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Original	June 05, 2011	Initial Certification of entire TCO	1-67
Revision 1	October 01, 2011	Corrections and Updates	1,2,7,9,10,11,13,14, 16,52,67
Revision 2	April 30, 2012	Entire Manual	1-72
Revision 3	October 15, 2012	Merged Ground & Flight TCO's	1-93
Revision 4	April 15, 2013		1,2,5,7,9,13,14,15,17,44, 45,47,53,54,67,68,69,71,72, 73,74,86,87,89,90,91,92,93
Revision 5	December 01,2013	Ground school time 36 hours, Type errors, ground school two Floors added.	1,2,4,5,7,9,10,11-13,15,17-39 41,42,44,45,48,49,51,53,57, 58-62,64,66,71,72,74-89
Revision 6	November 17, 2014	Chief Flight Instructor Change	7,17
Revision 7	January 9, 2015	Stage 1 &2 flight ground lessons Grading System changes	1,2,4,5,7, 11-15, 18-96
Revision 8	August 16, 2015	Updated GS testing requirements Corrected for 3.5 sim allowance Adjusted some elements for better Understanding& documentation of elements Completed. Added rules For conducting lessons out of order..	1,2, 5, 7,15,18, 38, 39,40,46,47, 50,51,53, 54, 57, 60, 61, 63,64,66,67,70, 75,76

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Instrument Pilot Certification Course Airplane

1. North Star Aviation Inc., located at Mankato Regional Airport, Mankato, Minnesota is owned and operated as:
North Star Aviation, Inc.
3030 Airport Road North
Mankato, Minnesota 56001

2. **COURSE TITLE:** Instrument Rating Certification Course - Airplane.

3. This TCO meets all of the curriculum requirements for the Instrument Rating Certification Course contained in appendix C of 14 CFR Part 141. These curriculum contents are intended to parallel the Instrument Rating Airplane Practical Test Standards (PTS).

4. The training syllabus herein contains a separate ground training course and a flight training course which can be taught concurrently or separately. Separately will be defined as starting the ground course prior to or on the same day as the flight training course.

5. **COURSE OBJECTIVE:** The student will obtain the knowledge, skill and aeronautical experience necessary to meet the requirements for an Instrument Rating with an Airplane category rating.

6. **COMPLETION STANDARD:** The student must demonstrate through written tests, practical tests, and through appropriate records that he/she meets the knowledge, skill and experience requirements necessary to obtain an Instrument Certificate with an airplane category rating. Each student should satisfactorily complete at least one stage of training within 100 days or the Chief Flight Instructor may terminate you from the program. Students that are inactive for more than 180 days may be terminated from the course. The Chief Flight Instructor may terminate the student for other reasons such as academic failure of the ground school, poor attendance of the scheduled flight labs or any other reason the Chief Flight Instructor determines valid.

7. **GROUND INSTRUCTIONAL FACILITIES:** Ground instruction facilities are located at North Star Aviation, Inc. in the Terminal Building at Mankato Regional Airport, and Armstrong Hall at Minnesota State University Mankato Campus.
 - A. The training space at North Star Aviation Inc. in the terminal building at Mankato Regional Airport consists of the student briefing area is 36' by 46' and consists of instructor cubicles with tables, 36" x 36" dry erase boards, aeronautical charts, including the current FAR AIM. North Star Aviation, Inc. has the following resources available to the students; a Garmin 430/530 computer based simulator, Garmin 500 computer based simulator, Poster of Aircraft Instrument panel, Bicycle wheel, model airplane, instrument gauges, computer, monitor, and keyboard. North Star Aviation, Inc. also has a conference room that is 30' x 24' available for class room training and consists of a VCR player, DVD player, TV, Overhead projector, Grease Board , HP 61-110 projector and extendable projection screen. The room has nine 5 foot tables with each table able to handle two students...The space in the room can handle up to 12 tables and 24 students. (Diagram 1, Appendix A)

 - B. The training Rooms in Armstrong Hall at Minnesota State University Mankato Campus rooms consists of a Sharp Data Projector, Crestron Control System, Elmo Document Camera, Sony DVD/VCR Combo, Laptop Hookup, and a dry erase board or chalk board. (See Floor Plans in Diagram 2, 3 & 4, Appendix A)The room numbers, square footage and corresponding capacities are listed below:

<u>ROOM</u>	<u>STUDENT CAPACITY</u>	<u>ROOM SQUARE FOOTAGE</u>
Room 302	33	503
Room 303	36	669
Room 304	43	674
Room 305	48	762
Room 306	58	881
Room 308	42	644
Room 309	40	733

North Star Aviation, Inc.

Instrument Rating Certification Course - Airplane

Room 310	32	501
Room 311	41	653
Room 314	40	764
Room 315	34	671
Room 316	44	664
Room 317	30	501
Room 319	33	500
Room 320	32	665
Room 321	38	671
Room 322	35	765
Room 323	58	881
Room 325	30	502
Room 326	25	502
Room 327	26	528
Room 330	43	882
Room 331	30	740
Room 332	10	673
Room 333	30	669
Room 334	33	501
Room 202	33	504
Room 203	27	665
Room 204	27	670
Room 205	40	761
Room 208	40	650
Room 209	36	741
Room 211	42	650
Room 213	55	882
Room 214	50	761
Room 215	38	581
Room 216	40	763
Room 217	33	503
Room 219	33	505
Room 220	40	761
Room 221	28	581
Room 222	50	770
Room 225	30	522
Room 231	50	762
Room 232	44	668
Room 233	42	668
Room 101	161	1539
Room 102	112	1282
Room 123	42	633

C. The training rooms at both locations are well lighted and the temperature is thermostatically controlled. Each room is well ventilated and conforms to the city of Mankato building, sanitation and health codes. The rooms are designed and located so that students will not be distracted by instruction conducted in the other rooms or by flight and maintenance operations at the airport.

8. AIRPORT: Mankato Regional Airport is the main operations base for training in this course. All flight training originates from this airport. Mankato Regional Airport has hard surfaced runways and meets the requirements of 14CFR Part 141.38 of the FAR for day and night flight operations. The airport has fuel services available for North Star Aviation customers from Monday through Friday 0700 – 1800, and Saturday and Sunday 0700 through 1700 local. Maintenance is available Monday through Friday 0700 – 1700. The Waseca airport (KACQ) will be used as an alternative student pilot solo takeoff and landing practice area after an initial solo flight has been accomplished at the Mankato airport (KMKT) as needed. This will be used on an on demand basis with no more than 1 student pilot assigned to the Waseca airport for solo takeoff and landings. The student Pilot will receive a log book endorsement for repeated solo cross country after having flown to and from each airport. Procedures to get to and from Waseca airport in (ALPHA) designated practice area and other practice areas can be reviewed in the KMKT Practice Areas in **Appendix A – Diagram 8**. Private pilot rated students will use the Faribault airport (KFBL), Owatonna airport (KOWA) and New Ulm airport (KULM) during periods of high student pilot solo takeoff and landing activity.

9. AIRPORT FACILITIES: The Mankato Regional Airport is equipped with two flight briefing areas. These areas are located in the airport's terminal. Both briefing areas are equipped with Televent DTN and a telephone is also available with the number posted on how to dial the Minneapolis Automated Flight Service Station (AFSS). These facilities are used by students and regular customers of North Star Aviation. The student briefing area is 36' by 46' and consists of instructor cubicles with tables, dry erase boards, aeronautical charts, including the current FAR AIM. North Star Aviation, Inc. also has a conference room that is 30' x 24' available for class room training and consists of a VCR player, DVD player, TV, Overhead projector, Grease Board, HP 61-110 projector and extendable projection screen. The room has nine 5 foot tables with each table able to handle two students...The space in the room can handle up to 12 tables and 24 students. The facilities are used exclusively by students, air taxi pilots, aircraft salesmen, itinerant pilots, and regular customers of North Star Aviation, Inc. The local practice areas are shown and described on a detailed chart posted on the wall in the dispatch area. A safety information board is maintained on the wall next to dispatch and a monitor can be viewed by students at the dispatch area with continuous updated KMKT local airport weather conditions

10. Simulation Training: Two **Redbird FMX 1000** Advanced Aviation Training Devices (AATD) will be used for simulation training. They are both located in one room that is 30' x 24' with two 36' x 36" dry erase boards on the walls. The Redbird FMX 1000 features an electric motion platform, fully enclosed cockpit, wrap around exterior visuals, quick change cockpit configurations for single and multi-engine, traditional and glass cockpit, center and left side control, compatible with headset, defined mission compatible with scenario based training, complete terrain and airport database, instructor station inside cockpit, and standard 110 power source. Each simulator is equipped with a Garmin 430 and a Garmin 530 avionics package. A copy of FAA letter of authorization can be found in **Appendix A – Diagram 5**. Redbird FMX 1000 AATD may be used on lesson #10, #11, #13, #18, #21, #24, #28 and as needed for any repeated aircraft lesson as approved by the Chief Flight Instructor. Flight trainer lessons #10, #11, #13, #18, #21, #24, #28 may be flown in an aircraft

11. AIRCRAFT: PA- 28, fixed gear noncomplex airplanes can be used for all flight training in this course. These aircraft will meet the requirements of 14 CFR Part 141.39. Radio equipment will consist of at least one 360 channel transceiver and at least one VOR navigational receiver and a 4096 code transponder with Mode C capability. The PA- 28 airplanes are equipped for day and night VFR and IFR flying as specified in 14 CFR Part 91.205 (a) (b) (c) (d).

12. CHIEF FLIGHT INSTRUCTOR: The Chief Flight Instructor shall meet 14 CFR Part 141.35 requirements and hold at least a Commercial Pilot Certificate in a Single and Multi -Engine Airplane. The Chief Flight Instructor must be the holder of a flight instructor certificate with an airplane category rating with a single-engine and multi-engine class rating and an instrument airplane rating. The Chief Ground Instructor will also hold an Advanced Ground Instructor rating and an Instrument Ground Instructor rating. Duties: Conduct initial and annual qualification checks of flight instructors, document all delegations of duties, certification of training records, graduation certificates, stage and final test reports, stage and final test recommendations as to pass or recommendations for additional training. The Chief Flight Instructor will be available for consultation if not in the office by cell phone, telephone, email and/ or text. The Chief Flight Instructor will maintain overall responsibility to improve and documentation of flight school training program.

13. ASSISTANT CHIEF FLIGHT INSTRUCTOR(S): The Assistant Chief Flight Instructor(s) will meet the 14 CFR Part 141.36 requirements and hold at least a Commercial Pilot Certificate in a single engine and multi-engine airplane. The Assistant Chief Flight Instructor must be the holder of a flight instructor certificate with an airplane category rating with a single-engine and multi-engine class rating and an instrument airplane rating. Delegated Duties: Conduct initial and annual qualification checks of flight instructors, stage and final test recommendations as to pass or recommendations for additional training. The Assistant Chief Instructor will also help review certification of training records, graduation certificates, stage and final test reports. The Assistant Chief Flight Instructors will be available for consultation if not in the office by cell phone, telephone, email and / or text.

14. SENIOR CHECK INSTRUCTORS: Each Senior Check Instructor will meet the requirements of a Check Instructor. Each Senior Check Instructors training file will note the approved courses they may perform student stage checks, end of course tests, and instructor proficiency checks.

15 CHECK INSTRUCTORS: Each Check Instructor, under 14 CFR Part 141.37, must be the holder of at least a Commercial Pilot Certificate in a single- engine airplane and multi-engine airplane. The Check Instructor must be the holder of a flight instructor certificate with an airplane category rating with a single-engine and multi-engine class rating and an instrument airplane rating. Each Check Instructors training file will note the approved courses they may perform student stage checks, end of course tests, and instructor proficiency checks.

16. FLIGHT INSTRUCTORS: Each Flight Instructor assigned to this course must be the holder of at least a commercial pilot certificate in a single- engine airplane and multi-engine airplane.. The instructor must be the holder of a flight instructor certificate with an airplane category rating with a single-engine and multi-engine class rating and an instrument airplane rating. Perform course training as specified in Syllabus and document training in student training record.

17. CHIEF GROUND INSTRUCTOR: The Chief Ground Instructor for the Private Pilot Ground School Course, Instrument Pilot Ground School Course, Commercial Pilot Ground School Course will meet the requirements of 14 CFR Part 141.35 (e) .

18. GROUND INSTRUCTORS: The ground instructors for this course will meet the requirements under 14 CFR Part 141.81, holding either an Advanced Ground Instructor or Certified Flight Instructor rating to teach the Private Pilot and Commercial Pilot ground course. For ground instruction for the Instrument rating the ground instructor will hold an Instrument Ground Instructor or Certified Flight Instructor Instrument Airplane rating. Duties: Train according to the course syllabus and document training in each student's ground school training record.

The North Star Aviation (NSA) ground instructors will document ground instruction of each student attending a class. This will be done by an attendance roster completed by each faculty ground instructor and signed certifying each students attendance in each class. Should a student fail to attend a class, the session must be made up with a North Star Aviation Ground or Flight instructor. Each class attendance roster during a week will be entered into the NSA Electronic record keeping system. The following courses are managed through the NSA electronic student's ground school training record for the following courses:

- Private Pilot Ground School Course
- Instrument Pilot Ground School Course
- Commercial Pilot Ground School Course

19. **Dispatcher:** A Dispatcher may release training flights. The dispatcher will be given training on how to enter aircraft information, student information, review student flight log books for appropriate endorsements if necessary, review currency, print dispatch release, and required pilot documents. Training will be documented in each dispatchers training file. The dispatcher will understand maintenance due dates and help coordinate with maintenance inspections coming due with aircraft availability. The dispatcher will help document weekly student attendance and flight training records as necessary and directed by the Chief Flight Instructor.

20. **Ground Course Testing:** The following ground training courses:

- Private Pilot Ground School Course
- Instrument Pilot Ground School Course
- Commercial Pilot Ground School Course

Ground Instructor will have at least one Stage exam at the end of each Ground training Stage. The exam will be instructor created and will represent the content that was covered within the stage. The method of testing should represent a method of testing that is currently in practice for the FAA knowledge test, however, it is not limited to that method.

21. **Additional Required Flight Training:** Additional flight training if needed may be performed in the Redbird FMX 1000 Advanced Aviation Training Devices (AATD).

22. **The following reference books and reference material s may be used in this course:**

AIM	Aeronautical Information Manual	AC 43-9C	Maintenance Records
FAR's	Federal Aviation Regulations	AC 43-12A	Preventative Maintenance
FAR's	Federal Aviation Regulations EXPLAINED by Kent Jackson	AC 60-22	Aeronautical Decision Making
NTSB 830	Notification & Reporting of Aircraft Accidents & Incidents	AC 61-65	Certification: Pilots and Flight Instructors
FAA-H-8083-25A	Pilot's Handbook of Aeronautical Knowledge	AC 61-67	Stall and Spin Awareness Training
FAA-H-8083-1A	Aircraft Weight and Balance Handbook	AC 61-84	Role of Preflight
FAA-H-8083-3	Airplane Flying Handbook	AC 90-23E	Aircraft Wake Turbulence
FAA-H 8083-6	Advanced Avionics Handbook	AC 90-48C	Pilot's Role in Collision Avoidance
FAA-H-8083-15A	Instrument Flying Handbook	AC 91-33A	Use of Alternate Grades of Aviation Gasoline for Grade 80/87, and use of Automotive Gasoline
FAA-H-8083-19	Plane Sense	AC 91-51A	Effect of Icing on Aircraft Control and Airplane Deice and Anti-ice Systems
FAA-H-8261-1A	Instrument Procedures Handbook	AC 90-66A	Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports without Operating Control Towers
AC 00-6	Aviation Weather	AC 91-67	Minimum Equipment for General Aviation Operations under FAR Part 91
AC 00-24B	Thunderstorms	AC 120-51	Crew Resource Management Training
AC 00-34A	Aircraft Ground Handling and Servicing		
AC 00-45G	Aviation Weather Services		
AC 00-54	Pilots Windshear Guide		
AC 20-43C	Aircraft Fuel Control		
AC 20-73A	Aircraft Ice Protection		

The Garmin GNS 430 A Pilot Friendly Manual by Jon Dittner

POH / AFM Pilot Operating Handbooks / Aircraft Flight Manuals (Various Manufactures)

FAA Airport Facility Directory

Instrument Pilot Practical Test Oral Study Guide instructor version with answers & explanations – by June Bonesteel

Everything Explained for Professional Pilots by Richie Lengel

Aircraft Systems For Pilots by Dale De Remer, Phd

ASA Instrument Pilot Oral Exam Guide

Jeppesen Commercial / Instrument Pilot Book

Gleim Instrument Pilot Written Test Bank

North Star Aviation, Inc.

Instrument Rating Certification Course - Airplane

FAA Instrument Pilot Practical Test Standards

North Star Aviation, Inc. Instrument Pilot printed or power point standardized training presentation

North Star Aviation Standard Operating Procedures

VTS, Inc. VTS Training Systems Piper Warrior and Piper Seminole aircraft systems training software

Garmin's 400 and 500 Series online flight simulator

Garmin's 400W and 500W Series downloadable flight simulator

Jeppesen's Garmin 430 and Garmin 530 Training Software

U.S. Terminal Procedures Approach Charts and Enroute Chart

The Garmin GNS 430 A Pilot Friendly Manual by Jon Dittner

POH / AFM Pilot Operating Handbooks / Aircraft Flight Manuals (Various Manufactures)

FAA Airport Facility Directory

U.S. Terminal Procedures Approach Charts and Enroute Charts

Jeppesen Terminal Procedures Charts and Enroute Charts

Apple IPAD Electronic Display of either Jeppesen Terminal Procedures Charts or U. S. Terminal Procedures Charts.

Jeppesen GFD instrument / Commercial DVD Course

Jeppesen Instrument / Commercial Image CD-ROM

North Star Aviation, Inc. Instrument ASEL Power Point Standardized Flight Training Presentation

North Star Aviation, Inc. Standard Operating Procedures - Piper Aircraft Warrior III PA-28-181

North Star Aviation, Inc. Preflight Power Point Presentation on the Piper Aircraft Warrior III PA-28-181

North Star Aviation, Inc. Instrument Rating Airplane printed or power point standardized training presentation

In addition at the discretion of the instructor, they may refer to any supplemental source of information (Advisory Circulars and other FAA publications) in order to increase the quality of the training along with NASA training videos, FAA Safety Videos and internet based AOPA Air Safety Foundation web based safety training may be used.

