed Indicator, Altimeter if the Static Port is clogged? Describe the same scenario when the Pitot Tube, Drain Hole, and Static Port are clogged?

Discuss the impact on the Attitude Indicator, Heading Indicator and Turn Coordinator if you lose your vacuum pump system. What about a total loss of electrical (including battery) power?

Discuss the procedures for altitude, route, leaving a holding fix, and approach with lost comms.

Is the loss of any navigational capability in controlled airspace under IFR reportable to ATC?

Discuss what you might do in the event of engine failure when in IMC.

When would you announce a minimum or emergency fuel to ATC? Is the former an emergency?

Close (Additional Study):

Review and **Watch** the FLY8MA IFR Course Lesson: Instrument Flying Emergencies, **Review** the FLY8MA IFR Course Lesson: IFR Facts, Tips, and Tricks.

Review Scenario 1 – Pitot-Static System Failure due to Icing in FLY8MA Syllabus.

Scenario: You are planning a cross country trip to an airport 100 to 150 NM away. The weather at your departure airport is clear with calm winds. At your planned destination, the weather is forecast to be overcast at 2,500' with a freezing level of 5,000' and cloud tops to 5,000'. As there is substantial terrain en-route, you plan to fly above the overcast layer at 7,000 MSL. As you near your destination airport, you are given a lower altitude, placing you in the clouds below 32 degrees F. You turn on the pitot heat and windshield defrost. You look out at the left wing and notice rime ice very slowly begin to accumulate on the leading edge. You request lower, however due to traffic ATC is not able to immediately accommodate the request. Ice continues to form on the leading edge as you notice accumulation begin on the pitot tube. Suddenly, the Pitot-Static heat breaker pops.

Scenario Objective(s): The student will demonstrates appropriate and safe aeronautical decision making and communicate appropriately with air traffic control. They will demonstrate knowledge in partial panel operations with a pitot-static system failure, have an understanding of how pitot-static instruments are affected, and how the instruments will read with a pitot tube blockage.

Equipment Needed:

- **Notebook**
- **FAR/AIM**
- **View Limiting Device**
- **IPH**

Instructor Actions:

- Ask the student to create an IFR flight plan from Airport A to Airport B.
- Brief the student on the simulated weather conditions.
- Play the part of ATC. Simulate ATC instructions to student to descend to an altitude located in the overcast layer above freezing level.
- Run the student through the scenario and ask them how they would deal with each hurdle and what they might need to consider.

Desired Student Actions:

- Request a lower altitude upon leveling off at an altitude where ice is present.
- Correctly briefs the instructor on what instruments become inoperable and *how they indicate* when the Pitot tube becomes clogged.
- Makes conservative and safe decisions.
- Demonstrates proficiency in partial panel flying with a pitot-static failure.
- Appropriately and effectively communicates with Air Traffic Control.
- Apply SRM to scenario presented by CFII.

Activity Elements (content)

_ Discuss the scenario and multiple courses of action with the CFII
_ The CFII will pose several questions to test the student's system knowledge in regards to the failures, and test their use of SRM in resolving the issues.
_ Required reports to ATC
_ Legality of continuing the flight with inoperative equipment
_ Finding a suitable airport and approach to use for a safe landing

Completion objectives:

The student should show reasoning skills and understanding of dealing with in-flight emergencies. The student should offer satisfactory answers as to how they would handle the situation in regard to the aircraft, ATC, and finding a suitable approach and airport for landing.

Common Errors to address during discussion:

- Errors that result in not recognizing an inoperative airspeed indicator in IMC.
- (Partial Panel Flying errors)
- Cross-checking too rapidly, looking at the instruments without knowing what to look for.
- Fixation at a single instrument or omission of an instrument from a cross-check.

Debrief Questions:

What instruments rely on the static port?

What instruments rely on the pitot tube?

What instruments will you use in the event of a total pitot-static system failure (or system unreliable)?

What would the pitot-static instruments do if the pitot tube was totally iced over and you climbed?

What does pulling the alt. static source knob do to the instruments?

How could you get an alt. static source in the aircraft when a knob is not installed?

Close (Additional Study):

Review and **Watch** the FLY8MA IFR Course Lesson: Instrument Flying Emergencies

Review Scenario #2 lesson plan.

Scenario: You will meet your instructor for the last of the free checkout flights that come with your new airplane (congrats on buying a new plane). The temperature is just at freezing and the instructor wants to take you to another airport that is known for its coffee. During this last training flight, the instructor will brief you on some of the malfunctions that could occur in an emergency. The weather is low overcast at both your departure and arrival airport; because of this your instructor thinks that you could get some more practice with programming and flying instrument approaches.

Scenario Objective(s): The student files, and departs under IFR to another airport. The instructor will go through at least 3 simulated failures, ending with a partial panel failure. The student should fly a circle to land approach under partial panel, fly the published missed for that approach, and then divert to another airport all under IFR and land from a circling approach. The return flight should be uneventful, but include a holding pattern issued along the route between the two airports by the CFII. The return flight should also be conducted under IFR.

Equipment Needed:

- **Notebook**
- **FAR/AIM**
- **EFB / View Limiting Device**
- **IPH**

Instructor Actions:

- Ask the student to create an IFR flight plan from Airport A to Airport B with an alternate nearby (both airports should have circling approaches available).
- Brief the student on the simulated weather conditions.
- Play the part of ATC, Simulate ATC instructions to student to fly approaches, have student request to go to the alternate and play the part of ATC.
- Run the student through the scenario and ask them how they would deal with each hurdle and what they might need to consider.

Desired Student Actions:

- File IFR and select appropriate destination and alternate based on the approaches required.
- Check legality of flight plan based on current weather. Would the flight still be legal if all airports were 800' overcast?
- Makes conservative and safe decisions.
- Demonstrates proficiency in partial panel flying and flying circling approaches.
- Appropriately and effectively communicates with Air Traffic Control.
- Apply SRM to scenario presented by CFII.

Activity Elements (content):

Demonstrated Lesson Items

_ Checklist Usage
_ ADM with an emphasis on SRM in IMC
_ Partial Panel Flying (Including approaches and landing)
_ Inoperative components or visual aids

Completion Standards:

The student successfully plans and flies the flight as described, including the two approaches (more if needed for practice) and the spontaneous hold on the return flight. The student shows proficiency in operating the FMS or avionics to configure the approaches and holds, as well as proficiency in partial panel flying.

Altitude +/-100 feet | Airspeed +/-10 Knots | Bank +/- 10 degrees | Heading +/- 10 degrees | CDI/Glideslope < Half Full Scale Deflection

Common Errors:

- Not using the avionics correctly to configure the approaches, go missed, go to the alternate, or set up for a spontaneous hold given by ATC.
- (Partial Panel Flying errors)
- Failing to use proper phraseology to request particular approaches or communicate to ATC you want to divert to another airport.
- Fixation at a single instrument or omission of an instrument from a cross-check.

Debrief Questions:

What went well on the flight?

What could have gone better? Why? How will you fix that in the future?

Would the flight have been legal if the weather at all airports was 600' overcast? What about 900' overcast?

How would your personal minimums affect your decision to make this flight?

Give an example of when a circle to land approach would not be allowed at an airport.

If flying an approach to runway 5 and planning to circle to land on runway 31, when would it be okay to fly the missed approach for runway 31?

When do you have to go missed on a circling approach?

Close (Additional Study):

Review and **Watch** the FLY8MA IFR Course Lesson: Approach Charts

Review Debrief questions and the Scenario #3 Lesson Plan

Scenario: You need to fly from Rochester to Albany after work on Friday night to be in Albany early Saturday morning for your son's soccer tournament. The weather for the two airports and surrounding airports is attached. (Friday night is the 27th)

Scenario Objective(s): For the student to understand the legalities in planning a flight with different equipment onboard the aircraft, exercise good ADM and SRM when deciding a go/no go decision, thinking of alternative courses of action (driving or renting a car nearby). Discuss various forecast products, their usefulness and limitations with the CFII. Complete a cross country flight (at least 30nm from point of departure) under IFR and fly a IFR approach to a full stop and shut down at destination airport. After getting out of the plane, complete a proper post flight, take a break, then complete proper pre-flight and file IFR to return to original point of departure. Departure should be under VFR and pick up clearance in the air from FSS. Scenario should include an alternator failure halfway back to original airport after picking up IFR clearance.

Equipment Needed:

- **Notebook**
- **FAR/AIM**
- **EFB / View Limiting Device**
- **IPH**

Instructor Actions:

- Ask the student to create an IFR flight plan from Airport A to Airport B with an alternate if req'd.
- Help the student see what problems may exist in forecast weather (being able to return to departure airport, getting into the destination, issues encountered enroute flying at night in low IFR.
- Play the part of ATC, preferably use real ATC if available in your area and flying in the airplane.
- Conduct the lesson in a simulator and use listed airports above (assuming they are unfamiliar) to get the student used to unfamiliar areas and approaches.
- CFII provides route change after FMS is already configured and IFR clearance has been obtained (obtain amended clearance if in flight).

Desired Student Actions:

- File IFR and select appropriate destination and alternate based on the approaches required.
- Check legality of flight plan based on current weather. Would the flight still be legal if all airports were 800' overcast? What about 500' overcast?
- Makes conservative and safe decisions regarding go/no go and what alternatives exist (delaying, driving, bringing a CFII, etc).
- Demonstrates proficiency in filing on the ground and picking up clearance in air.
- Demonstrates systems knowledge of an in-flight alternator failure under IFR.
- Apply SRM to scenario presented by CFII.

Activity Elements (content):

_ Checklist Usage
_ ADM with an emphasis on SRM in IMC
_ Alternator Failure in IMC (simulated)
_ Flies two IFR approaches to standards (select approaches that may need practice)
_ Files IFR and picks up clearance properly after departure

Content Continued:

_ Manges automation and avionics appropriately to decrease workload in-flight
_ Correctly programs route change in-flight after retrieving IFR clearance

Completion Standards:

The student successfully plans and flies the flight as described, including the two approaches (more if needed for practice) and retrieves the IFR clearance airborne appropriately. The student shows proficiency in operating the FMS or avionics to configure the approaches and holds, as well as proficiency in handling an alternator failure while operating under IFR.

Altitude +/-100 feet | Airspeed +/-10 Knots | Bank +/- 10 degrees | Heading +/- 10 degrees | CDI/Glideslope < Half Full Scale Deflection

Common Errors:

- Not using the avionics correctly to configure the approaches, going missed, or for route changes in-flight.
- Improper phraseology or not sure who to contact to open IFR flight plan.
- Failing to use proper phraseology to request particular approaches or communicate to ATC (especially during alternator failure).
- Fixation at a single instrument or omission of an instrument from a cross-check.

Debrief Questions:

What went well on the flight?

What could have gone better? Why? How will you fix that in the future?

Would the flight have been legal if the weather at all airports was 600' overcast? What about 900' overcast?

How would your personal minimums affect your decision to make this flight?

What are all of the instruments affected by an alternator failure?

How can you troubleshoot an alternator failure (name at least three ways)?

What are the lost comms procedures if you lost your radio at the time of the alternator failure?

What is the minimum safe weather for takeoff from Rochester to be able to return to the airport incase of an issue immediately after takeoff?

Close (Additional Study):

Review and **Watch** any videos assigned in the FLY8MA IFR course by your CFII

Review Debrief questions and the Scenario #4 Lesson Plan

Appendix:

Scenario #3 Weather

```
KBDL 280051Z 36006KT 7SM FEW004 BKN160 OVC250 17/16 A2970 RMK AO2 RAE03
SLP056 P0000 T01720161

KBDL 272327Z 2800/2906 02004KT P6SM SHRA BKN006
  FM280300 00000KT P6SM BKN003
  FM280600 00000KT 3SM BR SCT020
  FM281100 00000KT 4SM BR SCT015
  FM281200 00000KT P6SM SCT250
  FM281500 31004KT P6SM SCT250

KALB 280051Z 36004KT 9SM OVC006 15/15 A2973 RMK AO2 CIG 005V008 SLP066
T01500150

KALB 272355Z 2800/2824 VRB03KT P6SM VCSH BKN007 OVC015
  FM280100 VRB03KT P6SM BKN007 OVC015
  FM280600 VRB03KT 5SM BR SCT007 OVC015
  FM281300 VRB03KT P6SM SCT030
  FM281500 29006KT P6SM SCT050

KPSF 280054Z AUTO 21003KT 2SM OVC002 19/19 A2972 RMK AO2 SLP046 T01890188

KPSF 272340Z 2800/2824 VRB03KT P6SM VCSH SCT006 OVC015
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  FM280400 00000KT 6SM SCT006 OVC015
  FM280900 00000KT 3SM BR BKN006 OVC025
  FM281200 00000KT P6SM BKN015
  FM281500 29006KT 6SM BKN005

KSYR 280054Z 25008KT 2SM SCT004 BKN006 BKN200 23/22 A2974 RMK AO2 SLP063
T02280224

KSYR 272324Z 2800/2824 28008KT 2SM SCT005 OVC007
  TEMPO 2800/2804 BKN025
  FM280400 29015KT 1/2SM BKN008 OVC020
  FM280700 VRB03KT 3SM BR BKN006
  FM281400 30026KT P6SM FEW006 BKN018
  FM281700 31015KT P6SM SCT004 BKN015

KROC 280054Z 33005KT 10SM FEW009 BKN030 BKN100 23/20 A2978 RMK AO2 SLP082
T02330200 $

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  FM280200 30005KT P6SM BKN040
  FM280500 VRB03KT 3SM BR SCT100
  FM280700 VRB03KT 2SM BR SCT008
  FM281200 36005KT P6SM BKN040
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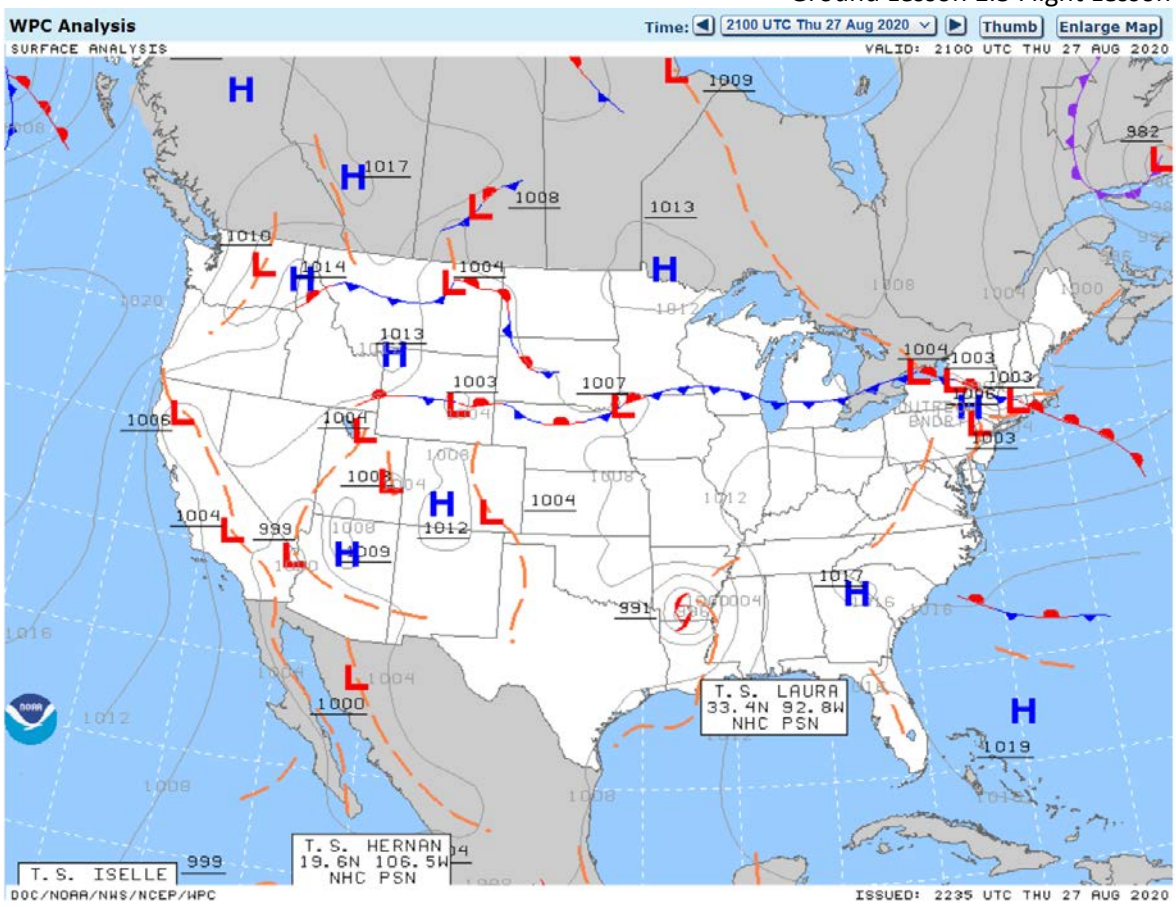
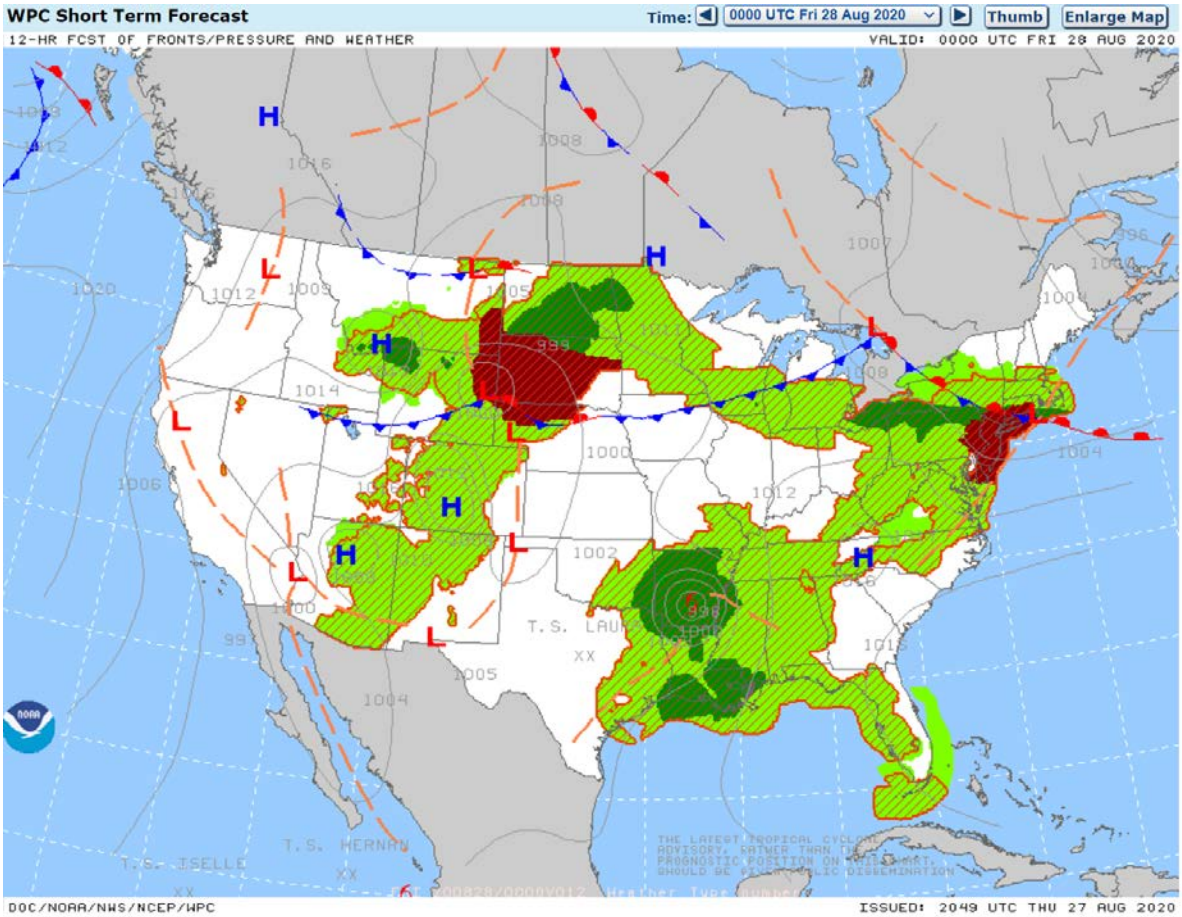

WPC Analysis
Time: 2100 UTC Thu 27 Aug 2020
Thumb
Enlarge Map
SURFACE ANALYSIS
VALID: 2100 UTC THU 27 AUG 2020
T.S. LAURA
33.4N 92.8W
NHC PSN
T.S. HERNAN
19.6N 106.5W
NHC PSN
T.S. ISELLE
DOC/NOAA/NWS/NCEP/WPC
ISSUED: 2235 UTC THU 27 AUG 2020


WPC Short Term Forecast
Time: 0000 UTC Fri 28 Aug 2020
Thumb
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12-HR FCST OF FRONTS/PRESSURE AND WEATHER
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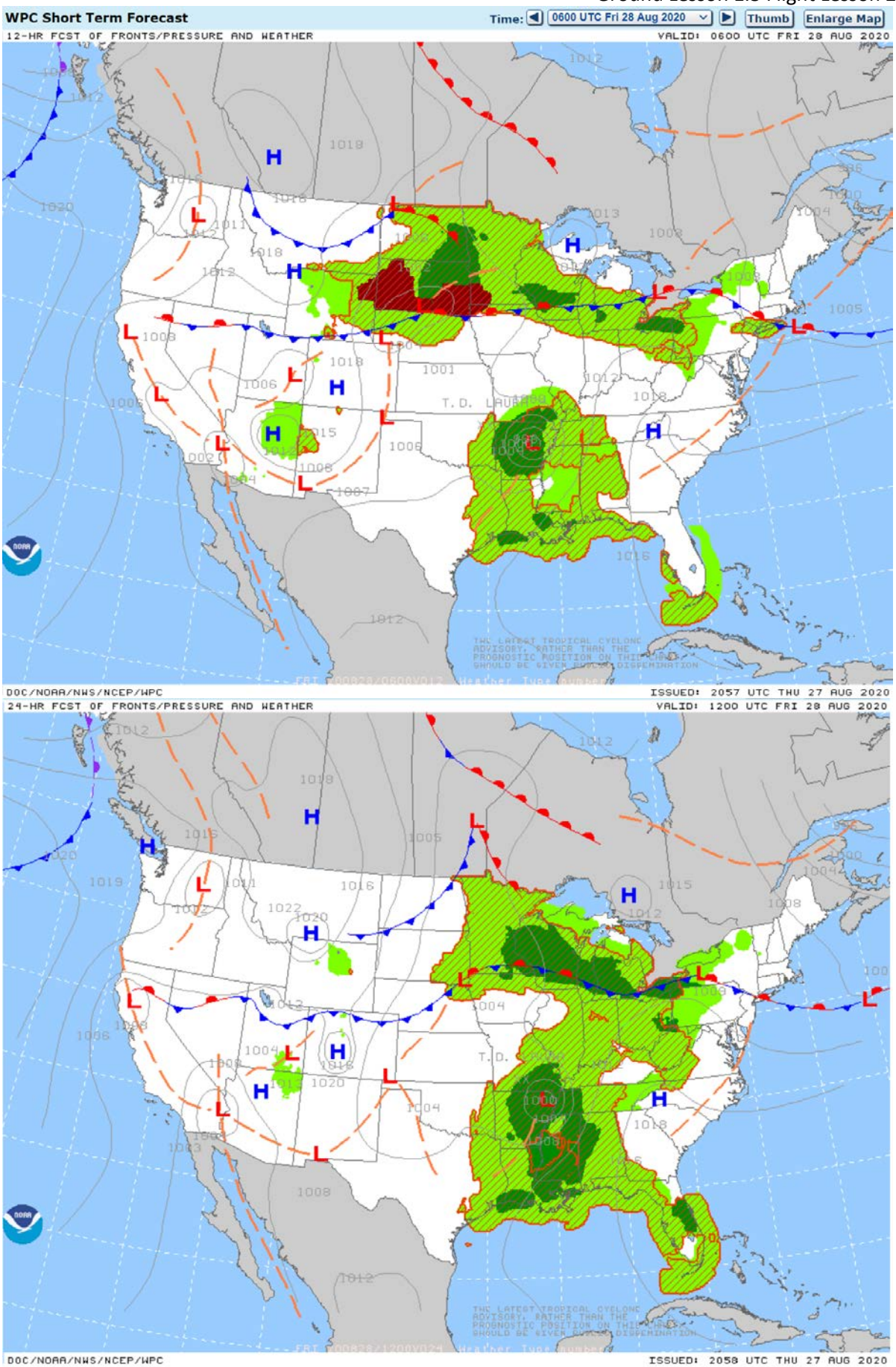
DOC/NOAA/NWS/NCEP/WPC
ISSUED: 2049 UTC THU 27 AUG 2020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Enlarge Map
12-HR FCST OF FRONTS/PRESSURE AND WEATHER
VALID: 0600 UTC FRI 28 AUG 2020
DOC/NOAA/NWS/NCEP/WPC
ISSUED: 2057 UTC THU 27 AUG 2020
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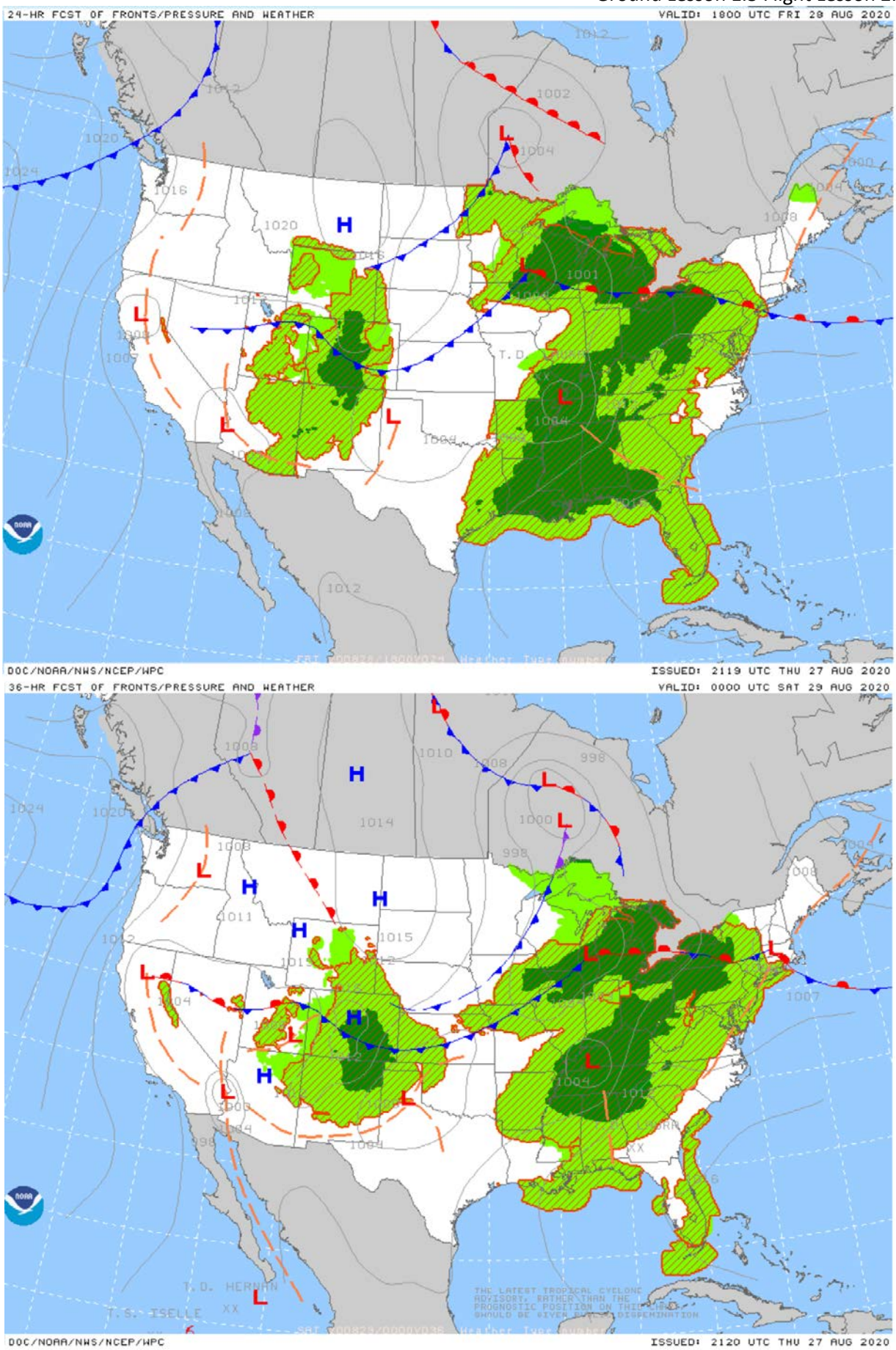
VALID: 1200 UTC FRI 28 AUG 2020
DOC/NOAA/NWS/NCEP/WPC
ISSUED: 2058 UTC THU 27 AUG 2020


24-HR FCST OF FRONTS/PRESSURE AND WEATHER
VALID: 1800 UTC FRI 28 AUG 2020
DOC/NOAA/NWS/NCEP/WPC
ISSUED: 2119 UTC THU 27 AUG 2020
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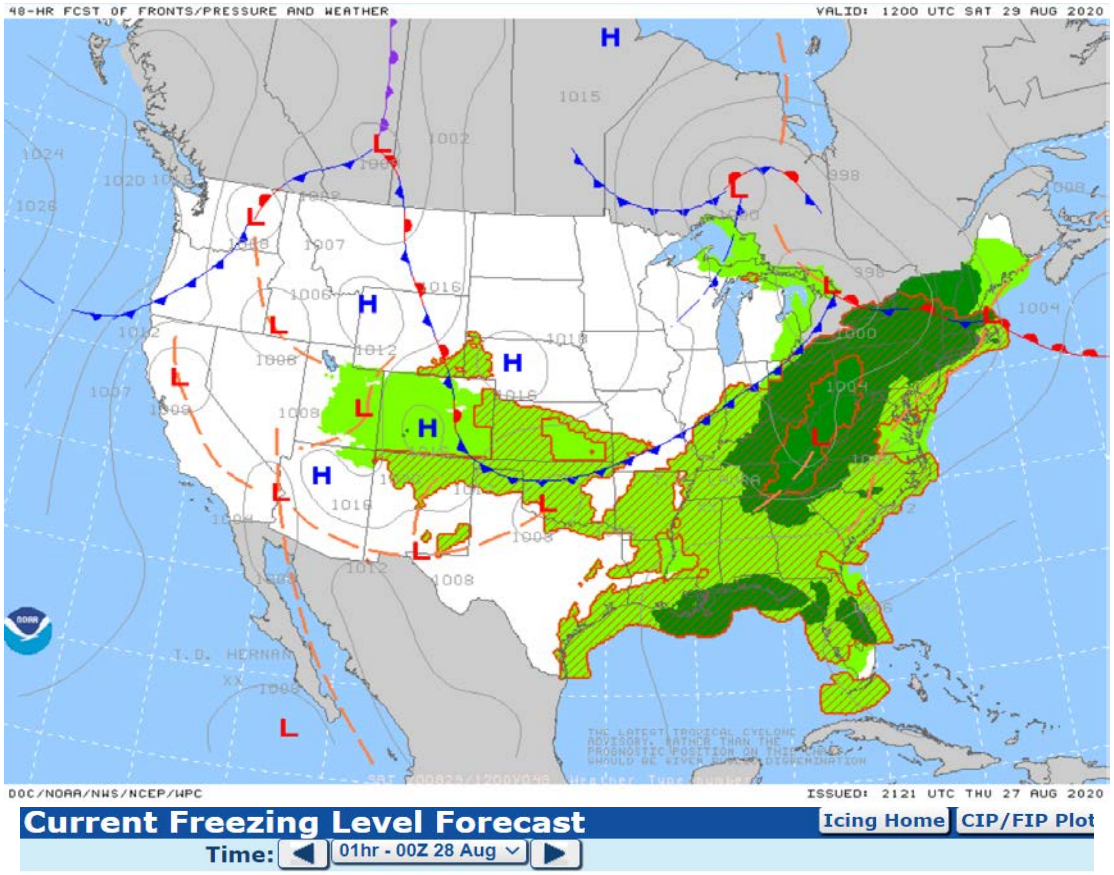
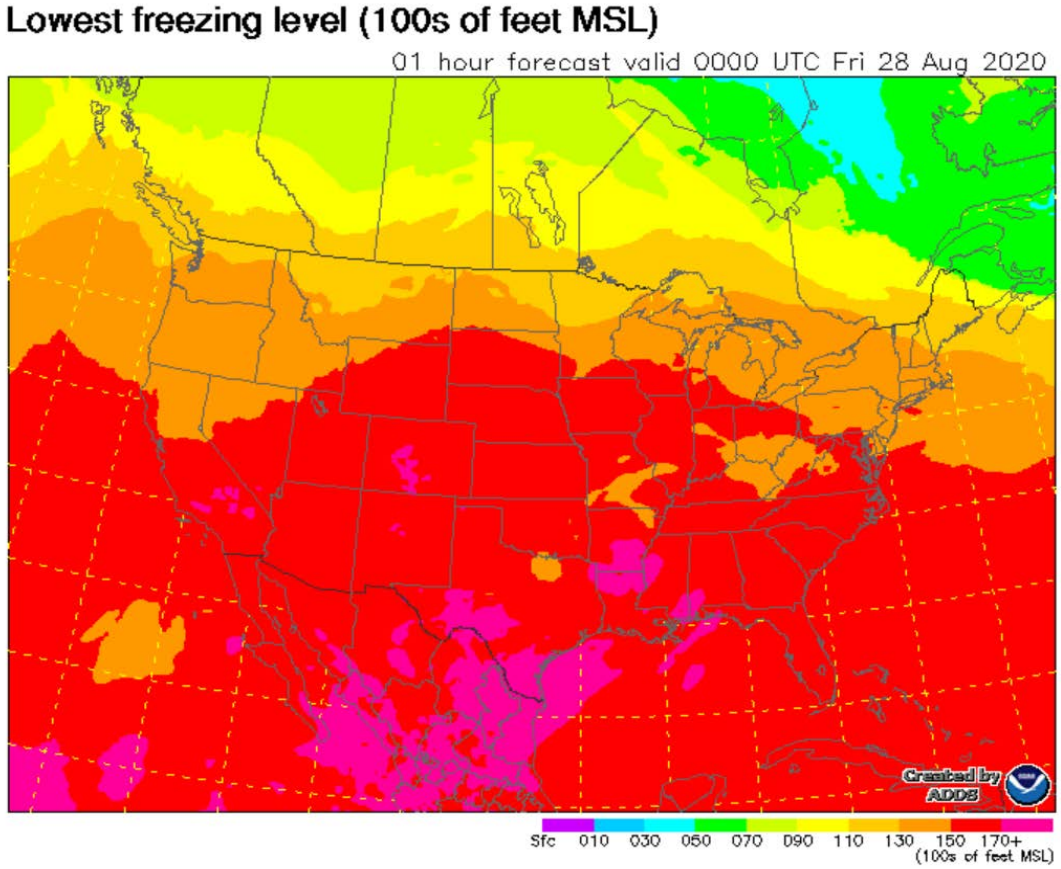
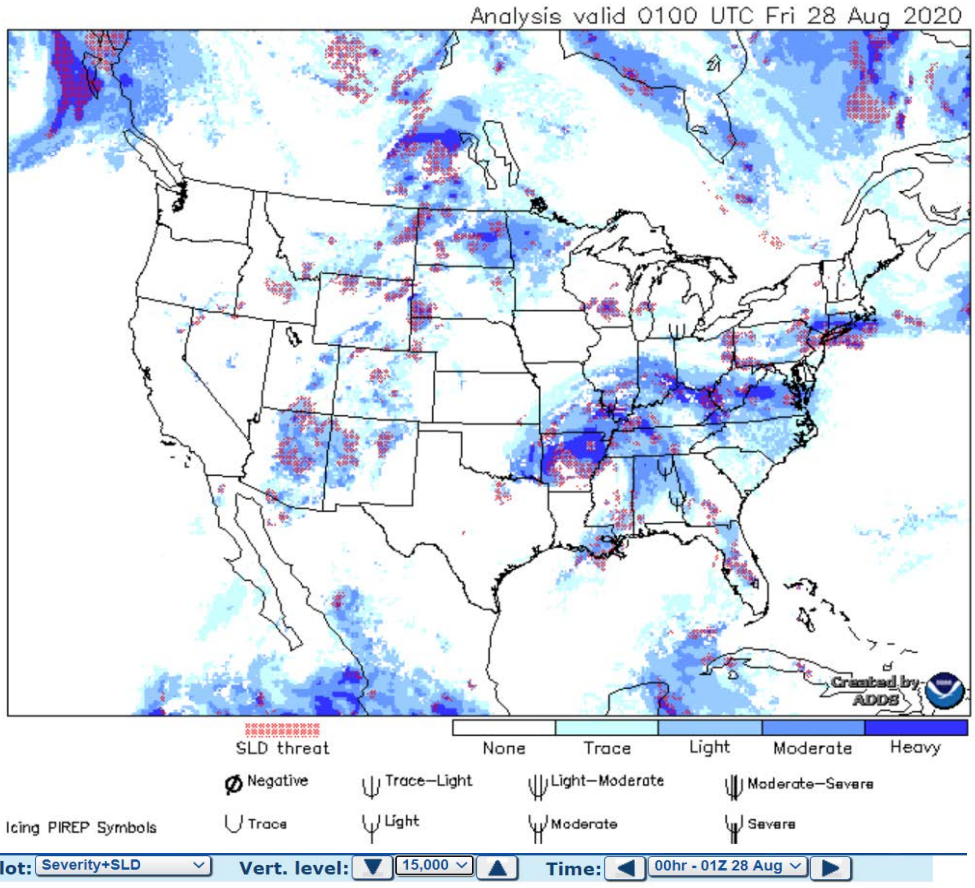
DOC/NOAA/NWS/NCEP/WPC
ISSUED: 2120 UTC THU 27 AUG 2020


48-HR FCST OF FRONTS/PRESSURE AND WEATHER
VALID: 1200 UTC SAT 29 AUG 2020
DOC/NOAA/NWS/NCEP/WPC
ISSUED: 2121 UTC THU 27 AUG 2020
Current Freezing Level Forecast
Icing Home
CIP/FIP Plot
Time:
01hr - 00Z 28 Aug


Lowest freezing level (100s of feet MSL)
01 hour forecast valid 0000 UTC Fri 28 Aug 2020
Created by ADDS
Sfc 010 030 050 070 090 110 130 150 170+
(100s of feet MSL)

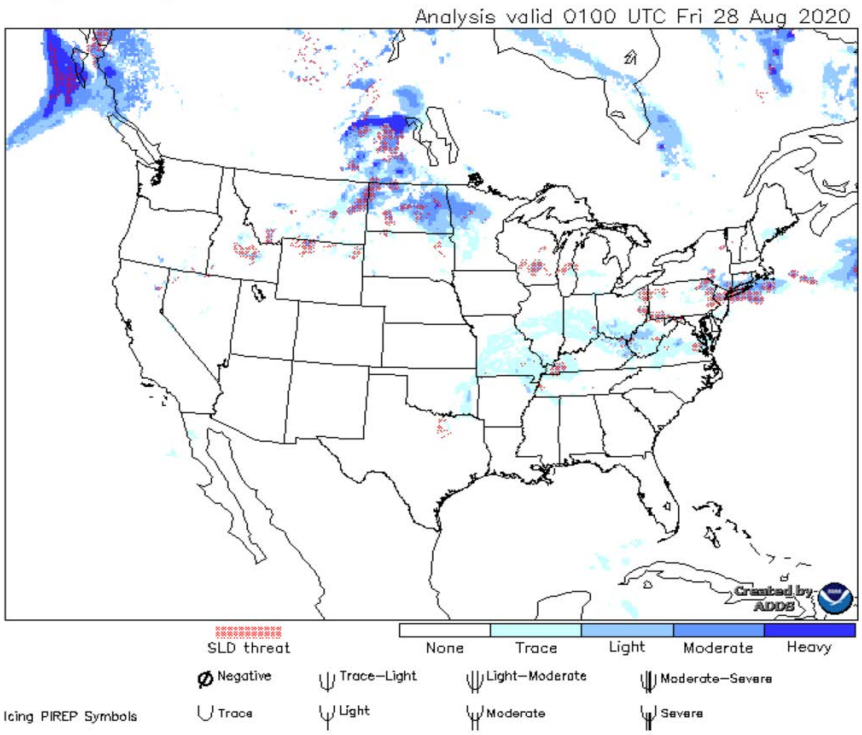
Plot: Severity+SLD Vert. level: max Time: 00hr - 01Z 28 Aug

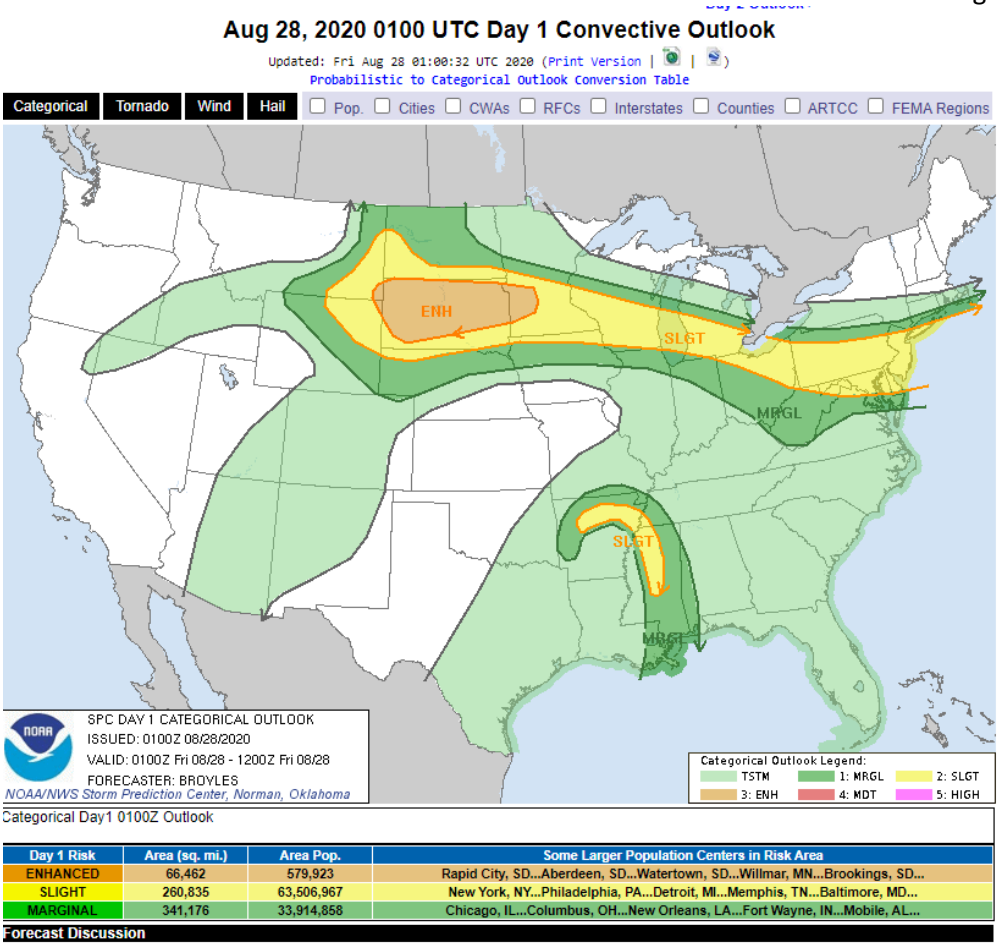
Maximum icing severity (1000 ft. MSL to FL300)



Plot: Severity+SLD Vert. level: 15,000 Time: 00hr - 01Z 28 Aug

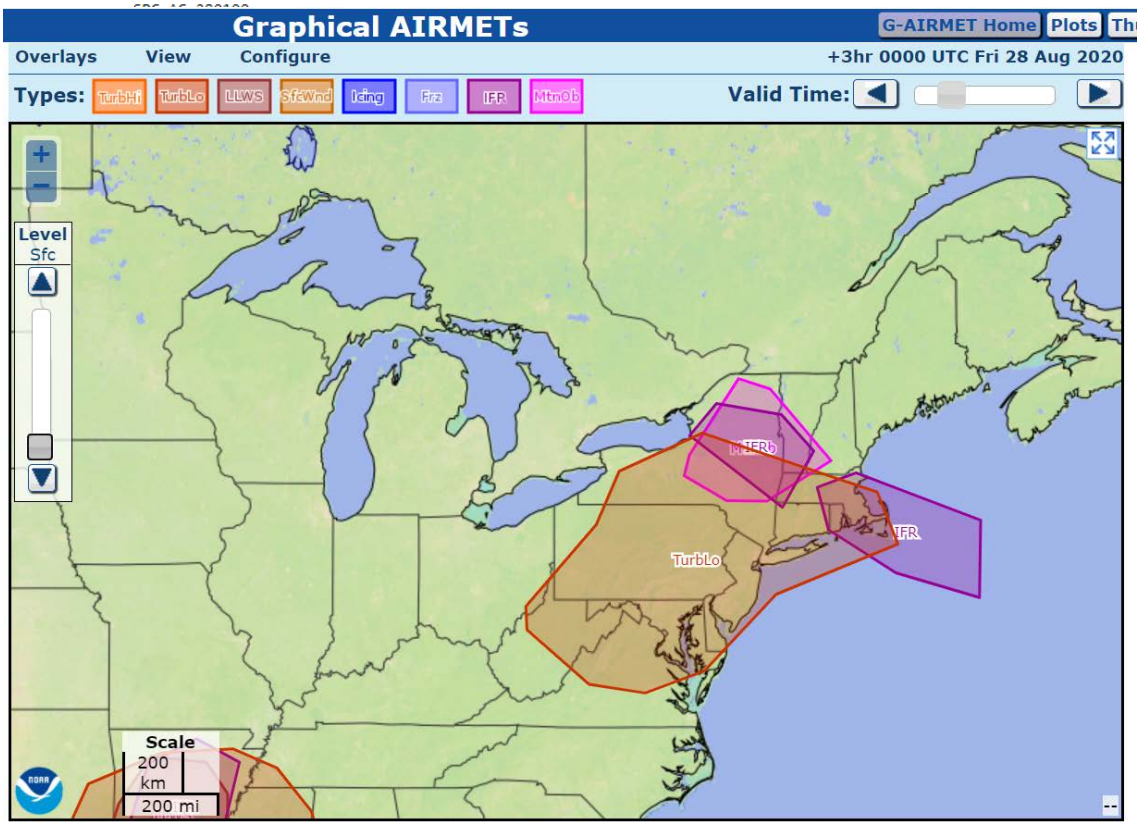