23. Flight Lesson Grading

S	Task accomplished meets lesson completion standards
I	Incomplete needs additional training
PC	Previously Completed.
NP	Not Performed

- For a lesson to be Completed all items on that lesson must be signed off with an “S”
- When a lesson is flown a second or more times to complete, any items that were completed on previous flights of that lesson shall be marked with PC indicating that the item was previously completed.
- In the case where items were not trained or not performed on that flight the instructor will mark those items with “NP” indicating not performed. These “NP” items must be marked with an “S” on Subsequent flights to complete the lesson.
- In the event a student receives a “I” (Incomplete & Needs Additional Training) in a lesson.
 1. For a lesson to be completed all items on the lesson must have been graded with an “S”.
 2. The instructor must give additional ground or flight training in the area an “I” was given, on the next training session for that lesson.
 3. The additional training will be documented by dispatching the lesson again and only the items that were graded with “I” shall be flown on that lesson all other items will be marked PC. Place an “S” in the box if completion standards are met or another “I”. If an “I” is given the lesson will remain open until all items on the lesson meet the completion standards. If the lesson items need to be flown more than 2 times the lesson must reviewed with the Chief Flight Instructor or Assistant Chief Flight Instructor before further flights are conducted. Once an “S” mark is received in all items of the lesson the lesson will then be complete.
 4. Students may not progress to the next lesson until the lesson is completed
 5. If an item on the lesson is marked with and NP the lesson will remain open until all items on the lesson have been graded with an “S”.
 6. Lessons with items that are labeled “if aircraft equipped” may be graded “NP” in the case where the aircraft of Flight trainer are not equipped to perform the procedure. In this case the lesson will be considered complete with only those items graded “NP”.

24. Enrollment

As required in 14 CFR Part 141.93 (a) a copy will be defined as: A written copy, emailed copy, an electronic copy in a PDF format that may be distributed to the student through a central download site or delivered through an electronic means.

25. Graduation

The Chief Flight Instructor may reduce flight training and ground training requirements of this training course outline provided, FAR 141 Appendix C Instrument Rating Course requirements have been complied with, and the exception is documented in the students file. Reductions are only allowed for areas where this Training Course Outline exceeds the requirements of 14 CFR Part 141 Appendix C.

26. Documentation of student flight time

Effective January 1, 2015, all students enrolling in a certification course will have their records maintained electronically in the North Star Aviation electronic training record system. The electronic format will also require an electronic backup file of the training data. All lessons in the electronic system will reflect the TCO presented here and all flights will be tracked to the corresponding lesson flown. Each lesson will be electronically signed by the Student and Instructor who conducted the lesson. Each time a lesson is flown it will be individually dispatched to show exactly what was taught. Each flight will follow the grading system described in item 23 above.

27. Performing Lessons out of order

All lessons in this course must be conducted in the order presented through Lesson 26. Lessons 27 through 30 may be conducted in any order. Lessons 31 through 33 must be conducted in order.

INSTRUMENT PILOT CERTIFICATION COURSE AIRPLANE FLIGHT LESSON LAYOUT

INSTRUMENT RATING

	TOTAL	DUAL	ASEL	DUAL X-C	FLT TRAINER	NIGHT	INST	PRE/POST
	42.9	42.9	31.9	10	11	0	39.7	32
LESSON	DUAL	DUAL	ASEL	DUAL X-C	FLT TRAINER	NIGHT	INST	PRE & POST
1	0	0	0	0	0	0	0	2
2	1.5	1.5	1.5	0	0	0	1.3	0.5
3	1.5	1.5	1.5	0	0	0	1.3	0.5
4	1.5	1.5	1.5	0	0	0	1.3	0.5
5	1.5	1.5	1.5	0	0	0	1.3	0.5
6	1.5	1.5	1.5	0	0	0	1.3	0.5
7	0	0	0	0	0	0	0	2
8	1.5	1.5	1.5	0	0	0	1.5	0.5
9	1.5	1.5	1.5	0	0	0	1.5	0.5
10	1.5	1.5	0	0	1.5	0	1.5	0.5
11	1.5	1.5	0	0	1.5	0	1.5	0.5
12	0	0	0	0	0	0	0	2
13	1.5	1.5	0	0	1.5	0	1.5	0.5
14	1.7	1.7	1.7	0	0	0	1.5	0.5
15	0	0	0	0	0	0	0	2
16	1.7	1.7	1.7	0	0	0	1.5	1.5
Stage Total	18.4	18.4	13.9	0	4.5	0	17	15
17	0	0	0	0	0	0	0	2
18	1.8	1.8	0	0	1.8	0	1.8	0.2
19	1.5	1.5	1.5	0	0	0	1.3	0.5
20	0	0	0	0	0	0	0	2
21	1.8	1.8	0	0	1.8	0	1.8	0.2
22	1.5	1.5	1.5	0	0	0	1.3	0.5
23	0	0	0	0	0	0	0	2
24	1.5	1.5	0	0	1.5	0	1.5	0.5
25	1.5	1.5	1.5	0	0	0	1.3	0.5
26	0	0	0	0	0	0	0	2
27	3	3	3	3	0	0	2.8	0.5
28	1.4	1.4	0	0	1.4	0	1.4	0.6
29	3	3	3	3	0	0	2.7	0.5
30	4	4	4	4	0	0	3.7	0.5
31	0	0	0	0	0	0	0	2
32	1.5	1.5	1.5	0	0	0	1.3	0.5
33	2	2	2	0	0	0	1.8	2
Stage Total	24.5	24.5	18	10	6.5	0	22.7	17
Total	42.9	42.9	31.9	10	11	0	39.7	32

- Total flight time may be less than that 42.9 hours indicated in the above table provided the total ASEL is 31.5 or higher and simulator is 3.5 or greater. ASEL Flight time (31.5) + (3.5) Simulator = 35 Total Flight hours as required in CFR Part 141 Appendix "C" 4 (b) The maximum simulator time approved by the FAA letter for the Redbird AATD FMX 1000 is 3.5 hours. See the FAA authorization letter in Appendix A Diagram 5.
- Pre & Post ground briefing in the flight training program are recommended amounts of time and may be less than 32 total hours.

STAGE ONE – BASIC INSTRUMENT FLYING

18.4 TOTAL FLIGHT TRAINING TIME
15.0 HOURS TOTAL PRE/POST

1. **STAGE ONE OBJECTIVE:** The student will be instructed in the basic flying procedures and skills necessary for basic instrument flying.

2. **STAGE ONE COMPLETION STANDARDS:** The stage will be completed when the student satisfactorily passes the Stage One check and is able to conduct basic instrument flight maneuvers safely.

PRE & POST GROUND LESSON 1

2 HOUR GROUND BRIEF

LESSON REFERENCES:



Instrument Flying Handbook

Chapters 3, 4, 5, 6

FAR / AIM

FARs Part 91 - 91.205, 91.207, 91.213, 91.215, 91.411, and 91.413

AIM – Chapter 7 - Section 2 - Altimeter Setting Procedures



Airplane Flight Manual (AFM) or Pilot's Operating Handbook (POH)

Equipment Requirements

RECOMMENDED SEQUENCE:

Note: Students should read the corresponding reference materials listed above prior to start of Ground Lesson 1.

LESSON OBJECTIVES:

- To begin to apply the study material to getting into the aircraft and flying it with only reference to instruments. Student will become acquainted with the human factors, aerodynamic factors, flight instruments and their general operations/limitations, most importantly the student will become familiar with how to control the aircraft with ways to cross check and interpret the instruments.

ACADEMIC CONTENT:

- FAA Instrument and Equipment Requirements for IFR Operations
- Pilot's Operating Handbook (POH)

FLIGHT INSTRUMENTS

- Introduction
- Pitot-Static Systems
- Pitot-Static Instruments
- Compass Systems
- Gyroscopic Instruments
- Vacuum System

- Avidyne System vs 6 pack
- Instrument Systems Preflight Procedures

AIRPLANE ATTITUDE INSTRUMENT FLYING

CONTROL AND PERFORMANCE METHOD

- Control Instruments
- Performance Instruments
- Navigation Instruments
- Procedural Steps
- Attitude Control
- Power Control

PRIMARY AND SUPPORTING METHOD

- Pitch Instruments
- Bank Instruments
- Power Instruments

Managing Pitch, Power & Trim

- Establish Process to Determine Power Settings to Achieve Known Airspeeds
- Establish Pitch Attitudes for Climbs & Descents
- Review Attitude Indicator Markings

COMPLETION STANDARDS:

- Through oral quizzing demonstrate understanding of use of instruments to control aircraft by reference to only instruments. Student should have some basic idea how to establish known power settings to achieve desired airspeeds as well as where they will intend to initially establish pitch angles to achieve desired climb rates.

STUDY ASSIGNMENT:



Review of Ground Lesson 1

Instrument Flying Handbook

Chapters 3, 4, 5 & 6 Review

Read Chapter 7 Section 1 or 2 based on aircraft to be used for first flight.

FLIGHT LESSON 2

1.5 TOTAL FLIGHT TIME
OF WHICH:
1.5 HOUR DUAL FLIGHT
1.3 HOUR INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

- To establish practical knowledge of how each instrument works and relates to VR world they are coming in from
- Establish known power settings for different key airspeeds
- Improve general aircraft control through the proper use of trim, and improving overall coordination in establishing turns and controlled flight at slower airspeeds.
- To begin to develop instrument scanning techniques to quickly and accurately anticipate and control the aircraft
-

Note: All maneuvers are to be performed under the hood unless specified otherwise.

INTRODUCE:

PREFLIGHT ORIENTATION AND PREPARATION

- Briefing Process
- Bring Standard DUATS Briefing to Each Flight Lesson
- Making Go/No Go Decisions
- VFR Systems, Looking at Them for IFR
- Additional Inspection Compliances include Pitot Static, Transponder, VOR and GPS Currency
- Applying IMSAFE, DECIDE Check Lists to Each Flight

PREFLIGHT PROCEDURES

- VFR Flight vs IFR Flight-
Point out any items that might have become habit to skip as they did not apply to VFR
- Review of Aircraft Performance and Limitations
- Aircraft Servicing
- Cockpit Management
- Equipment Checks
- Engine Start and Warm up
- Avionics Setup
- Taxi Procedures
Hydroplane, ice patches, or ice coated taxi surfaces, Snow banks
- Pre-takeoff Checks
- Pre-takeoff Briefing
- Runway Incursions
*Fogged or frosted windows
Low visibility due to precipitation*

FUNDAMENTALS OF INSTRUMENT FLYING (FULL PANEL)

- Review all Aircraft Control (Pitch/Power/ Trim)
- Straight-and-Level Flight Relate VR to IR
- Standard-Rate Turns Relate VR to IR
- Turns at Different Bank Angles Relate VR to IR
- Flight at Key Airspeeds Noting Power Settings (IR)
- Establish Climbs and Level Offs (IR)
- Establish Descents and Level Offs (IR)
- Introduce Rate Climbs and Calibrate VSI to Prove How it Works at Varied Rates (IR)
- Turns Using the Turn Coordinator to Establish Rate (IR)
- Calibrate the Turn Coordinator to Show Timed Turns(IR)
- Establish Turns in Various Degrees of Bank Up to 45°(IR)
- Turns to Specific Headings - Emphasis on Leading Rollouts by 50% of Bank Angle (IR)

TAKEOFFS AND LANDINGS

- Normal IFR Takeoff (Setting Pitch Attitude)
- Traffic Pattern
- Normal Landing

COMPLETION STANDARDS:

Be able to explain in simple turns what instruments to use to establish a pitch change or attitude change
Be able to explain what order to perform inputs on the controls to change pitch and heading.
Be able to establish climbs and descents to a specified rate through the use of known power settings
Execute level offs ± 100 ft. Roll out from turns $\pm 10^\circ$
Student should have the ability to maintain specified altitude ± 150 ft. while not assigned a climb or decent.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

FLIGHT LESSON 3

1.5 HOUR TOTAL FLIGHT TIME
OF WHICH:
1.5 HOUR DUAL FLIGHT
1.3 INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

- Increase proficiency in full panel instrument flying
- Develop stall and spin awareness and proper use of recovery techniques while performing slow flight, stalls and unusual attitudes under simulated instrument conditions
- Continue to develop the scan and interpretations of the instruments
- Continue to develop students skills on smooth and coordinated flight control inputs
- Continue to improve ability to configure the aircraft from level flight to specified climbs and turns and then climbing turns.

Note: *All Flying is to be done IR unless otherwise specified.*

REVIEW:

PREFLIGHT PROCEDURES

- Preflight Briefing
- Preflight Inspection
- Cockpit Management
- Equipment Checks
- Taxi Procedures
- Pre-takeoff Checks
- Pre-takeoff Briefing

FUNDAMENTALS OF INSTRUMENT FLYING

(FULL PANEL)

- Review all Aircraft Control (Pitch, Power & Trim)
- Straight-and-Level Flight
- Standard-Rate Turns
- Turns at Different Bank Angles
- Flight at Key Airspeeds Noting Power Settings
- Establish Climbs and Level Offs
- Establish Descents and Level Offs
- Review Rate Climbs and Calibrate VSI to Prove it Works at Varied Rates.
- Turns Using the Turn Coordinator to Establish Rate
- Calibrate the Turn Coordinator to Show Timed Turns
- Establish Turns in Various Degrees of Bank Up to 45°
- Turns to Specific Headings - Emphasis on Leading Rollouts

INTRODUCE:

INSTRUMENT PREFLIGHT PROCEDURES

- Aircraft Systems Related to IFR Operations
- Aircraft Flight Instruments and Navigation Equipment
- Preflight Check of Instruments, Equipment, and Systems
- Instrument Cockpit Check
- IFR Takeoff Preparations
- Checking Instruments and Equipment at Engine Shutdown

STALL/SPIN AWARENESS INSTRUMENT TRAINING

- Maneuvering During Slow Flight
- Power-Off Stalls
- Power-On Stalls
- Recovery from Unusual Attitudes

COMPLETION STANDARDS:

- During the flight, the student should maintain altitude ± 150 feet, headings $\pm 15^\circ$, airspeed ± 15 knots.
- Student will be able to smoothly enter climbs, descents, and level off as directed. Student will level off ± 50 ft of specified altitude
- Student will show ability to perform stalls and recovery from stalls and unusual attitude situations without instructor assistance.
- Through use of proper rudder coordination in slow flight and stalls student will demonstrate awareness of proper control inputs avoiding any maneuver inducing a risk of a potential spin situation.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

Student study assignment will be to review AIM chapters 6-8
Instrument Flying Handbook chapter 1-7

Note: It will take some time and many reviews to really understand this material, you will need to read this multiple times and you will find new information to apply each time as you progress through your training.

FLIGHT LESSON 4

1.5 HOURS FLIGHT
OF WHICH:
1.5 HOURS DUAL FLIGHT
1.3 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

- Enhance proficiency in the listed full panel instrument maneuvers.
- Introduce advanced Attitude Instrument Flying techniques and advanced scanning exercises to further develop students ability take on higher workloads and dividing attention with precision between more and then less instruments.
- Helping student understand as work load increases the fixation or omission errors will become more of a challenge to overcome.
- Introduce partial panel instrument flying.

Note: *All Maneuvers are to be performed IR unless otherwise noted.*

REVIEW:

PREFLIGHT PROCEDURES

- Preflight Briefing
- Preflight Inspection
- Cockpit Management
- Equipment Checks
- Taxi Procedures
- Pre-takeoff Checks
- Pre-takeoff Briefing

FUNDAMENTALS OF INSTRUMENT FLYING

- Straight-and-Level Flight
- Standard-Rate Turns
- Turns at Different Bank Angles
- Steep Turns
- Flight at Various Drag Configurations

STALL/SPIN AWARENESS INSTRUMENT TRAINING (FULL PANEL)

- Maneuvering During Slow Flight
- Power-Off Stalls
- Power-On Stalls

INTRODUCE:

ADVANCED FUNDAMENTALS OF ATTITUDE

INSTRUMENT FLYING

- Instrument Take Off (Zero/Zero Simulated)
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns
- Pattern A (Appendix A Diagram 10)
- Vertical S Maneuver

PARTIAL PANEL INSTRUMENT FLYING

- Straight-and-Level Flight
- Standard-Rate Turns
- Timed Turns
- Magnetic Compass Turns
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns
- Recovery from Unusual Attitudes

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- Student will be able to perform constant rate climbs and descents as specified by instructor with use only of A/I and VSI with a timer be able to climb and descend to a specified altitude ± 50 Foot
- Student will be able to perform standard rate turns with student having the ability to turn to a specified heading with only the use of a timer and turn coordinator during the turn and rollout on desired heading. $\pm 10^\circ$
- The student will begin to recognize and understand the effect of instrument systems and equipment malfunctions.
- Recognize the change in instrument cross-check necessary to maintain aircraft control while using full and partial panel procedures.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

Student study assignment will be to review AIM chapters 6-8 Instrument Flying Handbook chapter 1-7

FLIGHT LESSON 5

1.5 HOURS TOTAL FLIGHT TIME
OF WHICH:
1.5 HOURS DUAL GIVEN
1.3 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

- Further develop full and partial panel instrument flying skills.
- Enhance the student's proficiency in dealing with related systems and equipment malfunctions.
- Introduce partial panel stalls and maneuvering during slow flight.

REVIEW:

INSTRUMENT PREFLIGHT PROCEDURES INSTRUMENT PREFLIGHT PREPARATION

FULL PANEL INSTRUMENT FLYING

- Straight-and-Level Flight Vertical S's
- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns
- Steep Turns Optional
- Recovery from Unusual Attitudes Optional

SYSTEMS AND EQUIPMENT MALFUNCTIONS

- Electrical System Failure
- Vacuum/Pressure Pump(s) Failure
- Gyroscopic Instrument Failures

PARTIAL PANEL INSTRUMENT FLYING

- Straight-and-Level Flight
- Standard-Rate Turns
- Timed Turns
- Magnetic Compass Turns
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns
- Recovery from Unusual Attitudes

INTRODUCE:

FLIGHT PATTERNS:

- Pattern B (Appendix A Diagram 11)
- Pattern C (Appendix A Diagram 12)

PARTIAL PANEL INSTRUMENT FLYING

- Maneuvering During Slow Flight
- Power-Off Stalls
- Power-On Stalls

POST FLIGHT PROCEDURES

- After Landing
- Parking and Securing the Aircraft
- Instrument Checks and Antennas

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will recognize and understand the effect of instrument systems and equipment malfunctions.
- The student will perform correct recovery techniques from unusual attitudes and stalls, using full and partial instrument reference.
- Student will use smooth and precise inputs to insure good control practices.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

FLIGHT LESSON 6

1.5 HOURS TOTAL FLIGHT TIME
OF WHICH:
1.5 HOURS DUAL GIVEN
1.3 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

This lesson will have the student demonstrate they have full control of the aircraft using good coordinated flight techniques with only reference to instruments. This lesson will be flown with an instrument takeoff (hood on at take-off) until they look up to land on short final. The student will demonstrate they have mastered attitude instrument flying and they are ready to proceed to more advanced skills.