Icing severity at 15000 ft. MSL

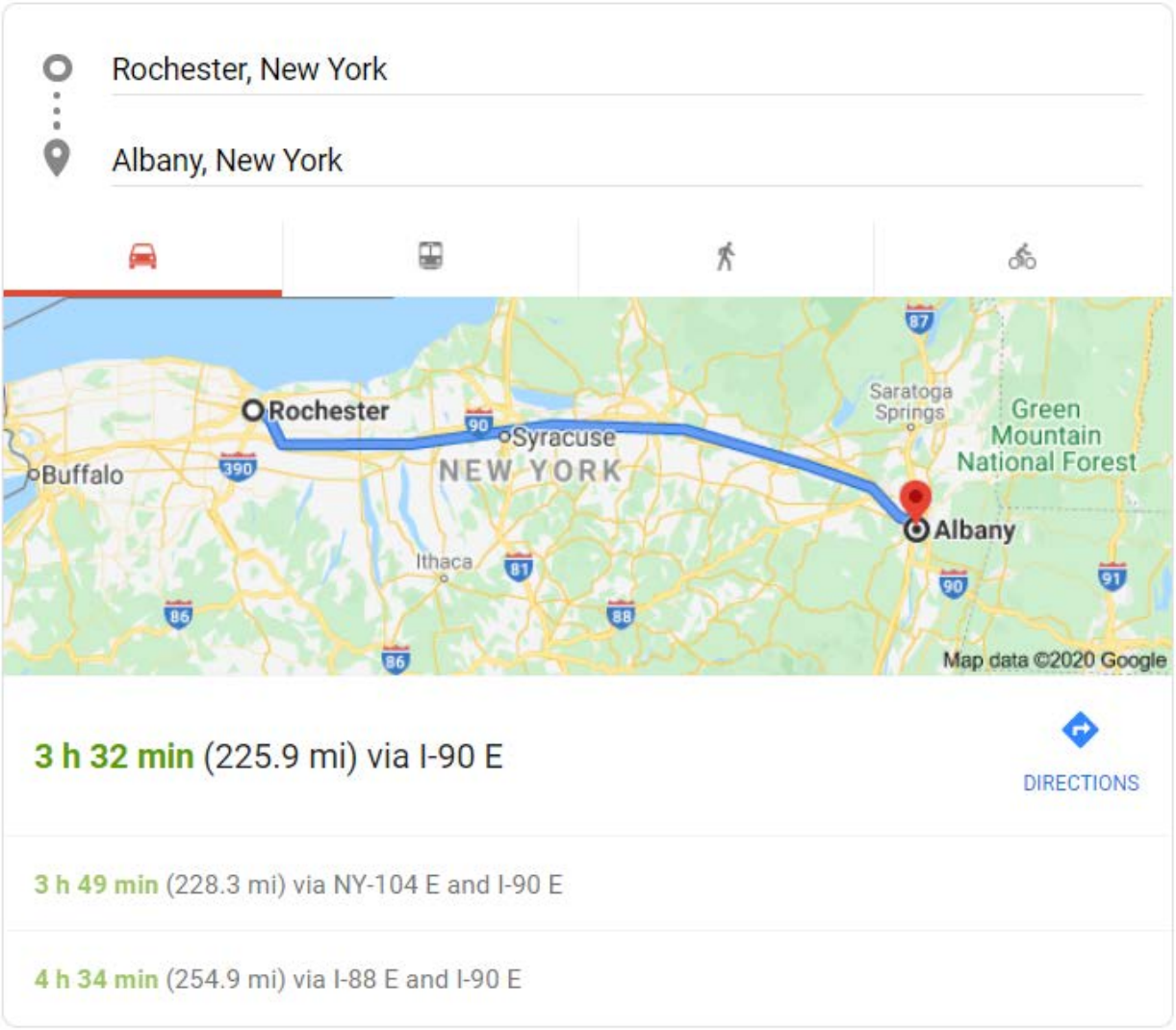




Day 1 Risk	Area (sq. mi.)	Area Pop.	Some Larger Population Centers in Risk Area
ENHANCED	66,462	579,923	Rapid City, SD...Aberdeen, SD...Watertown, SD...Willmar, MN...Brookings, SD...
SLIGHT	260,835	63,506,967	New York, NY...Philadelphia, PA...Detroit, MI...Memphis, TN...Baltimore, MD...
MARGINAL	341,176	33,914,858	Chicago, IL...Columbus, OH...New Orleans, LA...Fort Wayne, IN...Mobile, AL...

Forecast Discussion





Come on, just drive it…or take the money you were going to drop on Avgas and rent a fancy car to drive out there. IFR at night in a single engine, single pilot airplane is just dumb. I know you like to fly, and you'll get there pretty late if you drive, but you'll be even later if you're dead.

Scenario: You will file and depart under IFR to another airport (minimum 20nm away). While being vectored for the approach you will lose comms (at the command of your CFII). You will trouble shoot the comms, and then follow lost comms procedures to fly the approach and make a full stop landing. You will then depart to your home airport, filing IFR in the air and retrieving the clearance in the air. A few minutes after retrieving the clearance and prior to being vectored for the approach, you will again loose comms, talk through the various ways to troubleshoot this with your CFII.

Scenario Objective(s): To practice multiple scenarios of losing comms in actual IMC on an IFR flight. Lost comms are a part of any IFR checkride, and adapting to the various scenarios under which it may happen, as well as knowing all of the various ways to troubleshoot and try to reestablish communications, is crucial for success on the day of your checkride.

Equipment Needed:

- **Notebook**
- **FAR/AIM**
- **EFB / View Limiting Device**
- **IPH**

Instructor Actions:

- Ask the student to create an IFR flight plan from Airport A to Airport B with an alternate airport based on simulated weather provided by the CFII.
- Brief the student on the simulated weather conditions.
- Play the part of ATC, Simulate ATC instructions to the student to fly approaches; talk to ATC to cancel flight plan during sim comm failures.
- Run the student through the scenario and ask them how they would deal with each hurdle and what they might need to consider.

Desired Student Actions:

- File IFR and select appropriate destination and alternate based on the simulated weather given by your CFII.
- Check legality of flight plan based on current weather. Would the flight still be legal if all airports were 800' overcast?
- Make conservative and safe decisions.
- Demonstrates understanding and application of lost comm procedures.
- Appropriately and effectively communicates with Air Traffic Control (while the radios are working).
- Apply SRM to scenario presented by CFII.

Activity Elements (content):

_ Checklist Usage
_ ADM with an emphasis on SRM in IMC
_ Proper understanding of Lost Comms on the ground
_ Proper application of Lost Comms procedures in-flight
_ Proper troubleshooting of comm failure (checking radios, plugs, thinking of using cell phone and how, who to call, etc.)
_ Define AVE F MEA

Completion Standards:

The student successfully plans and executes both flights, flying approaches within standards, executing a go around if needed, and applying lost comm procedures appropriately and also troubleshoots comm failure in the air and during discussion appropriately.

Altitude +/-100 feet | Airspeed +/-10 Knots | Bank +/- 10 degrees | Heading +/- 10 degrees | CDI/Glideslope < Half Full Scale Deflection

Common Errors:

- Not troubleshooting lost comms appropriately
- Becoming distracted and not flying the airplane first
- Failing to apply AVE F MEA appropriately to the situation
- Lack of preparation for the lesson in lost comm procedures for varying scenarios and different stages of flight.

Debrief Questions:

What went well on the flight?

What could have gone better? Why? How will you fix that in the future?

Can you squawk 7700 instead of 7600?

What happens if you have to go missed with lost comms?

Who would you call using your cellphone? Is it legal to use your cell phone in flight?

What will you do to help you remember what to do in the event of lost comms in a real situation?

How can you “stack the deck in your favor” so things are easier in the event you do loose comms?

Close (Additional Study):

Review the FLY8MA IFR Course Lesson: Emergencies, and Lesson: FARs (Lost Comms)

Review Debrief questions and the Scenario #5 Lesson Plan, along with VOR navigation and flight planning procedures for non /G operations.

Scenario: You need to get your aircraft to a repair shop about 50nm away to have the GPS receiver repaired. The weather is MVFR at your departure airport, and IFR at your destination, but MVFR in the airports surrounding your destination (alternates available nearby). The only working navigation equipment you have in your aircraft is VORs (one or two depending on the airplane you will be using for your checkride). You will file and conduct the flight under IFR flying only with VORs and paper IFR charts (or with an IPAD with the GPS turned off). GPS outages could lead to a flight like this in real life after your checkride.

Scenario Objective(s): To fly the aircraft with only VOR and low enroute charts. On the day of your checkride, expect the examiner at one point or another to take away all GPS navigation. In the real world, GPS does fail from time to time in flight, and you must be ready to us back up navigation. The scenario will be to one airport under only VORs, landing, then filing a new flight plan to return home using /G navigation, and having the GPS fail within 8-12 minutes after takeoff on the return leg home, forcing you to find your location on charts and ask ATC for a route change to use only VORs to get home.

Equipment Needed:

- **Notebook**
- **FAR/AIM**
- **EFB / View Limiting Device**
- **IPH**

Instructor Actions:

- Ask the student to create an IFR flight plan from Airport A to Airport B using a departure procedure at one or both airports, if one is available. Try to use an airport with a DP and have the student file the flight plan for that.
- Brief the student on the simulated weather conditions.
- Play the part of ATC, and when able, use real ATC as much as possible and allow the student to run the radios.
- Run the student through the scenario and ask them how they would deal with each hurdle and what they might need to consider.

Desired Student Actions:

- File IFR and select an appropriate destination and alternate based on only having VORs.
- Make the same flight plan and explain what approaches and alternates you could use if you had a non-WAAS GPS.
- Explain what approaches and alternates you could file with a WAAS GPS.
- Makes conservative and safe decisions.
- Demonstrates proficiency in partial panel flying and flying circling approaches.
- Appropriately and effectively communicates with Air Traffic Control.
- Apply SRM to scenario presented by CFII.

Activity Elements (content):

Demonstrated Lesson Items

_ Checklist Usage
_ Programming FMS and avionics appropriately