REVIEW:

- INSTRUMENT PREFLIGHT PROCEDURES
- INSTRUMENT PREFLIGHT PREPARATION

FULL PANEL INSTRUMENT FLYING

- Straight-and-Level Flight
- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns
- Vertical S 180 Degrees each Direction with Climbs and Descents.

ATTITUDE INSTRUMENT FLYING

FULL & PARTIAL PANEL

- Straight-and-Level Flight
- Standard-Rate Turns
- Timed Turns
- Magnetic Compass Turns
- Maneuvering during Varied Speeds
Representing Approaches and Patterns,
Flight at Varied Drag Configurations, Should
be practiced at Cruise, 90, 80, 70, 60
Holding Configuration.
- Vertical S Maneuver Climbing and
Descending
- Pattern D (Appendix A Diagram 13)
- Pattern E (Appendix A Diagram 14)

POST FLIGHT PROCEDURES

- After Landing
- Parking and Securing the Aircraft
- Instrument Checks and Antennas

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will recognize and understand the effect of instrument systems and equipment malfunctions.
- The student will perform correct recovery techniques from unusual attitudes and stalls, using full and partial instrument reference.
- The student will be able to perform all turns to headings as directed by instructor with smooth inputs.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

PRE & POST GROUND LESSON 7

2.0 HOURS GROUND BRIEF

LESSON REFERENCES:



Instrument Flying Handbook
Chapter 7 - Navigation Systems
Chapter 10 - Holding Procedures

Aeronautical Information Manual
Chapter 1 - Navigation Aids. Chapter 4
Section 2 - Radio Communications
phraseology and techniques
Chapter 5 - Section 3, Paragraph 7 (5-3-7),
Holding.

LESSON OBJECTIVES:

- Learn the function, use, and limitations of VOR, DME, and ADF radio equipment for navigation.
- Become familiar with other types of instrument navigation including RNAV and GPS.

VOR's

- VOR Theory to Include Types of VOR's and How They Generally Work
- Distance Measuring Equipment (DME)
- Define and Apply Use of Following Terms
 - Radial
 - Course To
 - Intercept Radial Track Inbound
 - Intercept Radial Track Outbound
- How the Indicators in the Airplane Work
- Needle Movement if You Have a "To" Setting and Tracking To, then Same To Setting and Tracking From
- How to Use a VOR to Determine Your Location at Any Point in Time without any Other Nav Source.
- Time and Distance Calculations Based Current Position Without Any Other Nav Source
- Work Through Several Paper Examples Using a IFR Chart Place Your Position in Varied Locations and Have the Student Indicate What the CDI Needles Will Indicate in the Cockpit.
- Work through Several Paper Examples Where the Student Will be Able to Locate Current Position from Given CDI Needles.
- Tests and How We Know the VOR's are Safe to Use.
- Intercepting and tracking DME arcs

- GPS Navigation
- Components of the GPS System
- Types of Receivers Both Approved & Informational Only
- Explain WAAS and How that Changes the GPS Game
- Number Satellites in Orbit and How Many We Need to Navigate Safely
- How Do We Know We Have Safe GPS Signal to Use for Navigation
- Database Updates and What Happens if it is Out of Date in the Airplane.
- Functions of the GNS430 and Using it for GPS Navigation.
- Changing NAV Modes CDI Settings and OBS Button On the GNS430
- Course To and Bearing From
- Tracking To and From Waypoints

RNAV & ADF Navigation

- RNAV Use in Today's General Aviation Aircraft
- How RNAV has been Used and Why We See it Combined with GPS Most of the Time
- ADF System
- When Equipped How Does it Work
- How Glass Cockpit Will have a Way to Emulate this Type of Navigation and How the ADF Needle in the 6 Pack is Used.

COMPLETION STANDARDS:

- Student will be able to look at a position on a chart and give the general needle indications from different VOR's
- Student will be able to explain the GPS navigation system and what must be in place to use it for IFR navigation in route.

STUDY ASSIGNMENT:



FLIGHT LESSON 8

1.5 HOURS TOTAL FLIGHT TIME
OF WHICH:
1.5 HOURS DUAL GIVEN
1.5 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

VOR Navigation:

- Further develop full panel instrument flying skills.
- Gain an understanding of VOR orientation and radial interception and tracking, and DME arcs intercepting and tracking, and time and distance calculations.

REVIEW:

FULL PANEL INSTRUMENT FLYING

- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns
- Pattern I (Appendix A Diagram 15)

INTRODUCE:

USE OF NAVIGATIONAL EQUIPMENT

- VOR Checks (Airborne, Dual & Ground)
- VOR Orientation
- VOR Radial Interception
- VOR Tracking IB and OB exercises

Note: use OBS compass info, not "right/left of course" ie. "turn easterly to intercept" eliminates reverse sensing confusion

- Intercept and Track a DME Arc through 30 degrees or More (Not the ILS arc)
- Time, Speed and Distance Calculation

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will have an understanding regarding VOR and VOR radials and interception and tracking.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

FLIGHT LESSON 9

1.5 HOURS TOTAL FLIGHT TIME
OF WHICH:
1.5 HOURS DUAL GIVEN
1.5 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

GPS NAVIGATION

- Further develop full and partial panel instrument flying skills.
- Demonstrate an increase in proficiency regarding GPS and orientation as well as GPS course interception and tracking.
- The student will be introduced to tracking, and time and distance calculations with use of a GPS navigation system.

REVIEW:

INSTRUMENT PREFLIGHT PROCEDURES INSTRUMENT PREFLIGHT PREPARATION

FULL PANEL INSTRUMENT FLYING

- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns
- Pattern I (Appendix A Diagram 15)

PARTIAL PANEL INSTRUMENT FLYING

- Straight-and-Level Flight
- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Pattern E (Appendix A Diagram 14)

INTRODUCE:

USE OF NAVIGATIONAL EQUIPMENT

- GPS Checks
- GPS Orientation
- GPS Radial Interception
- GPS Tracking IB and OB Exercises
- Note: use OBS compass info, not "right/left of course" ie. "turn easterly to intercept" eliminates reverse sensing confusion*
- Intercept and Track a DME Arc through 30 Degrees or More (Not the ILS arc)
- Time, Speed and Distance Calculation

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will have an understanding regarding GPS and GPS radials and interception and tracking.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

SIMULATOR LESSON 10

1.5 HOURS TOTAL FLIGHT TRAINER TIME
OF WHICH:
1.5 HOURS DUAL FLIGHT TRAINER
1.5 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

NDB NAVIGATION

- Further develop full and partial panel instrument flying skills.
- Demonstrate an increase in proficiency regarding GPS and orientation as well as GPS course interception and tracking.
- The student will be introduced to tracking, and time and distance calculations with use of a GPS navigation system.

Note: 3.5 hours is the maximum creditable Advanced Aviation Training Device per 14 CFR Part 141 Appendix "C" and approved by the FAA authorization letter for the Redbird AATD FMX 1000. See **Appendix A Diagram 5**.

REVIEW:

INSTRUMENT PREFLIGHT PROCEDURES INSTRUMENT PREFLIGHT PREPARATION

FULL PANEL INSTRUMENT FLYING

- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns

Note: 2 vertical S maneuvers to warm up. Once the performance is up to speed, move right into the navigation section.

INTRODUCE:

USE OF NAVIGATIONAL EQUIPMENT

- NDB Checks
- NDB Orientation
- NDB Bearing Interception
- NDB Tracking IB and OB exercises
- Time, Speed and Distance Calculation

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will have an understanding regarding NDB and NDB radials and interception and tracking.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

SIMULATOR LESSON 11

1.5 HOURS TOTAL FLIGHT TRAINER TIME
OF WHICH:
1.5 HOURS DUAL FLIGHT TRAINER
1.5 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

- Further develop ADM skills to be able to calmly respond to emergencies and make confident decisions.
- Being able to keep non-emergency situations from turning into emergencies.

Note: 3.5 hours is the maximum creditable Advanced Aviation Training Device per 14 CFR Part 141 Appendix "C" and approved by the FAA authorization letter for the Redbird AATD FMX 1000. See **Appendix A Diagram 5**.

Review:

PARTIAL PANEL INSTRUMENT FLYING

- Straight-and-Level Flight
- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Pattern I (Appendix A Diagram 15)

INTRODUCE:

ENGINE PROBLEMS

- Oil Pressure/Temperature Scenario
- Drop in RPM (Carb Heat)
- Low Fuel Indicator (One Tank Losing Fuel from Fuel Sump)
- Engine Failure Due to Failed Engine-Driven Pump)

ELECTRICAL FAILURE

- Single Item Failure (Radio, MFD, Transponder, Turn Coordinator)
- Alternator Failure (Either Avidyne (Discuss) or 6 Pack)
- Communication Failure (Broken Jacks, With and Without Hand Held Mic in Plane)
- Total Electrical Failure

VACUUM FAILURE

- Heading Indicator Failure
- DG Failure
- Vacuum Pump Failure

PITOT/STATIC FAILURE

- Airspeed Indicator at Zero
- Airspeed Indicator Acts Like Altimeter
- Static Port Blocked With Ice or Other Object

PFD/MFD FAILURES

- What's Lost With PFD Failure
- What's Lost With MFD Failure
- Actions to Take

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will have an understanding regarding a variety of emergencies that they may encounter.
- The student will manage various emergencies in a methodical, calm manner being able to identify and rectify the situation.
- Student should demonstrate confidence handling the different emergencies as they arise.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

PRE & POST GROUND LESSON 12

2.0 HOURS GROUND BRIEF

LESSON REFERENCES:



Instrument Flying Handbook
Chapter 7 - Navigation Systems
Chapter 10 - Holding Procedures

Aeronautical Information Manual
Chapter 1 - Navigation Aids
Chapter 4 - Section 2, Radio
Communications phraseology and
techniques
Chapter 5 - Section 3, Paragraph 7 (5-3-7),
Holding

LESSON OBJECTIVES:

- The student will become fully acquainted with holding procedures as well as ATC procedures related to holding. When lesson is completed student will be ready to go practice holding using VOR, GPS and NDB navigation systems.

HOLDING PROCEDURES

- Why do we hold?
- Types of Holds (Standard vs Nonstandard)
- Nav Aids Used to Hold at or Support Your Position
 - VOR, GPS, NDB
- How to Draw out a Non-published Hold
- Holding at Intersections
- Holding at Stations
- Holding at Waypoints
- How to Enter the Hold
- Speed for Holding
- Expect Further Clearance Time
- Expected Phraseology the Controller Will Use
When Assigning You a Hold
- Holding Made Easy (simple tools to quickly get the
right entry every time in 10 seconds or less)

HOLDING PROCEDURES

- Standard Holding Pattern
- Nonstandard Holding Pattern
- Outbound and Inbound Timing
- Crosswind Correction
- Maximum Holding Speed
- Holding Entry Procedures
- ATC Holding Instructions

COMPLETION STANDARDS:

- Student will be able to take a known position and instructions given using ATC phraseology and turn it into a diagram of a hold as instructed and then from their known position be able to state the correct holding entry and lengths/times as appropriate for the instructions given.

STUDY ASSIGNMENT:



SIMULATOR LESSON 13

1.5 HOURS TOTAL FLIGHT TRAINER TIME
OF WHICH:
1.5 HOURS DUAL FLIGHT TRAINER
1.5 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

- Further develop full and partial panel instrument flying skills regarding VOR/NDB/GPS orientation as well as VOR/NDB/GPS radial or bearing intercepting and tracking, and DME arc intercepting and tracking, and time and distance calculations.
- Continue to develop the ability to add more work load in the cockpit while maintaining precise control of the aircraft.
- The student should become familiar with VOR/ NDB/GPS standard and nonstandard holding procedures, as well as the procedures required to enter a holding pattern.

Note: 3.5 hours is the maximum creditable Advanced Aviation Training Device per 14 CFR Part 141 Appendix "C" and approved by the FAA authorization letter for the Redbird AATD FMX 1000. See **Appendix A Diagram 5.**

REVIEW:

NDB and RMI

- NDB Tracking vs. Homing
- Crab Correcting on Track
- NDB Orientation
- NDB Bearings – Relate to GPS Bearings
- NDB Course Intercepting IB and OB

INTRODUCE:

HOLDING PROCEDURES

- Entry Procedures in a Holding Pattern
- Standard VOR Holding
- Nonstandard VOR Holding
- Standard NDB Holding
- Nonstandard NDB Holding
- Standard GPS Hold
- Nonstandard GPS Hold
- Intersection Holding
- Waypoint Holding

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will demonstrate the ability to precisely control the aircraft while working to calculate various holding positions and with those holds determining and entering them in accordance to FAA prescribed methods.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

FLIGHT LESSON 14

1.7 HOURS TOTAL FLIGHT TIME
OF WHICH:
1.7 HOURS DUAL GIVEN
1.5 HOURS INSTRUMENT INSTRUCTION
.5 PRE/POST

LESSON OBJECTIVES:

- The student will have the opportunity to fly all navigation exercises which will include VOR intercepts and tracking, DME Arcs, GPS tracking
- Student will practice all different types of holds in flight. The flight will go out with a flight scenario that will allow the student to fly a plan and demonstrate precise control of the airplane while working through the additional work load with ATC tracking and holding instructions as presented by the instructor.
- Review all Basic instrument attitude flying maneuvers from the beginning of the stage in preparation for Stage Check.

Note: If the aircraft is not equipped with a NDB the Instructor will substitute the GPS in a Glass aircraft with the use of an RMI to simulate the NDB.

REVIEW:

INSTRUMENT PREFLIGHT PROCEDURES

- Aircraft Systems Related to IFR Operations
- Aircraft Flight Instruments and Navigation Equipment
- Preflight Check of Instruments, Equipment, and Systems
- Instrument Cockpit Check
- IFR Takeoff Preparations
- IFR Take Off (Zero/Zero Simulated)

HOLDING PROCEDURES

- Entry Procedures in a Holding Pattern
- Standard or Nonstandard VOR Holding
- Timing Procedures
- Aircraft Configuration
- Notifies ATC at Proper Time
- Accepts, Reads Back and Complies with ATC Clearance for the Hold

Note: Expectation is to do at least 4 different holds on this flight. Different nav sources should be used and one hold should be standard and the other nonstandard. Instructor should use intersection and made up fixes to give maximum experience to the student.

FULL/PARTIAL PANEL INSTRUMENT FLYING

- Straight-and-Level Flight
- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Pattern I (Appendix A Diagram 15)
-

- Climbing and Descending Turns
- Timed Turns
- Magnetic Turns to a Specific Heading

Note: This is the last flight prior to the Stage check. Instructor needs to make sure all Basic Attitude Instrument skills are tuned up at this time.

PERFORMANCE MANEUVERS AND AIR WORK

- Steep Turns
- Maneuvering During Slow Flight
- Power On Stall
- Power Off Stall
- Recovery from Unusual Attitude

SYSTEMS AND EQUIPMENT MALFUNCTIONS

- Electrical System Failure
- Vacuum/Pressure Pump Failure or EFIS Failure
- Gyroscopic Instrument Failures

USE OF NAVIGATIONAL EQUIPMENT

- VOR Checks
- VOR Orientation
- VOR Radial Interception and Tracking
- Interception and Tracking of DME Arcs (Using GPS or DME as equipped)

POST FLIGHT PROCEDURES

- After Landing
- Checking Instruments and Equipment at Engine Shutdown
- Parking and Securing the Aircraft
- Instrument Checks and Antennas

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will demonstrate the necessary skills and knowledge to perform the correct holding pattern entries and procedures for standard and nonstandard holding patterns.
- The student will exhibit basic understanding and ability to fly standard and nonstandard, intersection and DME holding patterns.
- Student will demonstrate the ability to establish an intercept plan and execute that plan and further continue to fly a specified DME arc ± 1 mile of specified arc distance
- At no time should the outcome of the designated intercepts, hold position, or DME arc be in doubt of the outcome.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON
Assign Basic Instrument Exam to be completed before next lesson

PRE & POST GROUND LESSON 15

2.0 HOURS GROUND BRIEF

LESSON REFERENCES:



Instrument Flying Handbook

Chapter 5 - Airplane Basic Flight Maneuvers
Chapter 11 - Emergency Operations – Aircraft System Malfunctions
Chapter 7 - Navigation Systems.

Aeronautical Information Manual

Chapter 1 - Navigation Aids

LESSON OBJECTIVES:

- Review all the Academic Content that was presented through all of Stage 1 in preparation of the Stage 1 check
- Review POH items that are specific to IFR flight or that has a different procedure with instrument operations
- Review maintenance and related inspections that must be done for safe IFR operation

ACADEMIC CONTENT:

INSTRUMENT SCANNING METHODS

FLIGHT INSTRUMENTS

- Pitot-Static Systems
- Pitot-Static Instruments
- Compass System & Errors
- Vacuum System
- Gyroscopic Systems
- Flight Director Systems
- Instrument Systems Preflight Procedures

CONTROL AND PERFORMANCE SCAN METHOD

PRIMARY AND SUPPORTING SCAN METHOD

AIRCRAFT SYSTEM MALFUNCTIONS

- Alternator/Generator Failure
- Instrument Failure
- Pneumatic System Failure
- Pitot-Static System Failure
- Coping with the Instrument Failure
- Partial Panel Flying
- Unusual Attitudes (Partial Panel)
- PFD Failures (Partial Panel by Standby Instruments)

HOLDING PROCEDURES

- Standard Holding Pattern
- Nonstandard Holding Pattern
- Outbound and Inbound Timing
- Crosswind Correction
- Maximum Holding Speed
- Holding Entry Procedures
- ATC Holding Instructions

NAVIGATION SYSTEMS

- Introduction
- Basic Radio Principles
- Non-Directional Radio Beacon (NDB)
- Very-High Frequency Omnidirectional Range (VOR)
- Distance Measuring Equipment (DME)
- Area Navigation (RNAV)
- Global Position System (GPS)
- Instrument Approach Systems
- Radar Navigation (Ground Based)

Basic Instrument Exam ($\geq 70\%$ required)

COMPLETION STANDARDS:

- Demonstrate the ability to apply the knowledge gained throughout this stage of the training to prepare an airplane for an IFR flight, know how to prepare themselves and their aircraft.
- Be able to work through VOR orientation scenarios as given by giving current position and what the needle indications in the cockpit will be.
- Using ADM skills be able to diagram and solve holding challenges wherever they may pop up.
- Pass the Basic Instrument Exam with a score of $\geq 70\%$.