_ Review VOR checks (ground and airborne, where to find them)
_ Successfully navigate using only VORs
_ Successfully navigate when GPS fails and switch to VORs

Completion Standards:

The student files a legal flight plan for VOR only navigation and selects approaches and alternates compatible with VOR only navigation. The student flies the aircraft on DPs, enroute, and approaches within checkride tolerances.

Altitude +/-100 feet | Airspeed +/-10 Knots | Bank +/- 10 degrees | Heading +/- 10 degrees | CDI/Glideslope < Half Full Scale Deflection

Common Errors:

- Not using the avionics correctly to configure for VOR only navigation.
- (Partial Panel Flying errors)
- Failing to file a legal flight plan for VOR only flight.
- Not maintaining proper course and orientation of where the aircraft is on the map.
- Failing to properly file or fly the selected DPs.

Debrief Questions:

What went well on the flight?

What could have gone better? Why? How will you fix that in the future?

Would the flight have been legal if the weather at all airports was 600' overcast? What about 900' overcast?

How would your personal minimums affect your decision to make this flight?

Give an example of a flight plan that is legal with GPS, but not legal with only VORs.

If your VORs are more than 4 degrees apart when checking them against each other, how do you know which is faulty? Can you still go fly with one faulty VOR legally?

If the Morse code identifier is missing from a VOR, what does that indicate?

Close (Additional Study):

Review and **Watch** the FLY8MA IFR Oral Exam Videos

Review Debrief questions and the Stage Check #2 Lesson Plan

Attention / Motivation : If you wish you could know exactly what is coming on your instrument checkride here's your chance. This will be a full mock checkride, oral and flight, with your CFII or even better, another CFII who can give you an independent evaluation of where you stand and if you are ready for the checkride. It is best to do this flight with a CFII you are not as familiar with as you are unlikely to know your DPE very well, and it is important to see how you can handle the airplane and IFR flying with an unfamiliar person on board.

Lesson Objective(s): The CFII will conduct a full mock oral and flight checkride with the student. The oral and flight should follow the ACS as the examiner will use it on the day of the checkride. Any mock scenarios that the examiner is known to use should be presented to the student. If none are known, the student and CFII should call the examiner and ask "what is the best way to prepare for the checkride, and what scenario would you like me to plan for on the day of the checkride?" The CFII should grade everything in accordance with completion standards as well as with respect to SRM/CRM.

Equipment Needed:

- **iPad/FLY8MA Instrument Pilot Course**
- **FLY8MA Instructor Kit**
- **Marker/Whiteboard**
- **2020 FAR/AIM**
- **Instrument Flying & Procedures Handbooks**
- **Instrument Rating ACS**
- **Your Personal Mins Booklet**
- **Your aircraft's POH**

Instructor Actions:

- Explain lesson objectives.
- Explain/apply the IFR ACS as required.
- **Conduct a mock checkride, consult local DPEs for scenarios and a plan of action.**
- **Ask the student questions that encourages them to teach the material back to you, use questions the local DPE would use during a checkride.**

Student Actions:

- Review all items that were graded a 2 or below on prior lessons.
- Use the IFR course, FAR/AIM, and other resources to review prior topics.
- **Prior to lesson write down 5 questions from the material you review.**

Discussion or Activity Elements (content):

_ A. When is an instrument rating required?
  - Recent IFR experience / what can be counted
    - Pilot logbooks / record keeping requirements
    - Safety pilot names, approach
    - Physiological factors affecting piloting ability
    - Distinguish proficiency vs Currency
    - Setting personal minimums
  - Weather planning
    - Current and Forecast weather, read a sample taf, prog chart, sigmet, airmet, three types
    - Thunderstorms and micro burst, time lasting and safe distance
    - Fog types

- Types and hazards of icing, including frost
- Wind, wind aloft, shear
- Moisture, precip, temp dewpoint
- Enroute weather resources
- FSS, EFAS, HIWAS, CWA, ADSB, XM, Cell phone
- 1090, vs 978 , tis-b fis-b ads-b
    - Tis-b goes 1090 or 978 uat
    - Fis-b is 978 uat only
- Make a good go-no-go decision

- Flight Plan
    - Fuel Planning
    - Definitions of Minimum or Emer Fuel
    - Symbology on enroute charts
    - Where to locate preferred routes, how to use
    - Elements of an ifr flight plan
    - Procedures for activating and closing a IFR flight plan at a towered and non towered airport
    - Oxygen requirements
    - Altitude and course requirements
    - Preflight req
    - Airspace, cloud clearance, and vis req
    - Selecting an alternate
    - GPS, RAIM, RNAV, RNP, WASS
    - Human factors affecting go-no-go
    - Flight in areas unsuitable for landing
    - Notams,, types, fdc, d

_ Preflight Procedures

- AC systems for IFR
    - Anti-ice vs deice, general operating and limitations associated with
    - Fuselage, wing, carb, induction system, prop, fuel, and static sys icing. Frost on fuel tanks
- Flight Instruments
    - General Operations
        - Pitot static
        - Gyro, vac, electric
        - Mag Compass
        - Transponder, mode C
        - Vacuum Pump
    - Gen Characteristics of Navigation Instruments
        - NAVAIDs

        - VOR
        - DME
        - RNAV
        - ILS and Marker Beacons
        - FMS, GPS, and Raim capability
    - Gen Characteristics and failure modes of autopilots
    - Failure modes of Flight instruments
    - Difference of approved and non-approved navigation devices
    - EFIS - PFD - MFD
- Instrument and Equip Check
    - Required doc for inop equipment
    - Required equip for IFR
    - Loss of equipment in IFR
    - Programming avionics during AC movement
    - Database updates
    - Runway Incursion and Hotspot

_ ATC Clearances and Proc

- Compliance with ATC Proc
    - Responsibilities associated with accepting a clearance, how and when not to
    - Requirements to read back a clearance
        - Altitudes, vectors, rwy assignments, rwy hold instructions
    - PIC emergency authority
    - Methods to obtain a clearance
    - Terrain clearance, ODPs
    - Purpose of Expect
    - Lost Comm
    - SIDs, STARs
    - Clearance void times
    - Non-towered airspace protection
    - Incorrect ATC clearances
    - Short Clearance void times
    - Airborne Clearances
    - Clearance Limits
    - IFR in non radar environ
    - Accepting another ACs instruction
    - Collision, terrain, obstacle avoidance
    - Standard Phraseology
    - CDI tolerances and deviation distance
- Holding Proc
    - Purpose of Holding

- Reporting criteria
- Recommended entry proc and holding speeds
- Figuring fuel, EFC
- Applying wind corrections
- Using an autopilot
- Fuel conservation

_ Flight By Ref To Instruments

- Straight and Level, Climbs, Turns, Descents
  - Primary Instruments
  - Spatial Disorientation and Optical Illusions