STUDY ASSIGNMENT:



Review of Ground Lesson 1, 7 & 12

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STAGE CHECK - FLIGHT 16

STAGE CHECK 1 – Basic Instrument Flying

1.7 HOURS TOTAL FLIGHT TIME
OF WHICH:
1.7 HOURS DUAL GIVEN
1.5 HOURS INSTRUMENT INSTRUCTION
1.5 PRE/POST

LESSON OBJECTIVES:

- The Chief Flight Instructor, the Assistant Chief Flight Instructor or a designated Check Flight Instructor will evaluate the student's proficiency in the proper execution of the instrument maneuvers and instrument procedures listed below.

Note: If the aircraft is not equipped with an NDB the Check Pilot may substitute with the GPS in a Glass aircraft with the use of an RMI to simulate the NDB.

INSTRUMENT PREFLIGHT PROCEDURES

- Aircraft Systems Related to IFR Operations
- Aircraft Flight Instruments and Navigation Equipment
- Preflight Check of Instruments, Equipment, and Systems
- Instrument Cockpit Check
- IFR Takeoff Preparations

FULL PANEL BASIC ATTITUDE INSTRUMENT FLYING

- Straight-and-Level Flight
- Standard-Rate Turns
- Turns at Different Bank Angles
- Constant Airspeed Climbs and Descents
- Constant Rate Climbs and Descents
- Climbing and Descending Turns
- Pattern I (Appendix A Diagram 15)

PARTIAL PANEL BASIC ATTITUDE INSTRUMENT FLYING

- Timed Turns
- Magnetic Compass Turns
- Pattern D (Appendix A Diagram 13)

PERFORMANCE MANEUVERS AND AIR WORK

- Given Airspeed - Establish Proper Power to Achieve AS
- Maneuvering During Slow Flight
- Power On Stall
- Power Off Stall
- Recovery from Unusual Attitude

HOLDING PROCEDURES (FULL/PARTIAL PANEL)

- Entry Procedures in a Holding Pattern
- Standard or Nonstandard VOR Holding
- Timing Procedures
- Aircraft Configuration
- Notifies ATC at Proper Time
- Accepts, Reads Back and Complies with ATC Clearance for the Hold

Note: Expectation is to do at least 2 different holds on this stage check. Different nav sources should be used and one hold should be standard and the other non standard. In the event the student is graded a "I" on holding, Check Pilot needs to be specific what type of holding was good and which hold would need to be retested.

SYSTEMS AND EQUIPMENT MALFUNCTIONS

- Electrical System Failure
- Vacuum/Pressure Pump Failure
- Gyroscopic Instrument Failures

USE OF NAVIGATIONAL EQUIPMENT

- VOR Checks Preflight
- VOR Orientation
- VOR Radial Interception and Tracking
- Interception and Tracking of DME Arcs
- Time, Speed and Distance Calculations
- GPS Bearing Interception and Tracking
- GPS to emulate ADF

POST FLIGHT PROCEDURES

- Checking Instruments and Equipment at Engine Shutdown Post Flight Items

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will demonstrate the necessary skills and knowledge to perform the correct holding pattern entries and procedures for standard and nonstandard VOR, GPS and NDB (if equipped) holding patterns.
- Student will demonstrate the ability to intercept and precisely fly any requested DME arc ± 1 mile from stated DME.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

STAGE TWO – INSTRUMENT APPROACHES/CROSS COUNTRY

24.5 HOURS TOTAL FLIGHT TRAINING TIME
17 HOURS TOTAL PRE/POST TRAINING TIME

1. **STAGE TWO OBJECTIVES:** The student will be instructed in the conduct of cross-country flights in an airplane using all available resources to an instrument pilot. In addition, the student will gain further knowledge of previously reviewed flight maneuvers/procedures and will be introduced to further maneuvers/procedures and emergency situations pertaining to IFR flight.

2. **STAGE TWO COMPLETION STANDARDS:** The stage will be completed when the student Demonstrates through stage check and records that he/she can safely conduct instrument flight safely and is able to meet or exceed all requirements of the Instrument Rating for an Airplane Practical Test Standards.

PRE & POST GROUND LESSON 17

2.0 HOURS GROUND BRIEF

LESSON REFERENCES:



Instrument Flying Handbook

Departure Procedures (DPs), Chap 8-10 and Chap 10-5.
Standard Terminal Arrival Procedures (STARs) Chap 8-13.
Instrument Approach Procedure Charts (IAPs), Chap 8-13.
Approaches, Chap 10-13.
Non-Directional Beacon (NDB), Chapter 7-3.
Very High Frequency Omnidirectional Range (VOR), Chap 7-8
Instrument Approach Systems, Chap 7-27
Area Navigation (RNAV), Chap 7-17
Aeronautical Information Manual (AIM)
Chapter 5, Section 2, Departure Procedures.
Chapter 5, Section 4, (5-4-1 through 5-4-27)
INSTRUMENT PROCEDURES HANDBOOK
FAA AERONAUTICAL CHART USER'S GUIDE

LESSON OBJECTIVES:

- Learn the format and symbols used to present information on charts.
- The student will begin to learn how to interpret and use information published on instrument approach charts.
- Gain a working knowledge of IFR procedures.

DEPARTURE CHARTS

- Instrument Departure Procedures (DP's and ODP's)
- Pilot Navigation Instrument Departure Procedure
- Vector Instrument Departure Procedure
- Chart Format and Symbols

DEPARTURE PROCEDURES

- Takeoff Minimums
- Departure Options
- IFR Departure Procedures
- Radar Departures
- VFR Departures
- RNAV Departures
- Selecting a Departure Method

ARRIVAL CHARTS

- Standard Terminal Arrival Route (STAR)
- Interpreting the STARs
- Vertical Navigation Planning
- RNAV Arrival

ARRIVAL PROCEDURES

- Preparing for the Arrival
- Reviewing the Approach
- Altitude
- Airspeeds/Power Settings at Various Points of an Approach

APPROACH SEGMENTS

- Initial Approach Segment
- Intermediate Approach Segment
- Final Approach Segment
- Missed Approach Segment

APPROACH CHART LAYOUT

- Heading Section
- Plan View
- Profile View
- Step Down Fix and VDP
- Landing Minimums
- Aircraft Approach Categories
- Minimum Descent Requirements
- Visibility Requirements
- Inoperative Components
- Heading Section
- Plan View and Additional Runway Information
- Takeoff and Alternate Minimums

VOR AND NDB APPROACHES

- VOR Approach Procedures
- Operating Principles
- VOR/DME RNAV Approaches
- Off-Airport Facility
- On-Airport Facility
- VOR/DME Approach Procedures
- NDB Approach Procedures
- Radar Vectors to the Approach

GPS APPROACHES

- Approach Design
- GPS Approaches
- GPS Equipment Requirements
- The Navigation Database
- Special GPS Navigation Considerations
- GPS Overlay Approach
- GPS Stand Alone Approach
- Vectors to a GPS Approach

MISSED APPROACHES

- Clearance and the Format
- Procedure when Missed is to be Executed
- Reporting Points
- Execution

COMPLETION STANDARDS:

- The Student will be able to brief a complete approach from the point of deciding which approach to request to what steps to take in preparation through the execution of the procedure.
- Will be able to verbally list the components of a VOR and GPS approach and what is required of the aircraft to perform each.
- Will be able to verbally go through expectation for executing a missed approach procedure.

SIMULATOR LESSON 18

1.8 HOUR TOTAL FLIGHT TRAINER TIME
OF WHICH:
1.8 HOUR DUAL FLIGHT TRAINER
1.8 HOUR INSTRUMENT INSTRUCTION
PRE/POST .2

LESSON OBJECTIVES:

- Obtain the knowledge necessary to successfully plan an IFR flight and recognize the factors related to effective decision making.
- In the simulator practice instrument departure and arrival procedures learned in ground lesson 17.
- Practice flying GPS, VOR and NDB approaches.
- Practice executing missed approach procedures in various weather conditions.

Note: 3.5 hours is the maximum creditable Advanced Aviation Training Device per 14 CFR Part 141 Appendix "C" and approved by the FAA authorization letter for the Redbird AATD FMX 1000. See **Appendix A Diagram 5**.

REVIEW:

- VOR Radial Intercepts and Tracking
- VOR Holding
- GPS Holding
- GPS Tracking
- GPS Holding
- NDB Tracking
- NDB Holding

INTRODUCE:

VOR APPROACH

- Setup and Briefing the Approach
- ATC Clearance
- Preparing for Missed Approach
- Procedure Turn
- Course Reversal Procedure
- Radar Vectors No Course Reversal
- Circle to Land Minimums
- Straight-in Minimums
- VOR A Approach
- VOR DME Approach

GPS APPROACH

- Setup and Briefing the Approach
- ATC Clearance
- Preparing for Missed Approach
- Procedure Turn
- Course Reversal Procedure
- Radar Vectors No Course Reversal
- Circle to Land Minimums
- Straight-in Minimums
- GPS A Approach

NDB APPROACH

- Setup and Briefing the Approach
- ATC Clearance
- Preparing for Missed Approach
- Procedure Turn
- Course Reversal Procedure
- Radar Vectors No Course Reversal
- Circle to Land Minimums
- Straight-in Minimums
- NDB A Approach
- Technique for Wind Correction Tracking the Bearing To

MISSED APPROACH PROCEDURES

- ATC Clearance
- Expect Further Clearance Time
- ADM When to Execute Missed Procedure
- Navigating and Managing the Missed Approach

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots,
- The student will demonstrate the necessary skills and knowledge to perform the correct holding pattern entries and procedures
- On the final approach segment the student should maintain heading $\pm 10^\circ$, airspeed ± 10 knots, and altitude that is not more than 100 feet above and 0 feet below the MDA.
- Student should demonstrate good ADM skills in determining when it is appropriate to execute a missed approach. ADM skills will be demonstrated in managing the descent on a circling approach from MDA to land.

SIMULATOR LESSON 19

1.5 HOURS TOTAL FLIGHT TIME
OF WHICH:
1.5 HOURS DUAL FLIGHT
1.3 HOURS INSTRUMENT INSTRUCTION
PRE/POST .5

LESSON OBJECTIVES:

- Obtain the knowledge necessary to successfully plan an IFR flight and recognize the factors related to effective decision making.
- In flight practice instrument departure and arrival procedures taking off and departing in simulated varied conditions.
- Practice flying GPS and VOR approaches.
- Practice executing missed approach procedures
- Practice Holding procedures

REVIEW:

HOLDING PROCEDURES

(FULL/PARTIAL PANEL) (pick 2 different holds)

- Entry Procedures in a Holding Pattern
- Standard and/or Nonstandard VOR Holding
- Standard and/or Nonstandard Intersection Holding
- Standard and/or Nonstandard DME Holding (If Airplane so Equipped)
- VOR Tracking and Intercepts
- VOR Positional Orientation
- Tracking VOR To vs From and Situational Awareness.

INTRODUCE:

VOR APPROACHES

- VOR Approach
- Approach Procedures to Straight-in Landing Minimums
- Missed Approach Procedures
- Landing from a Straight-in Approach Procedure
- Circle to Land Procedure

GPS APPROACHES

- GPS Approach
- Approach Procedures for Circling Landing Minimums
- Landing from a Circling Approach Procedure
- Straight-in to Land Procedure

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots,
- The student will demonstrate the necessary skills and knowledge to perform the correct holding pattern entries and procedures
- On the final approach segment the student should maintain heading $\pm 10^\circ$, airspeed ± 10 knots, and altitude that is not more than 100 feet above and 0 feet below the MDA.
- Student should demonstrate good ADM skills in determining when it is appropriate to execute a missed approach. ADM Skills will be demonstrated in managing the descent on a circling approach from MDA to landing.

PRE & POST GROUND LESSON 20

2.0 HOURS GROUND BRIEF

LESSON REFERENCES:



Instrument Flying Handbook

Chapter 9 Instrument Approach systems
9-35 thru 9-43 ILS operations.
AIM Chapter 5 section 2 & 4 (review)
Instrument Procedures Handbook Chapters 1-4
INSTRUMENT PROCEDURES HANDBOOK
FAA AERONAUTICAL CHART USER'S GUIDE

LESSON OBJECTIVES:

- Learn the format and symbols used to present information on charts.
- The student will begin to learn how to interpret and use information published on instrument approach charts.
- Gain a working knowledge of IFR procedures.

PRECISION APPROACH PROCEDURES

- Design of ILS Approaches
- Course Sensitivity
- DME Arcs
- Vectors for ILS
- Course Correction Requirements (small corrections)
- Glide Slope Intercept (Varies with Altitude You are Flying)
- Stabilized Descent – Power Setting/Airspeed/Vertical Speed
- Decision Height/Decision Altitude

LOCALIZER ONLY APPROACHES

- In Lieu of ILS
- LDA and SDF
- Stabilized Descent – Power Setting/Airspeed/Vertical Speed
- Missed Approach Point
- Execute Missed Procedure
- Circling Procedures

LOCALIZER BACK COURSE

- Importance of Setting Course to Front Course Inbound
- Reading Course Correction Properly (Reverse Sensing-OBS and HSI) Read Course Correction in Magnetic Direction (Correct to the North or Correct to the South - instead of turn opposite of needle right or left)
- Stabilized Descent for Non-Precision

- Missed Approach Procedures
- Circling Approach Procedures

GPS WAAS (If Trainer is Equipped)

- How to Know if Your GPS is WAAS Capable
- Differences of Precision and Non-Precision GPS Approaches
- Missed Approach Point vs. Decision Altitude
- Missed Approach Procedure
- What Suspend Mode Is and When to Turn It Off
- GPS Hold From Missed

APPROACH SEGMENTS

- Initial Approach Segment
- Intermediate Approach Segment
- Final Approach Segment
- FAF – Glide Slope Intercept vs. Localizer Only Intercept
- Missed Approach Segment

APPROACH CHART LAYOUT FOR ILS/GPS/LOCs

- Heading Section
- Plan View
- Profile View
- Step Down Fix and VDP
- Landing Minimums
- Aircraft Approach Categories
- Minimum Descent Requirements
- Visibility Requirements
- Inoperative Components
- Heading Section
- Plan View and Additional Runway Information
- Takeoff and Alternate Minimums

MISSED APPROACHES FOR ILS/GPS/LOCs

- Clearance and the Format
- Missed Approach Point
- Reporting Points
- Execution

COMPLETION STANDARDS:

- The Student will be able to brief a complete approach from the point of deciding which approach to request to what steps to take in preparation through the execution of the procedure.
- Will be able to verbally list the components of an ILS, LOC and GPS WAAS approach and what is required of the aircraft to perform each.
- Will be able to verbally go through expectation for executing a missed approach procedure.

SIMULATOR LESSON 21

1.8 HOUR TOTAL FLIGHT TRAINER TIME
OF WHICH:
1.8 HOURS DUAL FLIGHT TRAINER
1.8 HOUR INSTRUMENT INSTRUCTION
PRE/POST .2

LESSON OBJECTIVES:

- The student will increase proficiency in performing aircraft control, timely power adjustments, staying ahead of the aircraft.
- The student will increase proficiency in performing holding patterns and the procedures required to enter a holding pattern.
- Introduce ILS and Localizer (Front Course) approaches
Localizer Back Course and GPS approaches.

Note: 3.5 hours is the maximum creditable Advanced Aviation Training Device 14 CFR Part 141 Appendix "C" and approved by the FAA authorization letter for the Redbird AATD FMX 1000. See **Appendix A Diagram 5**.

REVIEW:

GPS APPROACH

- GPS Approach
- Check Cycling Enroute/Terminal/Approach Modes
- NoPT IAF Segments
- When to use the Holding IAF
- Missed Approach Procedures
- Holding Procedures
- Landing Straight-in and/or Circling

INTRODUCE:

ILS/LOCALIZER APPROACHES

- ILS and/or Localizer (Front Course) Approach
- ILS/DME Arc Approach (If Airplane so Equipped)
- Localizer Intercept Sensitivity
- Approach Procedures to Straight-in and/or Circling Landing Minimums
- Missed Approach Procedures
- Landing from a Straight-in and/or Circling Approach Procedure

LOCALIZER BACK COURSE APPROACH

- Back Course Localizer Approach
- Reverse Sensing
- Setting OBS to Front Course Inbound
- Missed Approach Procedure or Landing Straight-in or Circling

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will demonstrate the necessary skills and knowledge to perform ILS and Localizer (Front Course and Back Course) approaches, missed approach and holding procedures.
- On the final approach segment the student will maintain heading $\pm 10^\circ$, airspeed ± 10 knots, and altitude that is not more than 100 feet above and 0 feet below the MDA.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

FLIGHT LESSON 22

1.5 HOUR TOTAL FLIGHT TIME
OF WHICH:
1.5 HOURS DUAL FLIGHT
1.3 HOUR INSTRUMENT INSTRUCTION
PRE/POST .5

LESSON OBJECTIVES:

- The student will gain proficiency in performing ILS and Localizer Courses and increase proficiency in performing GPS approaches, holding patterns and the procedures required to enter a holding pattern.
- Introduce the student to Partial Panel ILS approaches.

REVIEW:

APPROACHES: *(Pick minimum 3 approaches)*

- ILS Approach – Optional DME Arc
- Localizer Approach
- GPS WAAS Approach (if Aircraft Equipped)
- GPS Approach with Hold or Procedure Turn
- Approach Procedures to Straight-In and/or Circling Landing Minimums
- Missed Approach Procedures

- Landing from a Straight-in and/or Circling Approach Procedure

APPROACHES (3)

- Localizer Approach
Location _____
- GPS Approach
Location _____
- ILS Partial Panel Approach
Location _____

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will demonstrate the necessary skills and knowledge to perform Localizer and GPS approaches, missed approach and holding procedures.
- On the final approach segment the student should maintain heading $\pm 10^\circ$, airspeed ± 10 knots, and altitude that is not more than 100 feet above and 0 feet below the MDA.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

PRE & POST GROUND LESSON 23

2.0 HOURS GROUND BRIEF

LESSON REFERENCES:



Instrument Flying Handbook

Chapter 10
Instrument Procedures Handbook
Appendix A Emergency Procedures
AIM Chapter 4 Section 2 Communications
Phraseology Techniques. Chapter 8 Human
medical factors
FAA Aeronautical Chart User's Guide

LESSON OBJECTIVES

- Student will be able to use an enroute chart.
- Student will learn to apply weather considerations in determining a route, organization of all materials, weather reports, route of flight, navigation capabilities and availability.
- Student will gain a working knowledge of IFR enroute procedures.
- Student will gain knowledge in communication techniques with ATC. Will expand knowledge in expected clearance formats and readbacks as it relates to IFR clearances for approaches and general handling during IFR operations
- Student will learn to prepare for emergency situations.

INTRODUCE:

- ATC Communications
- How to Contact ATC
- Listen Before You Transmit
- Aircraft Call Signs
- Protocol to Shorten Call Sign
- Expectations when Direction is given by ATC
- Handling Clarification of Instructions
- Radar Vectors vs Own Navigation Communications
- When to Switch Over to CTAF vs Staying with Approach/Center

ENROUTE CHARTS:

- Navigation by Airways vs. Direct
- Symbols
- Altitudes – MEA, MOCA, MCA, MRA, OROCA, etc.
- Center Sectors
- Obtaining Weather Enroute

SIDS AND STARS:

- Purpose of SIDS and STARS
- Read a SID and STAR
- Symbols
- Altitudes

EMERGENCIES:

- Partial Panel
- No Gyro Approaches
- SAR Approaches
- System Failures
- Instrument Failures
- Communication Failure
- Electrical Failure
- Engine Failure

COMPLETION STANDARDS:

- The student will know how to plan an IFR flight with information from an enroute chart.
- The student will be able to choose a route based on weather, aircraft limitations, & fuel requirements.
- The student will be able to verbally explain aircraft system failures and appropriate actions to ensure a safe outcome of any flight.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

SIMULATOR LESSON 24

1.5 HOUR TOTAL FLIGHT TRAINER TIME
OF WHICH:
1.5 HOURS DUAL FLIGHT TRAINER
1.5 HOUR INSTRUMENT INSTRUCTION
PRE/POST .5

LESSON OBJECTIVES:

- The student will gain proficiency in partial panel control.
- The student will gain experience and develop good ADM skills in emergency situations.
- The student should understand the ATC system and services available.

Note: 3.5 hours is the maximum creditable Advanced Aviation Training Device 14 CFR Part 141 Appendix "C" and approved by the FAA authorization letter for the Redbird AATD FMX 1000. See **Appendix A Diagram 5**.

INTRODUCE:

PARTIAL PANEL:

- Precision Approach
- Non-Precision Approach(es)
- ASR and No Gyro Approach Vectors
- Missed
- Holding
- Straight-in
- Circling

EMERGENCY PROCEDURES:

- Communication Failure
- System Failure
- Instrument Failure
- Engine Failure
- Oil Pressure Low or Failed
- Mode C Failure
- Mag Failure
- Icing Accumulating
- Flying into an Area of Precipitation Start Light then Progress to Severe.
- Scenario that Would Cause the Student to Maintain Va While Dealing with Situation.

COMPLETION STANDARDS:

- The student will fly approaches partial panel and maintain altitude ± 100 feet, heading $\pm 10^\circ$, airspeed ± 10 kts on the approach.
- The student will be able to take appropriate actions using knowledge of aircraft systems and appropriate emergency checklists.
- Student will take appropriate actions to ensure a safe outcome of the flight.
- Student will demonstrate good ADM skills in handling the various emergencies insuring that the decision made would not create a new problem or make the situation worse.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

FLIGHT LESSON 25

1.5 HOUR TOTAL FLIGHT TIME
OF WHICH:
1.5 HOURS DUAL FLIGHT
1.3 HOUR INSTRUMENT INSTRUCTION
PRE/POST .5

LESSON OBJECTIVES:

- The student should demonstrate increased proficiency in performing aircraft control, timely power adjustments, staying ahead of the aircraft.
- The student should demonstrate increased proficiency in performing Precision and Non-Precision Approaches.
- Student should perform holding patterns and the understand procedures required to enter a holding pattern and determine and enter using the appropriate holding entry.

Note: Only need 2 landings 1 straight in and 1 Circling. Minimum of 1 holding total for the lesson required.

INTRODUCE:

- IFR Emergencies – Options – Takeoff, Enroute and/or Destination

REVIEW APPROACHES, INCLUDE PARTIAL PANEL AND EMERGENCIES:

ILS/LOCALIZER APPROACHES

- ILS and/or Localizer Approach
 ILS/DME Arc Approach (If Airplane so Equipped)
 Approach Procedures to Straight-in and/or Circling Landing Minimums
 Missed Approach Procedures
 Holding Procedures
 Landing from a Straight-in and/or Circling Approach

GPS APPROACH

- GPS Approach
 Check Cycling Enroute/Terminal/Approach Modes
 From NoPT IAF Segments or Holding Segment
 Missed Approach Procedures
 Holding Procedures
 Landing Straight-in and/or Circling

VOR APPROACH

- VOR Approach
 Missed Approach Procedures
 VOR Hold Procedures
 Landing Straight-in and/or Circling

APPROACHES (3)

ILS/Location _____

GPS/Location _____

VOR/Location _____

- 1 of above as Partial Panel Approach
Type/Location _____

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will demonstrate the necessary skills and knowledge to perform precision and non-precision approaches, missed approach and holding procedures.
- On the final approach segment the student will maintain heading $\pm 10^\circ$, airspeed ± 10 knots, and altitude that is not more than 100 feet above and 0 feet below the DH or MDA.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

PRE & POST GROUND LESSON 26

2.0 HOURS GROUND BRIEF

LESSON REFERENCES:



For Reference and review:

Instrument Flying Handbook

FAR AIM Chapter 4 & 5 Section 4 & 5
INSTRUMENT PROCEDURES HANDBOOK
FAA AERONAUTICAL CHART USER'S GUIDE
WARRIOR POH
Aviation Weather Services
Chapter 1 through 19

LESSON OBJECTIVES:

- Student will learn ATC procedures and system.
- Student will learn to flight plan an IFR flight complete with determining weather, making go-no go decisions, organization of all materials, weather reports, route of flight, navigation capabilities and availability.
- Student will gain a working knowledge of IFR procedures.

Review:

- Air Traffic Control Clearance
- Clearance Copying
- Clearance Read Back
- Voice Communications
- Enroute Procedures and Clearances
- Arrival Procedures and Clearances

INTRODUCE:

IFR RELATED ATC PROCEDURES AND CLEARANCES

- Weather Information Related to IFR Flights
- Filing A Flight Plan
- Determine Need for Alternate
- Choose an Appropriate Alternate
- Identify Non-Standard Alternate and Take-off Minimums
- Use of Radar
- Lost Communication Procedures
- Emergencies in IMC Conditions
- RNAV Arrival and Departure Procedures
- Canceling A Flight Plan

IFR CROSS-COUNTRY FLIGHT PLANNING

- Aircraft Performance, Limitations, and Systems Related to IFR Cross-Country
- Use of IFR Navigation Log and Flight Planning
- Calculating ETEs and ETAs
- Use of DPs and/or STARS
- Plan Departure From Non-towered and Towered Airports
- Enroute Phase
- Approach Phase
- Open and Close IFR Flight Plans

COMPLETION STANDARDS:

- The Student will be able to apply FAR regulations for IFR flight.
- Will be able to plan, file, and understand execution of an IFR flight.
- Will be able to choose a route, altitude, understand enroute emergency procedures.

FLIGHT LESSON 27

3.0 HOUR TOTAL FLIGHT TIME
OF WHICH:
3.0 HOUR FLIGHT
2.8 HOUR INSTRUMENT INSTRUCTION
3.0 CROSS COUNTRY
PRE-POST .5

LESSON OBJECTIVES:

- The student should demonstrate increased proficiency in performing cross-country flight planning and execution.
- Student should demonstrate increased performance of all listed approaches and instrument procedures.
- The student should develop an understanding of IFR related Air Traffic Control procedures and clearances.
- Student will be introduced to instrument related IFR ATC procedures working with ATC during this flight

Note: *Flight must have 1 leg at least 50NM long and the flight must have 3 approaches all at different airports.*

Suggested Route: *One airport in Class B with an operating control tower.*

INTRODUCE:

IFR RELATED ATC PROCEDURES AND CLEARANCES

- Weather Information Related to IFR Flights
- Filing A Flight Plan
- Air Traffic Control Clearance
- Clearance Copying
- Clearance Read Back
- Use of Radar
- Voice Communications
- Enroute Procedures and Clearances
- Arrival Procedures and Clearances
- RNAV Arrival and Departure Procedures
- Canceling A Flight Plan

IFR CROSS-COUNTRY FLIGHT PLANNING

- Aircraft Performance, Limitations, and Systems related to IFR Cross-Country
- Use of IFR Navigation Log and Flight Planning
- Calculating ETEs and ETAs
- Use of DPs and/or STARS

APPROACHES (3)

- Non-precision Approach
Type/Location _____
- Precision Approach
Type/Location _____
- Instructor Choice
Type/Location _____
- 1 of above as Partial Panel Approach
Type/Location _____

POST FLIGHT PROCEDURES

COMPLETION STANDARDS:

- The Student will be able to apply FAR regulations to an IFR flight.
 - Will be able to plan, file, and understand execution of an IFR flight.
 - Will be able to choose a route, altitude, understand enroute emergency procedures
 - Will be able to copy and read back a clearance
 - Follow ATC instructions during flight
 - The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
 - The student will demonstrate an increased understanding of IFR related Air Traffic Control procedures and clearances that can be used in the IFR system.
- **POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON**

SIMULATOR LESSON 28

1.4 HOUR TOTAL FLIGHT TRAINER TIME
OF WHICH:
1.4 HOURS DUAL FLIGHT TRAINER
1.4 HOUR INSTRUMENT INSTRUCTION
PRE/POST .6

LESSON OBJECTIVES:

- The student will gain proficiency in flying in weather that would be at the maximum for a PA-28
- The student will gain experience and develop good ADM skills in emergency situations.
- The student should understand the ATC system and services available.
- Student will be given various scenarios to challenge their ADM skills and give them exposure to what could be expected in adverse weather.

Note: 3.5hours is the maximum creditable Advanced Aviation Training Device 14 CFR Part 141 Appendix "C" and approved by the FAA authorization letter for the Redbird AATD FMX 1000. See **Appendix A Diagram 5.**

INTRODUCE:

Adverse Weather

- High Cross Winds for Landing
- High Winds that Force a Circle to Land with a Cross Wind.
- Zero-Zero Take Off
- Straight-in Non-precision Approach to Minimums
- Circling Non-precision Approach with Ragged Ceiling (if they go back into clouds ADM for missed)
- Holding with 40 knot Winds
- Thunderstorms in the Area Approach to Avoid and Get in Ahead of
- Approach into Area of Weather that is increasing in Intensity as You Get Closer to the Airport.

Work Load Increases with Basic Emergencies

- Communication Failure
- GPS Loses RAIM
- Rough Running Engine
- Carb Ice Emergency
- Icing Accumulating
- Flying into an Area of Precipitation Start Light then Turns to Ice or Freezing Rain.
- Scenario that Would Cause the Student to Maintain Va While Dealing with Situation.

COMPLETION STANDARDS:

- The student will fly approaches partial panel and maintain altitude ± 100 feet, heading $\pm 10^\circ$, airspeed ± 10 kts on the approach.
- The student will be able to take appropriate actions using knowledge of aircraft systems and appropriate emergency checklists.
- Student will take appropriate actions to ensure a safe outcome of the flight.
- Student will demonstrate good ADM skills in handling the various emergencies insuring that the decision made would not create a new problem or make the situation worse.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

FLIGHT LESSON 29

3.0 HOURS TOTAL FLIGHT TIME
OF WHICH:
3.0 HOURS DUAL GIVEN
2.7 HOURS INSTRUMENT INSTRUCTION
3.0 CROSS COUNTRY
0.5 PRE/POST

LESSON OBJECTIVES:

- The student should demonstrate increased proficiency in performing all listed approaches and instrument procedures.
- The student should demonstrate increased proficiency in IFR related Air Traffic Control procedures and clearances.
- Student will gain more IFR experience in filing an IFR flight plan and working with ATC throughout the flight.
- The furthest airport used must be at least 50 NM away from MKT

Note: Suggested one airport with an operating control tower and 3 approaches each being conducted at different airports.

REVIEW:

- INSTRUMENT PREFLIGHT PROCEDURES
- INSTRUMENT PREFLIGHT PREPARATION
- ILS Approach
- VOR and/or Localizer Approach(es)
- NDB and/or GPS Approach(es) (If Airplane so Equipped)
- Intercepting and Tracking DME Arcs (If Airplane so Equipped)
- Approach Procedures to Straight-In and/or Circling Landing Minimums
- Missed Approach Procedures
- Holding Procedures
- Landing from a Straight-In and/or Circling Approach Procedure
- Partial Panel Non-precision Instrument Approach Procedures
- Partial Panel Precision Instrument Approach Procedures
- Partial Panel Missed Approach Procedure
- No-Gyro Radar Vectoring & Approach Procedure

IFR RELATED ATC PROCEDURES AND CLEARANCES

- Weather Information Related to IFR Flights
- Filing A Flight Plan
- Air Traffic Control Clearance
- Clearance Copying
- Clearance Read Back
- Use of Radar
- Voice Communications
- Enroute Procedures and Clearances
- Arrival Procedures and Clearances
- RNAV Arrival and Departure Procedures
- Canceling A Flight Plan

APPROACHES (3)

- Non-precision Approach
Type/Location _____
- Precision Approach
Type/Location _____
- Instructor Choice
Type/Location _____
- 1 of above as Partial Panel Approach
Type/Location _____

POST FLIGHT PROCEDURES

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- Student will demonstrate the ability to file, activate, and close an IFR flight plan.
- Student shall show the ability to write down and read back ATC clearance for flight and will comply with all ATC instructions throughout the flight. Instructor will insure compliance with all ATC instructions and comply with all IFR regulations throughout the flight.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

Assign Advanced Instrument Exam to be completed before Lesson 31 Ground session

FLIGHT LESSON 30

4.0 HOURS TOTAL FLIGHT TIME

OF WHICH:

4.0 HOURS DUAL FLIGHT

3.7 HOURS INSTRUMENT INSTRUCTION

4.0 CROSS COUNTRY

0.5 Hours PRE/POST

Suggested: airports: One in Class B with an operating control tower

LESSON OBJECTIVES:

- The student should demonstrate increased proficiency in performing all listed approaches and instrument procedures.
- The student should demonstrate increased proficiency of the procedures and techniques involved in IFR cross-country planning, filing IFR flight plans, and the proper conduct of an IFR cross-country flight.
- The student should develop an increased understanding of aeronautical decision making and cockpit management concept in the IFR environment while dealing with various simulated emergency procedures.
- This cross country will meet 14 CFR 141 Appendix C, 4 (c) (1) (i) through (iv) with a cross-country flight performed under IFR consisting of a distance of at least 250 nautical miles along airways or ATC-directed routing with one segment of the flight consisting of at least a straight-line distance of 100 nautical miles between airports, involves an instrument approach at each airport, and three (3) different kinds of approaches (**ASR & PAR ARE NOT CONSIDERED APPROACHES**) with the use of navigation systems.

REVIEW:

- ILS Approach
- VOR and/or Localizer Approach(es)
- NDB and/or GPS Approach(es) (If Airplane so Equipped)
- Approach Procedures to Straight-In and/or Circling Landing Minimums
- Missed Approach Procedures
- Landing from a Straight-In and/or Circling Approach Procedure

IFR RELATED ATC PROCEDURES AND CLEARANCES

- Weather Information related to IFR Flights
- Filing an IFR Flight Plan
- Departure Procedures and Clearances

- Air Traffic Control Clearance
- Clearance Copying
- Clearance Read Back
- Use of Radar
- Voice Communications
- Enroute Procedures and Clearances
- Arrival Procedures and Clearances
- Canceling IFR Flight Plan
- Aircraft Performance, Limitations, and Systems related to IFR Cross-Country
- Use of IFR Navigation Log and Flight Planning
- Calculating ETEs and ETAs
- Use of DPs and/or STARs

SIMULATED EMERGENCY PROCEDURES

- Loss of Communications
- Loss of Gyro – Attitude and/or Heading Indicator(s)
- Other Systems Malfunctions
- Cockpit Management
- Crew Resource Management
- Aeronautical Decision Making and Judgment

APPROACHES (3)

- Non-precision Approach
Type/Location _____
- Precision Approach
Type/Location _____
- Instructor Choice
Type/Location _____
- 1 of above as Partial Panel Approach
Type/Location _____

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will demonstrate the necessary skills and knowledge to perform all listed approaches and instrument procedures with minimal aid from the Instructor.
- The student will demonstrate an understanding of the procedures and techniques involved in IFR cross-country planning, filing IFR flight plans, and the proper conduct of an IFR cross-country flight.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

GROUND LESSON 31

2.0 HOURS GROUND BRIEF

LESSON REFERENCES:



For Reference and review:
Instrument Flying Handbook
FAR AIM
INSTRUMENT PROCEDURES HANDBOOK
FAA AERONAUTICAL CHART USER'S GUIDE
WARRIOR POH
Aviation Weather Services

LESSON OBJECTIVES:

- Review the areas listed in preparation for stage check and practical examination.

CHARTS

- US Terminal Procedures Publication
- Chart Format and Symbols
- IFR Enroute Charts
- IFR Enroute Chart Symbols on Front Panel

DEPARTURE PROCEDURES

- Takeoff Minimums
- Obstacle Departure Procedures
- Standard Departure Procedures
- Radar Departures
- VFR Departures

ARRIVAL PROCEDURES

- Standard Terminal Arrival Route (STAR's)
- Approach Briefing

ENROUTE AND AREA CHARTS

- Navigation Aids
- Victor Airways
- Communications
- Airspace
- IFR Cruising Altitudes

APPROACH SEGMENTS

- Initial Approach Segment
- Intermediate Approach Segment
- Final Approach Segment
- Missed Approach Segment

APPROACH CHART LAYOUT

- Heading Section
- Plan View, Profile View
- Step Down Fix and VDP
- Landing Minimums
- Aircraft Approach Categories
- Minimum Descent Requirements
- Visibility Requirements
- Inoperative Components
- Heading Section
- Plan View and Additional Runway Information
- Takeoff and Alternate Minimums

IFR EMERGENCIES

- Declaring an Emergency
- Minimum Fuel Advisory
- Gyroscopic Instrument Failure
- Communication Failure
- Emergency Approach Procedures
- Malfunction Reports

HOLDING PROCEDURES

- Standard and Nonstandard Pattern
- Outbound and Inbound Timing
- Crosswind Correction
- Maximum Holding Speed
- Entries

WEATHER

- METAR, TAF, FA, PIREP
- Prognostic Chart, Icing Products
- Significant Weather Chart
- Weather Symbols

Advanced Instrument Exam ($\geq 70\%$ required)

COMPLETION STANDARDS:

- The student will demonstrate the necessary knowledge to pass the practical oral that should meet standards set forth by the current FAA Instrument Rating Practical Test Standard.
- Pass the advanced instrument exam with a score of $\geq 70\%$.