  - Normal and Abnormal Indications
  - What degrades a pilot's crosscheck
  - Flying in unfamiliar display systems
- Unusual Attitudes
  - Physiological Factors
  - System and Equip Failures leading to unusual attitudes
  - Environmental Factors leading to an unusual attitude
  - Recovery procedures

_ Navigation Systems

- Intercepting and Tracking Navigational Systems and DME Arcs
  - Procedures for intercepting and tracking, and DME Arcs
  - Course Guidance, HSI
  - Indications of Nav system failures
- Departure, Enroute, And Arrival
  - DPs
  - ATC services
  - Pilot / Controller Responsibilities
  - Instrument Altitudes
  - Airport lighting, signs, markings
  - STARs
  - Communication during departure, enroute, and arrival
  - IAP terms and abbreviations
  - IAP charts

_ IAPs

- Non-precision approach
  - Procedures and limitations associated with a non-precision approach
  - Difference between LP and LNAV
  - Navigation system annunciations during GPS use
  - Circling Approaches (when to descend, when to go missed)
- Precision Approach

- Procedures and Limitations associated with a precision approach
- Proper missed approach procedure

- Missed Approach
- Circling Approach
- Landing from an Instrument Approach

_ Emergency Operations

- Lost Comms AVE F MEA
- Approach with loss of instruments

_ Postflight Procedures

- Pitot cover, static port cover, reporting any discrepancies or database issues

Completion Standards:

The student completes the scenario presented by the mock examiner in the aircraft after successfully answering 60-90 minutes of oral questioning (or however long it takes to go through the mock oral as described by a local DPE). The CFII conducting the check must not give any input to the student during the oral or flight for this stage check to be completed successfully. The student will likely have debrief items they can improve upon prior to a checkride, but the completion standard is ultimately that of a IFR checkride as outlined in the ACS.

Common Errors:

- Forgetting parts of a topic, not utilizing SRM in your decision making, not knowing regulations, not using or not knowing where to look up information you do not readily know off the top of your head.
- Failing to stay ahead of the airplane during the flight and not meeting the requirements of the ACS. ALWAYS be asking yourself “what is coming next” when flying the plane so you can stay ahead and be ready. If you fall behind, FLY THE PLANE and discontinue what you are doing that is increasing your workload (i.e. cancel your approach clearance and request vectors and an altitude to fly while you catch back up with your GPS, systems, or whatever you are struggling with).

Debrief / Remotivation

If you can make it through this stage check, then you have studied well through your IFR training. If you find this challenging that is okay. It is also okay to repeat part of or all of this stage check more than once to ensure you are ready for a checkride and to operate in the real world under IFR.

Oral Eval Questions:

Please review all areas that were weak during the mock oral using questions that begin with words such as How, What, When, Where, Why, and Describe.

Never ask the student “does that make sense”, instead ask a question that will make the student explain the topic back to you so you will know that they understand and it makes sense to them.

Close (Additional Study):

Review homework and course work as assigned by your mock examiner and CFII. Review the ACS cover to cover and then review any topics you feel unsure of that are mentioned within that document.