STUDY ASSIGNMENT:



*Review of Ground Lesson
1,7,12,15,17,20,23,26*

FLIGHT LESSON 32

1.5 HOUR TOTAL FLIGHT TIME
OF WHICH:
1.5 HOURS DUAL FLIGHT
1.3 HOUR INSTRUMENT INSTRUCTION
PRE/POST .5

LESSON OBJECTIVES:

- The purpose of this lesson is for a review of all course objectives prior to the End of Course Stage check.
- Profile for this flight should give the student a chance to insure they have all needed skills at PTS standard

REVIEW:

IFR RELATED ATC PROCEDURES AND CLEARANCES

- Weather Information Related to IFR Flights
- Filing A Flight Plan
- Air Traffic Control Clearance
- Clearance Copying
- Clearance Read back
- Use of Radar
- Voice Communications
- Enroute Procedures and Clearances
- Arrival Procedures and Clearances
- RNAV Arrival and Departure Procedures
- Canceling A Flight Plan

IFR CROSS-COUNTRY FLIGHT PLANNING

- Aircraft Performance, Limitations, and Systems Related to IFR Cross-Country
- Use of IFR Navigation Log and Flight Planning
- Calculating ETEs and ETAs
- Use of DPs and/or STARS

APPROACHES (3)

- Non-precision Approach
Type/Location _____
Circle or Straight-in to Land
- Precision Approach
Type/Location _____
 Circle or Straight-in to Land
 Instructor Choice
Type/Location _____
- Circle or Straight in to Land
 1 of above as Partial Panel Approach
Type/Location _____
- Circle or Straight-in to Land

HOLDING PROCEDURES

- Entry Procedures in a Holding Pattern
- Standard and/or Nonstandard VOR Holding
- Standard and/or Nonstandard Intersection Holding
- Standard and/or Nonstandard DME Holding (If Airplane so Equipped)
- VOR Tracking and Intercepts
- VOR Positional Orientation
- Tracking VOR To vs From and Situational Awareness.
- One Hold must be Partial Panel (indicate which one)

COMPLETION STANDARDS:

- The student will precisely control the airplane using full panel and/or partial panel instrument reference by maintaining altitude ± 100 feet, headings $\pm 10^\circ$, airspeed ± 10 knots.
- The student will perform the flight profile with no errors that would cause the flight not to meet the performance standards as required by the current published FAA Practical Test Standards Instrument Airplane.
- On the final approach segment the student should maintain heading $\pm 10^\circ$, airspeed ± 10 knots, and altitude that is not more than 100 feet above and 0 feet below the DH or MDA.

POST FLIGHT DISCUSSION AND PREVIEW OF NEXT LESSON

STAGE CHECK - FLIGHT 33

STAGE CHECK - 2

2.0 HOURS TOTAL FLIGHT TIME
OF WHICH:
2.0 HOURS DUAL GIVEN
1.8 HOURS INSTRUMENT INSTRUCTION
2.0 Hours PRE/POST

LESSON OBJECTIVES:

- The Chief Flight Instructor, Assistant Chief Flight Instructor or a Check Instructor will evaluate the student's IFR cross-country skills using the current Instrument Rating Practical Test Standards as the guide for the Oral and Flight test.

Test Areas

Single Pilot Resource Management

- Pilot Qualifications
- Aeronautical Decision Making
- Risk Management
- Task Management
- Situational Awareness
- Controlled flight Into Terrain Awareness.
- Automation Management
- Distractions During Flight test

Preflight Preparation

- Aircraft Systems Related to IFR Operations
- Aircraft Flight Instruments and Navigation Equipment
- Cross Country Planning
- Weather briefings and Charts

Preflight Procedures

- Use of Check lists
- Instrument Cockpit Check
- Positive Change of Controls
- Air Traffic Control Clearances and Procedures

Air Traffic Control Clearances

- Compliance with Departure, En Route, and Arrival Procedures and Clearances
- Clearance Copying and read back.
- Holding Procedures

Navigation Systems

- Intercepting and Tracking Navigational systems and DME ARCS

Flight By Reference to Instruments

- Basic Instrument Flight Maneuvers
- Recovery from unusual Flight Attitudes
- Instrument Approach Procedures
- Nonprecision Approach (NPA)
- Precision Approach (PA)
- Missed Approach
- Circling Approach
- Landing from a Straight-in or Circling Approach

Emergency Operations

- Loss of Communications
- Loss of Primary Flight Instrument Indicators

APPROACHES (3)

- Non-precision Approach
Type/Location _____
Circle or Straight-in to Land
- Precision Approach
Type/Location _____
 Circle or Straight-in to Land
 Instructor Choice
Type/Location _____
 Circle or Straight in to Land
 1 of above as Partial Panel Approach
Type/Location _____
 Circle or Straight-in to Land

POST FLIGHT PROCEDURES

COMPLETION STANDARDS:

- The student will demonstrate the necessary skills and knowledge to perform all listed approaches, maneuvers and instrument procedures at a proficiency level that should meet or exceed the criteria set forth by the current FAA Instrument Rating Practical Test Standards.

POST FLIGHT DISCUSSION AND PREPARATION FOR THE CHECK RIDE

**FLIGHT
LESSONS
COMPLETION
RECORD**

ENROLLEMENT DATE: _____

INSTRUCTOR: _____

RECORD OF FLIGHT TIME:

	TOTAL TIME	ASEL	DUAL	Flight Trainer	FLIGHT CONDITIONS			
					X-C	DAY	NIGHT	INST.
Total Time PRE-STAGE								
Total Course Time Requirements	42.9	31.5	42.9	3.5	10	-	-	39.7
Total Time POST-STAGE								

AUDITED BY: _____ DATE: _____

ADJUSTED RECORD OF FLIGHT TIME – IF FLIGHT TRAINER EXCEEDED 3.5. HOURS

Steps:

1. Insert ASEL time + Flight Trainer Time of 3.5 hours
2. Flight Trainer + ASEL must = minimum 35

Dual and Instrument totals must equal the chart below..

	TOTAL TIME	ASEL	DUAL	Flight Trainer	INST.
Total Time				3.5	
Total Time Requirements	42.9	31.5	42.9	3.5	39.7

Total flight time may be less than that 42.9 hours indicated in the above table provided the total ASEL is 31.5 or higher and simulator is 3.5 or greater. ASEL Flight time (31.5) + (3.5) Simulator = 35 Total Flight hours as required in CFR Part 141 Appendix "C" 4 (b) The maximum simulator time approved by the FAA letter for the Redbird AATD FMX 1000 is 3.5 hours. See the FAA authorization letter in Appendix A Diagram 5.

SPECIFIC COURSE REQUIREMENTS:

- **Cross-Country Flight Requirements:**
14 CFR Part 141, Appendix C, Section 4(c)(1)(i) through(iv)

FLIGHT LESSON	DATE	ROUTE OF FLIGHT	REQUIREMENTS	Approaches	Instructor's Signature
30			Cross-country flight performed under IFR consisting of a distance of at least 250 nautical miles along airways or ATC-directed routing with one segment of the flight consisting of at least a straight-line distance of 100 nautical miles between airports, involves an instrument approach at each airport, and three (3) different kinds of approaches with the use of navigation systems.		

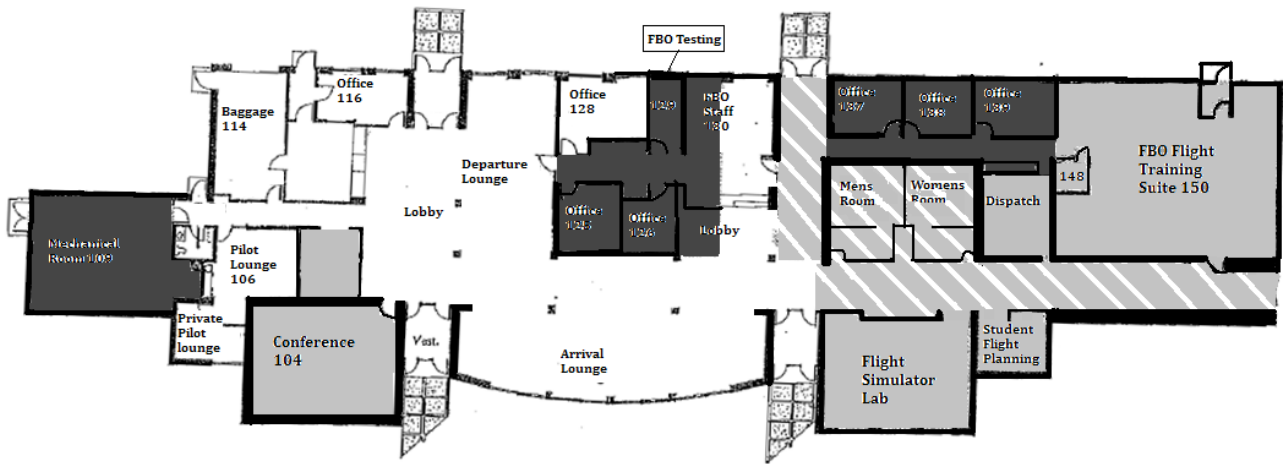
End Of Course Test

Date	Check Pilot	Result (1 st Attempt)

APPENDIX A

<u>ITEM</u>	<u>Labels</u>	<u>PAGE</u>
DIAGRAM 1	North Star Aviation Training Facility	78
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DIAGRAM - 1



Legend

- City of Mankato and public Area
- North Star Aviation Area
- Shared Area
- Flight Training Area



Area configurations:

The Corridors, washrooms, and the mechanical room divided up equally between the City of Mankato and North Star Aviation. Each space was calculated by three area configuration options.

- area calculated from outside of exterior wall to outside of exterior wall.
- area calculated from outside of exterior wall to center line of interior wall.
- area calculated from center line of interior wall to center line of interior wall.

City of Mankato and public space including shared Areas with North Star Aviation =	8,703 Sq Ft
North Star Aviation areas including Areas shared with City of Mankato and the public =	6,597 Sq Ft
<hr/> Total building area =	<hr/> 15,300 Sq Ft

DIAGRAM -2

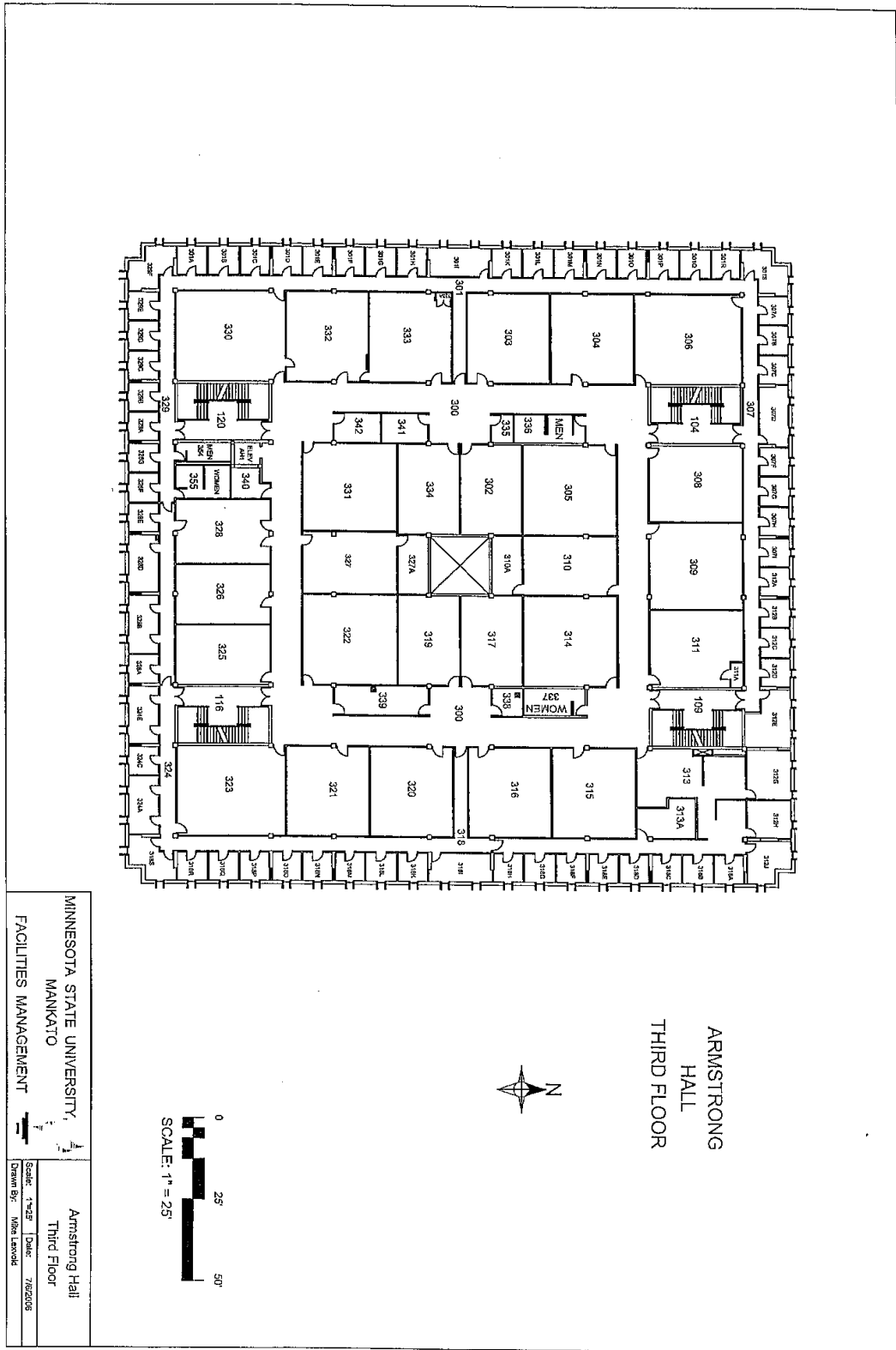


Diagram 2

DIAGRAM-3

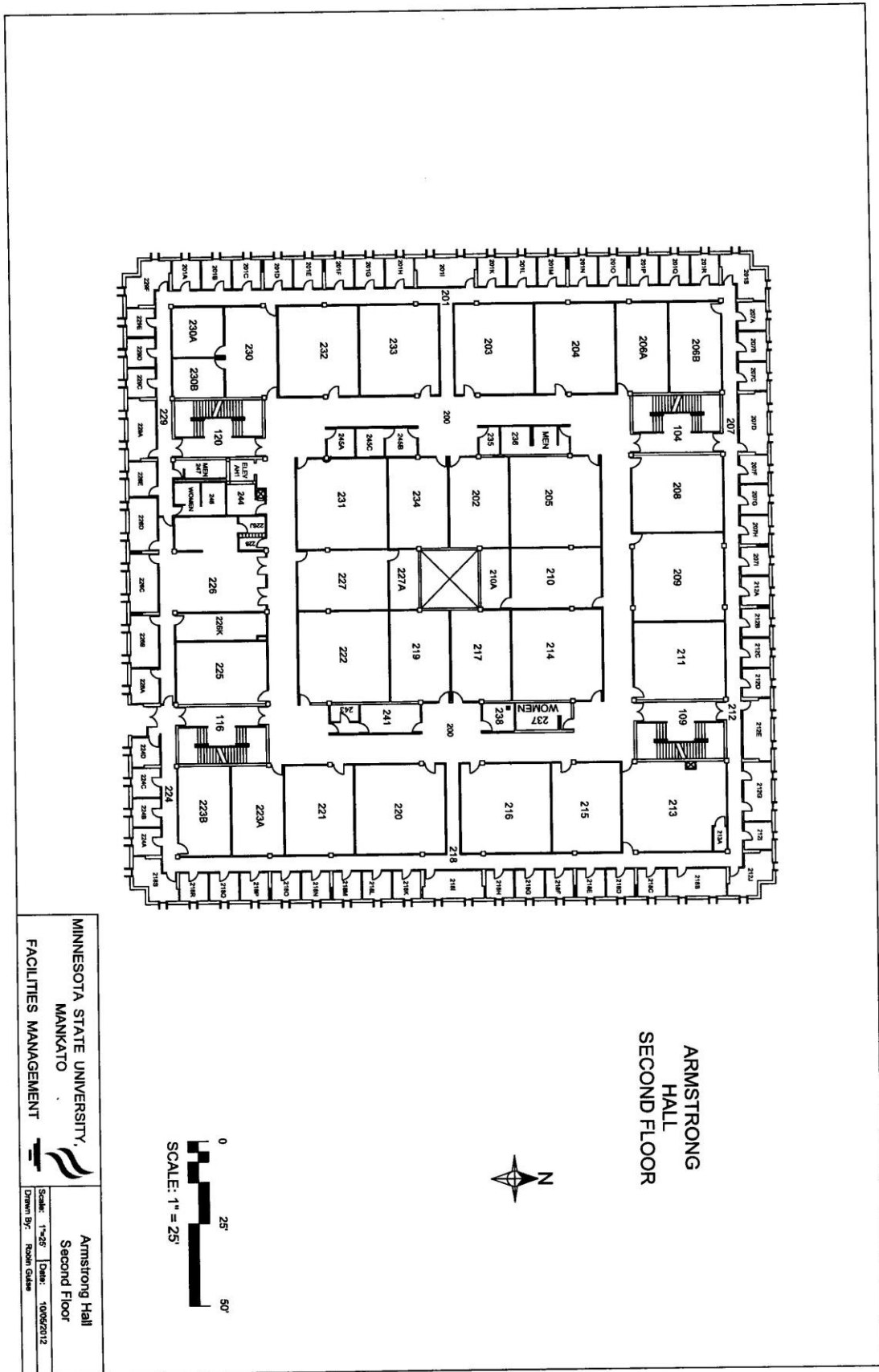


DIAGRAM -4

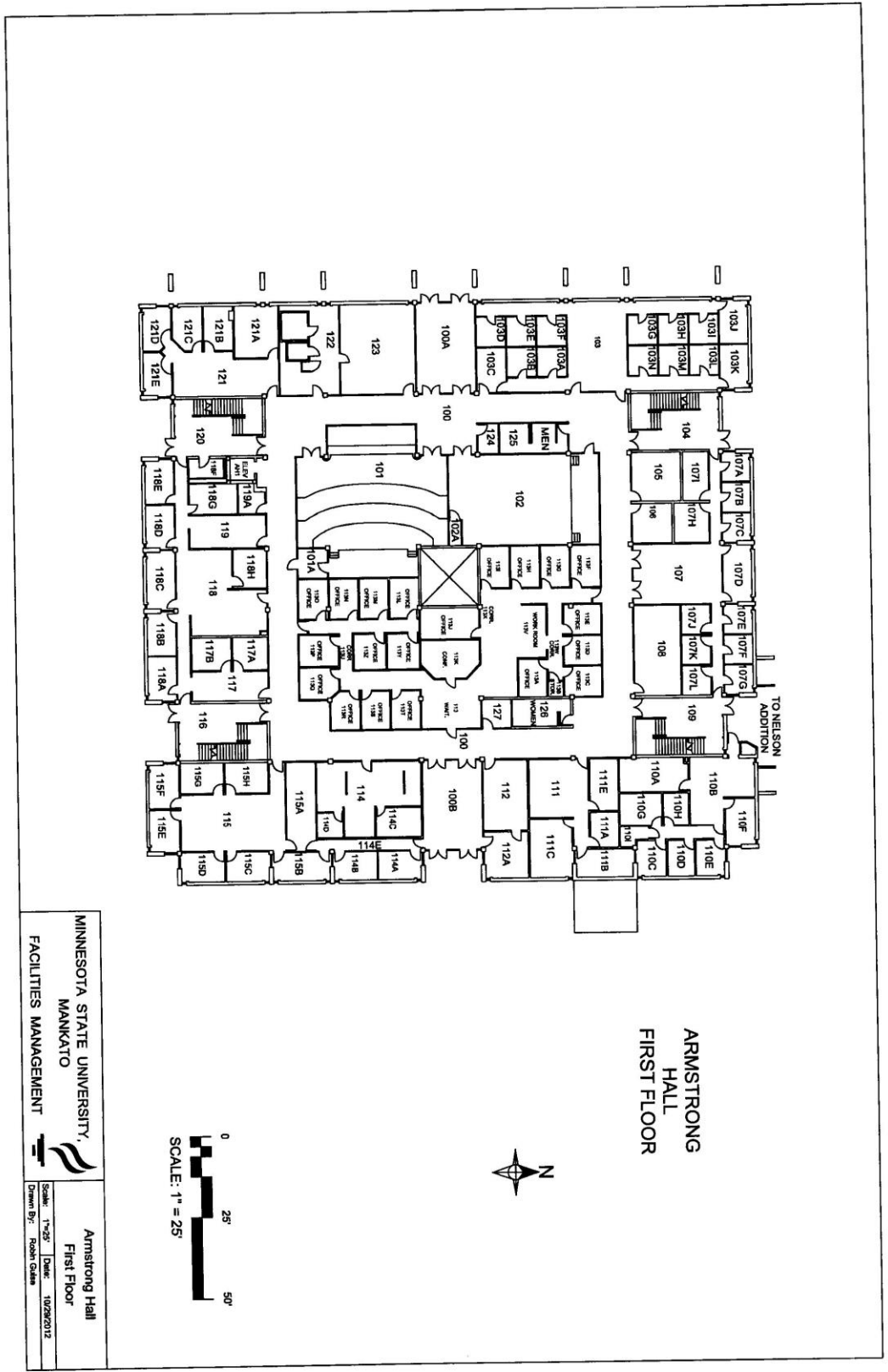


DIAGRAM – 5



U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., SW
Washington DC 20591

DEC 19 2014

Mr. Jerome N. Gregoire
Redbird Flight Simulations
2301 East St. Elmo Rd., Suite 100
Austin, Texas 78744

Dear Mr. Gregoire:

The Federal Aviation Administration (FAA) last qualified and approved your airplane LD, SD, FMX, and MCX device as an Advanced Aviation Training Device (AATD) on February 14, 2013 in accordance with Title 14 Code of Federal Regulations (14 CFR) section (§) 61.4(c). This training device was found to meet the criteria for an AATD as described in FAA Advisory Circular AC 61-136.

Starting January 1, 2015, the FAA requires all Letters of Authorization (LOA) to contain the correct training allowances to remain valid. Based on the previous approval and review of the qualification and approval guide dated February 7, 2013, the FAA has determined that this device continues to meet the current standards for approval. The Redbird model LD, SD, FMX, and MCX is authorized for use in satisfying the following sections of Title 14 of the Code of Federal Regulations parts 61 and 141:

**Redbird Model LD, SD, FMX, MCX version 4.4
Airplane Single and Multi-Engine Land
Advanced Aviation Training Device (AATD)**

- § 61.51(b)(3) – Logbook entries;
- § 61.51 (h) – Logging training time;
- § 61.57(c) – Instrument experience;
- § 61.57(c)(4)(iii) – Instrument experience;
- § 61.57(c)(5)(ii) – Instrument experience;
- § 61.57(d)(1)(ii) – Instrument proficiency check, per the Instrument PTS;
- § 61.65(i) – Instrument rating;
- § 61.109(k)(1) – Private Pilot Certificate Aeronautical experience: up to 2.5 hours;
- § 61.129(i)(1)(i) – Commercial Pilot Certificate: up to 50 hours;
- § 61.159(a)(3)(i) – Airline Transport Pilot Certificate: up to 25 hours; and
- § 141.41(b) – Approved for use under the part 141 appendices as follows:
 - *Appendix B* – Up to 15% toward the total Private Pilot flight training time requirements;

- *Appendix C* – As allowed under 4(b) toward the total instrument flight training time requirements;
- *Appendix D* – Up to 20% toward the total Commercial Pilot flight training time requirements;
- *Appendix E* – Up to 25% toward the total Airline Transport Pilot flight training time requirements;
- *Appendix F* – Up to 5% toward the total Flight Instructor flight training time requirements;
- *Appendix G* – Up to 5% toward the total Flight Instructor instrument flight training time requirements;
- *Appendix I, Private Pilot Airplane Single Engine or Multiengine Class Rating Course* – Up to 3 hours toward the flight training time requirements;
- *Appendix I, Commercial Pilot Airplane Single Engine or Multiengine Class Rating Course* – Up to 11 hours toward the required flight training time requirements;
- *Appendix I, Airline Transport Pilot Airplane Multiengine Class Rating Course* – Up to 6.25 hours toward the flight training time; and
- *Appendix M, Combined Private Pilot Certification and Instrument Rating* – Up to 25% toward the total flight training time requirements

Note: Training or experience requirements such as cross country, night, solo, takeoffs and landings, or the 3 hours of training within 2 calendar months of the practical test must be accomplished in an aircraft. Private Pilot Airplane applicants must also complete the requirement for 3 hours of control and maneuvering of an airplane solely by reference to instruments specified in §61.109 in an airplane. Additionally, practical tests cannot be conducted in an AATD.

Exemption Notice: This device qualifies for the exemption from 14 CFR section 61.65(i) and part 141 Appendix C under the terms and conditions described in the FAA Notice of Policy Change for the Use of FAA Approved Training Devices in the Federal Register (Docket No.: FAA-2013-0809). This exemption allows pilots applying for an instrument rating to credit up to 20 hours of time obtained in this device toward the aeronautical experience requirements in § 61.65(d)(2). In addition, this exemption allows training providers with a training course outline approved under part 141 Appendix C, to continue to train under that program with up to a 40% credit of the training time requirement obtained in this device. This exemption will expire as noted in the Federal Register policy notice.

This approval is contingent upon the following:

- 1) This aviation training device must continue to maintain its performance and function without degradation. The minimum instrument requirements specified under 14 CFR part 91, § 91.205 for day visual flights rules (VFR) and instrument flight rules (IFR) must be functional during the training session;

- 2) Only the configurations that are in the FAA approved Qualification and Approval Guide are utilized during training;
- 3) A copy of this authorization and approval letter must be readily available in a location near the device when in use. Additionally, a copy of this authorization must be provided to the person using the above credits for pilot certification or ratings;
- 4) An authorized instructor must provide and certify the above instructional use;
- 5) Any changes or modifications to this aviation training device which have not been reviewed, evaluated, and approved by AFS-800 will terminate this letter of approval; and
- 6) The FAA reserves the right to revoke this authorization at any time if the Administrator determines that this training device is used contrary to FAA regulation, guidance, or safety.

This approval is valid for sixty (60) calendar months from the date of this letter and supersedes any previous approvals for this training device. Renewal requests should be made prior to the expiration (90 days in advance) by letter to AFS-800 and the above contingencies (1) through (6) must remain valid. At the time of application AFS-800 will conduct (at a minimum) a review of the QAG, to verify compliance with the current AC 61-136 for their approval and use, before a new Letter of Authorization (LOA) can be provided.

This authorization expires on 11/30/2019

Sincerely,



James A. Viola
Manager, General Aviation and Commercial Division
Flight Standards Service

DIAGRAM – 6 Enrollment Certificate

This is to certify that

(Name)

is enrolled in the Federal Aviation Administration approved *Instrument Rating Certification Course - Airplane* conducted by North Star Aviation Inc.

Date of Enrollment

X _____
Chief Flight Instructor

Revision: Original

DIAGRAM – 7 GRADUATION CERTIFICATE



The form is a graduation certificate for the Instrument Rating Certification Course Airplane. It features a background image of an airplane cockpit. In the top left corner, there is a logo of a stylized airplane and the text "DEPARTMENT OF AVIATION MINNESOTA STATE UNIVERSITY, MANKATO". In the top right corner, there is the "NORTH STAR AVIATION" logo, which consists of a red starburst shape and the text "NORTH STAR AVIATION". The title "Instrument Rating Certification Course Airplane Graduation Certificate" is centered in a bold, italicized font. Below the title, there is a line for the candidate's name, labeled "(Name)". A paragraph of text certifies that the candidate has successfully completed all the Federal Aviation Administration stage checks, tests, course requirements, and cross-country training specified in FAR 141 Appendix C. The text states: "I certify that the above named candidate has successfully completed all the Federal Aviation Administration stage checks, tests, course requirements and has completed the cross country training specified in FAR 141 Appendix C. I certify that North Star Aviation Inc. has trained the individual in accordance with our approved Flight Training School Syllabus for the Instrument Rating Certification Course Airplane and I certify this information to be true and correct." At the bottom right, there are three lines for the Chief Flight Instructor's signature, the flight school certificate number "NUTS521L", and the date of graduation.

DEPARTMENT OF AVIATION
MINNESOTA STATE UNIVERSITY, MANKATO

Instrument Rating Certification Course Airplane Graduation Certificate

(Name) _____

I certify that the above named candidate has successfully completed all the Federal Aviation Administration stage checks, tests, course requirements and has completed the cross country training specified in FAR 141 Appendix C. I certify that North Star Aviation Inc. has trained the individual in accordance with our approved Flight Training School Syllabus for the Instrument Rating Certification Course Airplane and I certify this information to be true and correct.

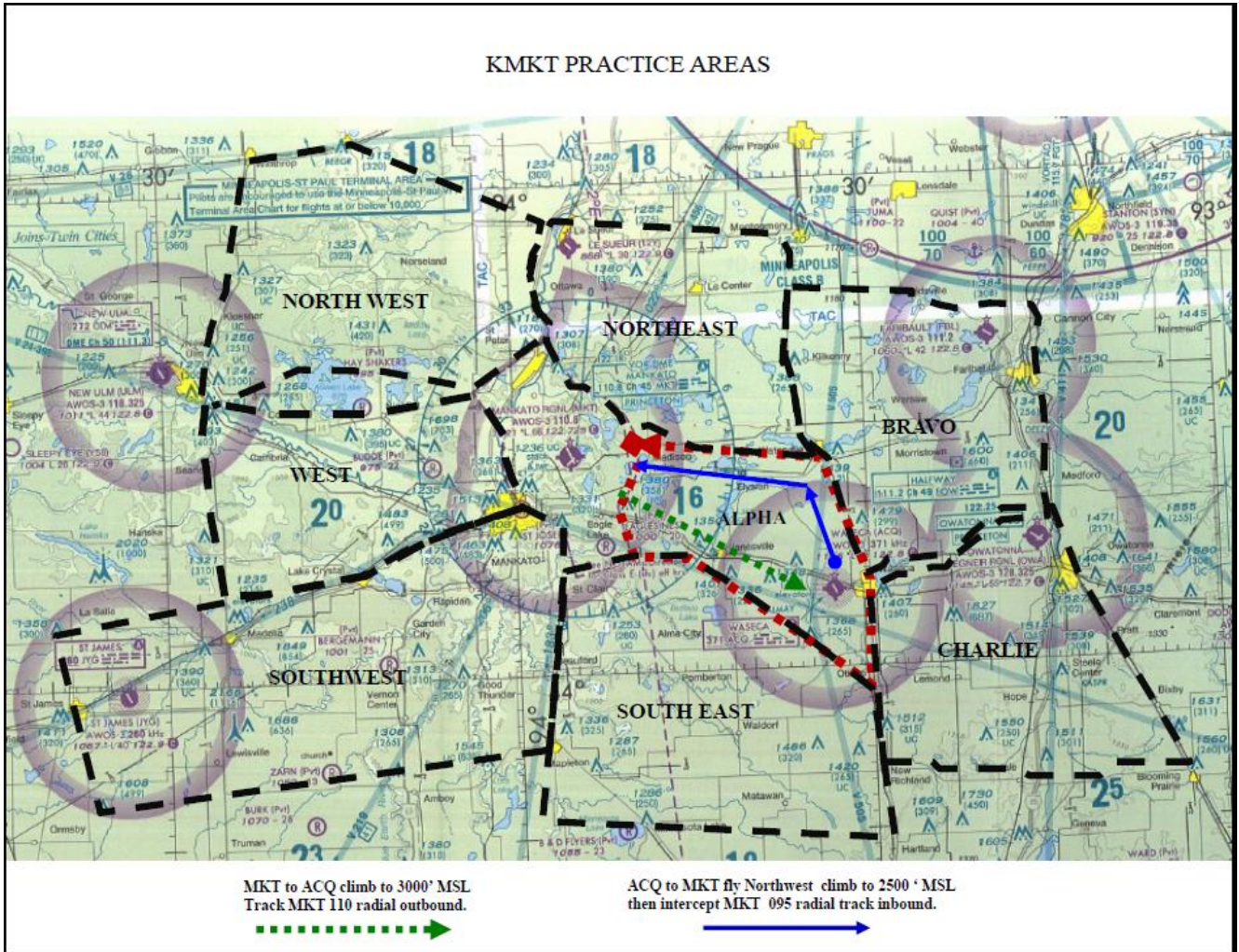
Chief Flight Instructor

NUTS521L

Flight School Certificate

Date of Graduation

DIAGRAM – 8 Practice Areas



INTENTIONALLY LEFT BLANK

DIAGRAM – 9 DISPATCH RELEASE (SAMPLE)



Dispatch Ticket

generated by Jeppesen SkyManager for
North Star Aviation

Date/Time	12/13/2013 10:00 AM	Aircraft	PA28 N281MK
Student	smsupport	Instructor	Robbie Johnson
Hobbs Out	104.0	Fuel	
Hobbs In		Oil	
Tach Out	123.0	Landings	
Tach In			

Comments

Squawks

Current						
Total						
	Actual Instrument	Simulated Instrument	Simulator	Dual Received	Dual Given	Pilot In Command
Previous	3.0	2.0	1.0		234.0	9.0
Current						
Total						

Student Signature and Date		Instructor Signature, Number, Date	
Annual		Pitot/Static	
ELT		Transponder	
50 Hour		100 Hour	

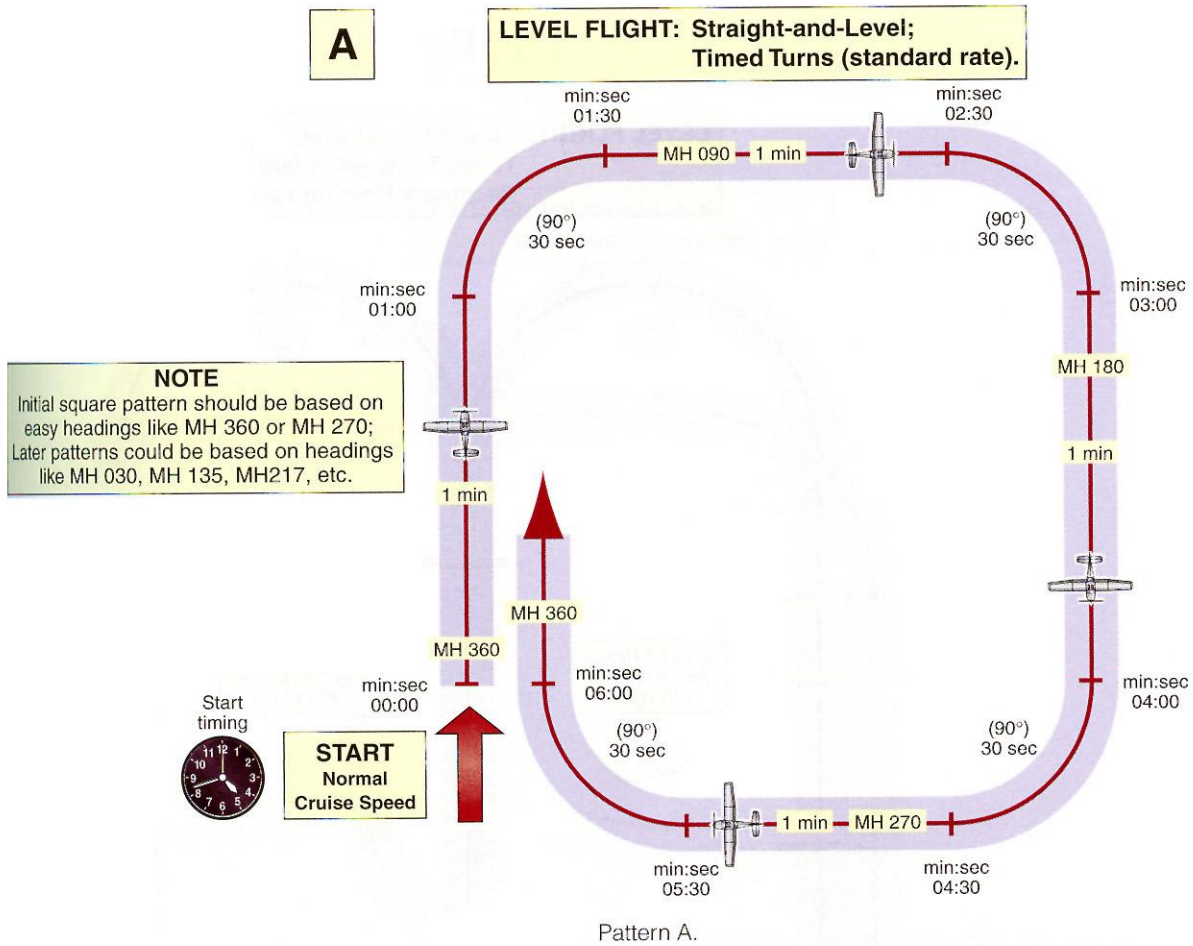
METAR (unofficial) KMKT 131555Z AUTO 08012KT 10SM CLR M09/M12 A3013 RMK AO1

TAF (unofficial) KMSP 131422Z 1314/1418 05011KT P6SM BKN025 OVC040 FM140400 04007KT 3SM -SN SCT015 OVC025 FM141400 36005KT 5SM -SN SCT012 OVC020

	No Instr App	No Ldg	Airplane SEL	Airplane MEL	Cross Country	Day	Night
Previous	1234.0	9.0					23.0

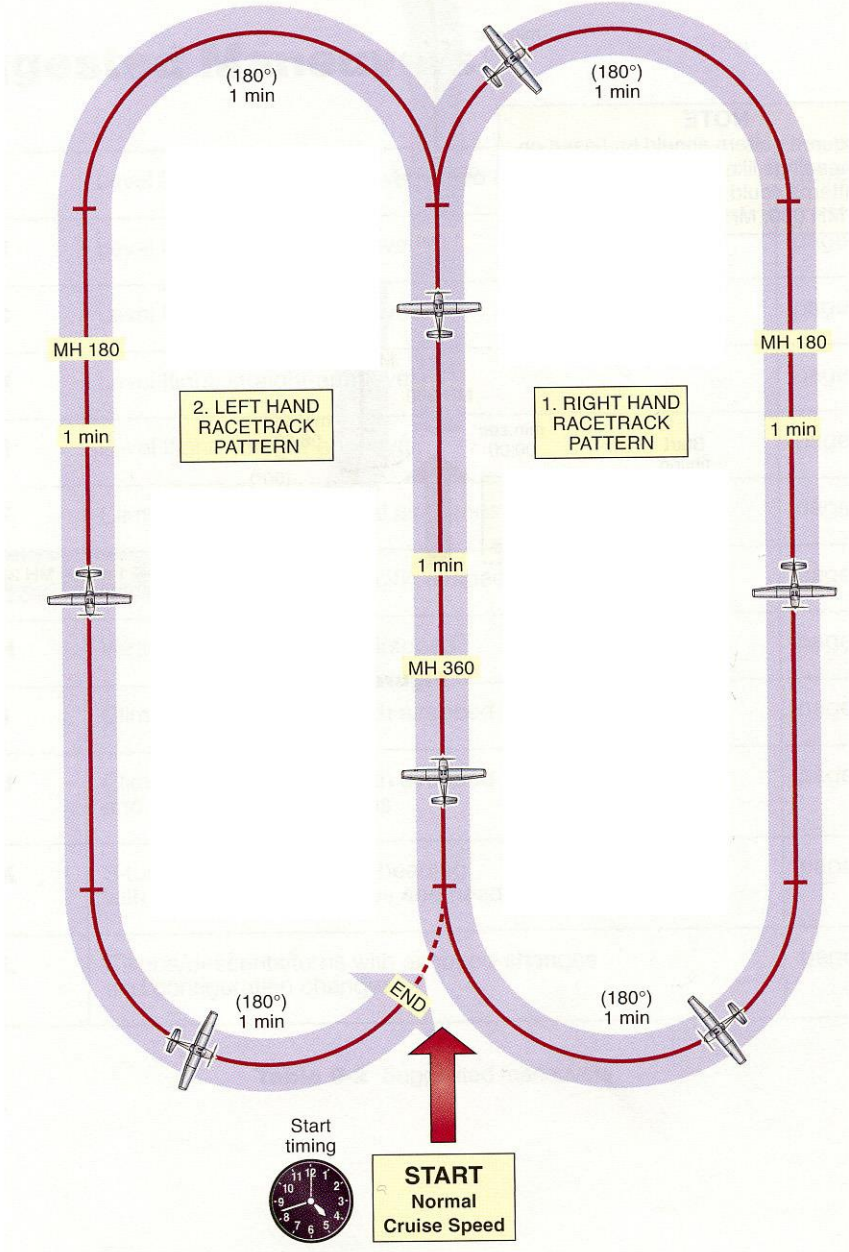
Copyright Jeppesen. All Rights Reserved.

DIAGRAM 10 PATTERN A



B

**LEVEL FLIGHT: Straight-and-Level;
Timed Turns (standard rate);
Racetrack Holding Pattern.**



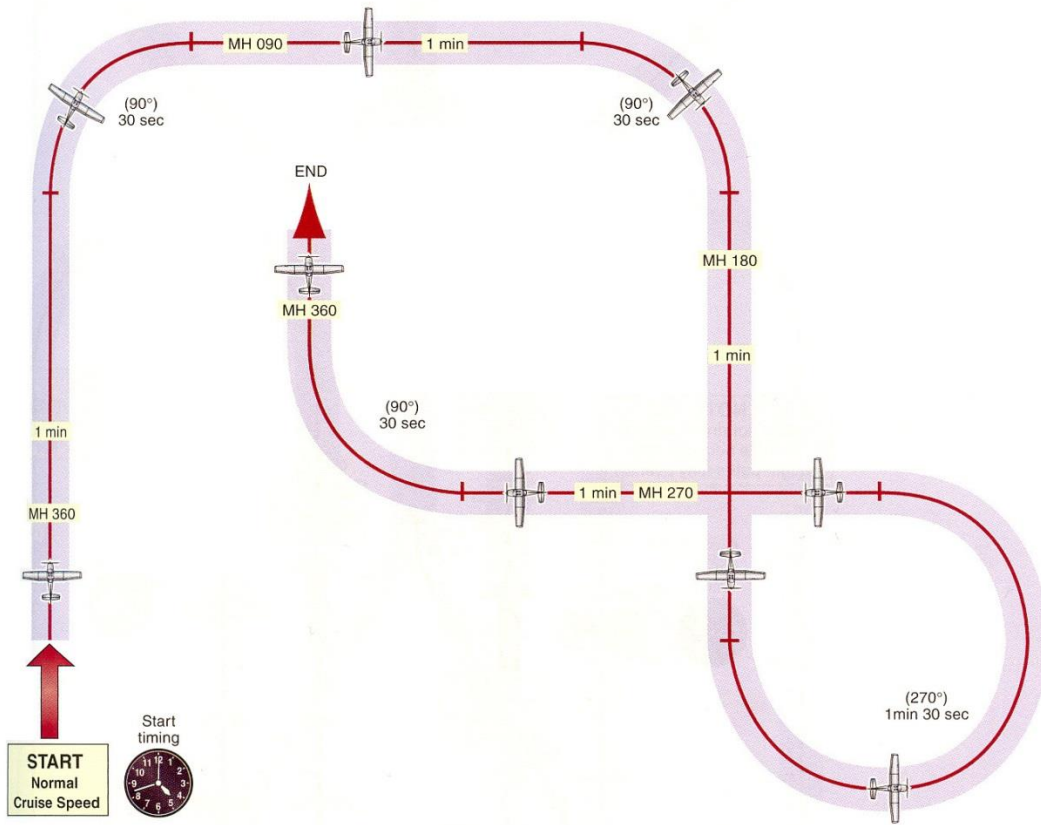
NOTE
We have included the cumulative intervals for Pattern A only — we suggest that you mark in the cumulative times for the remainder of the patterns yourself.

Pattern B.

DIAGRAM 12 PATTERN C

C

**LEVEL FLIGHT: Straight-and-Level;
Timed Turns (standard rate).**



Pattern C.

DIAGRAM 13 PATTERN D

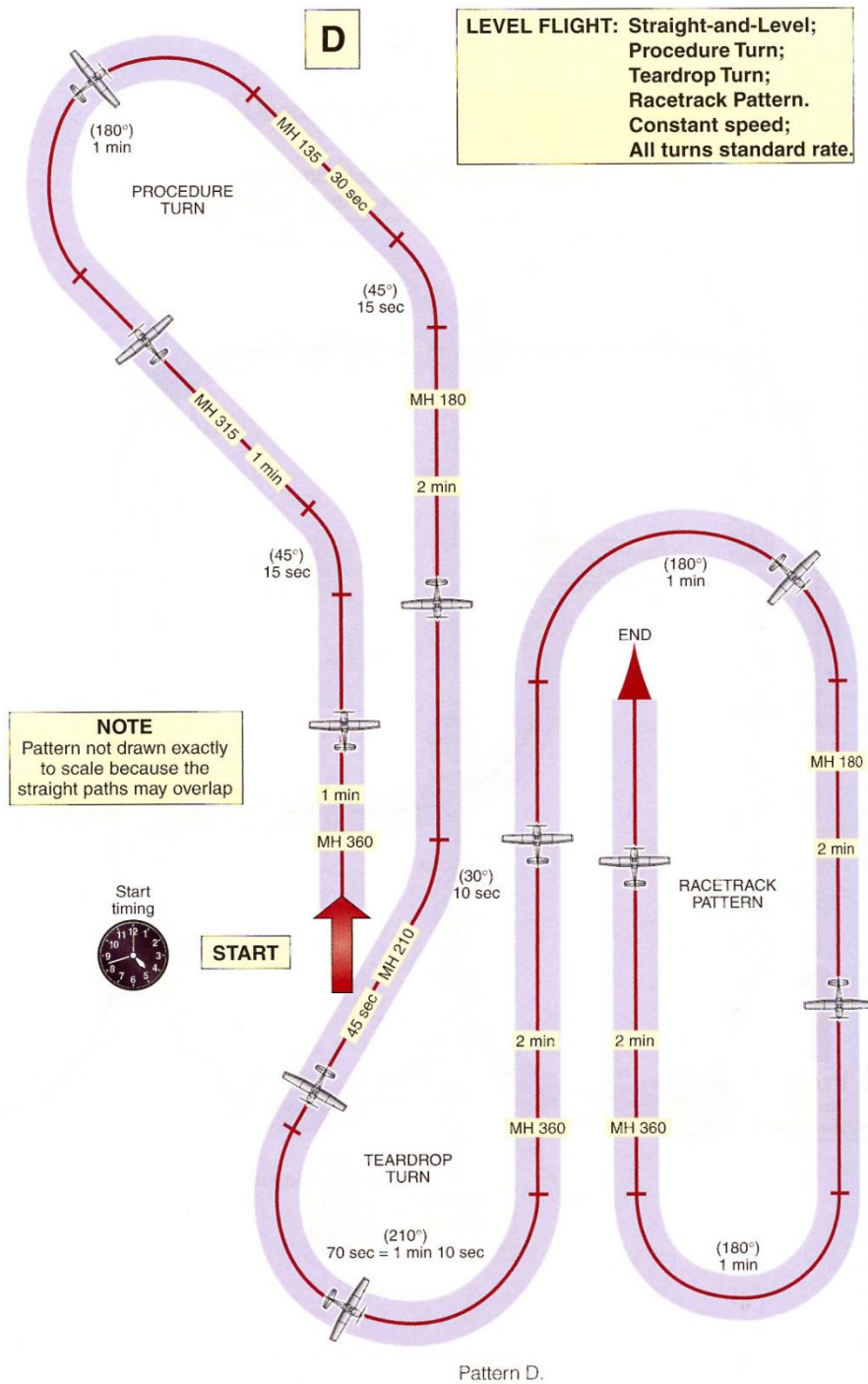


DIAGRAM 14 PATTERN E

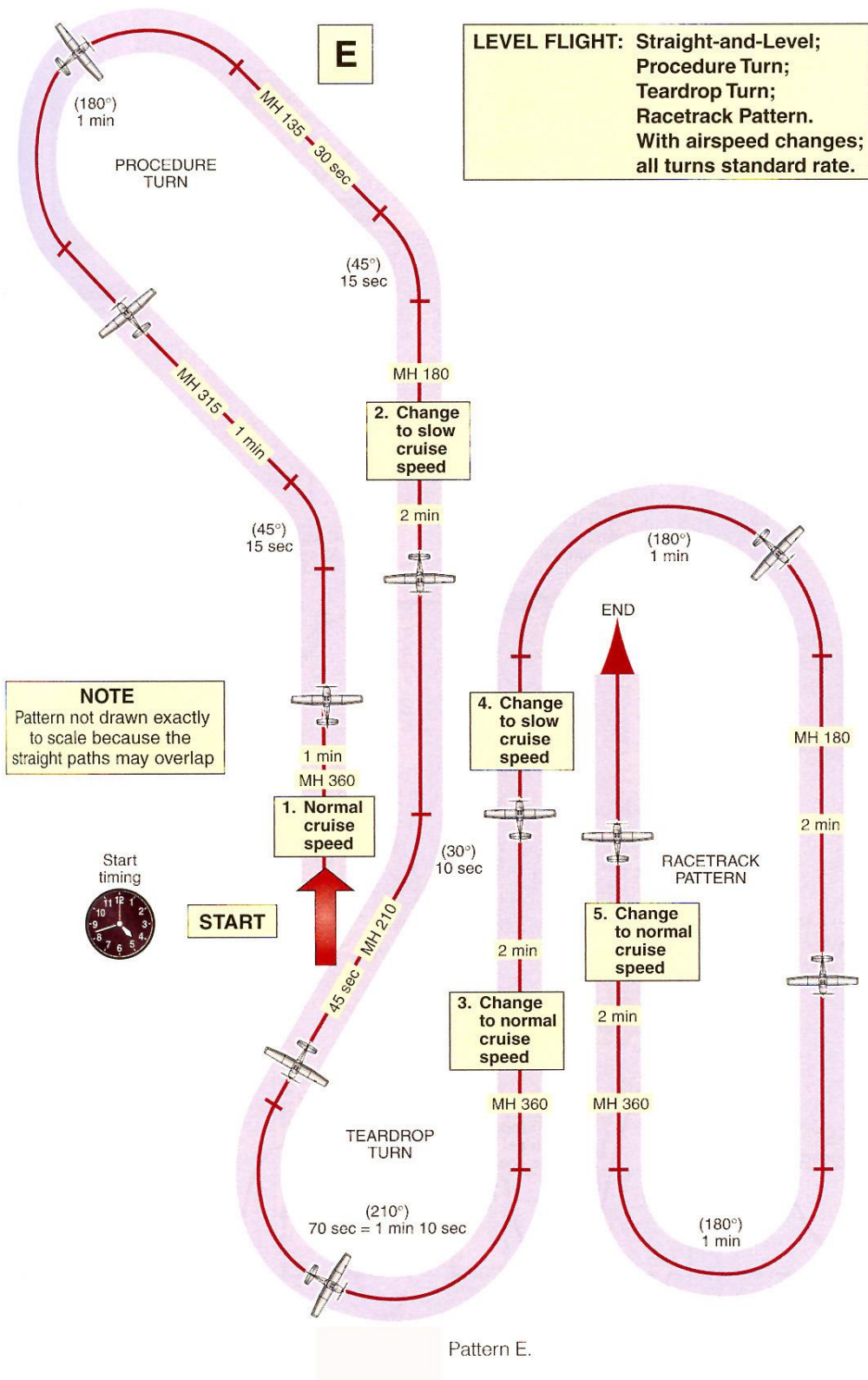
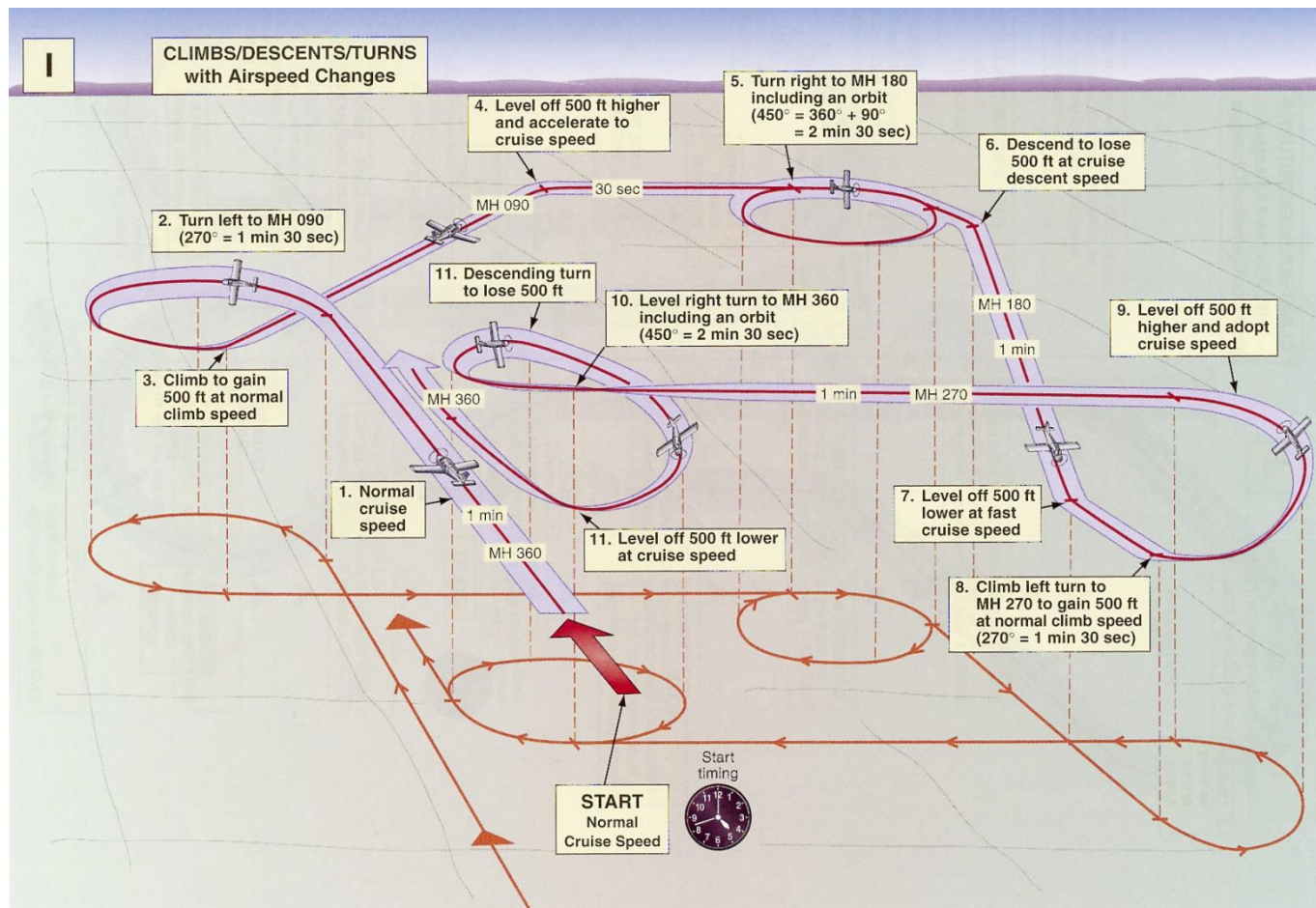


DIAGRAM 15 PATTERN I



Ground School Training Record

Instrument Pilot Ground School

STUDENT NAME: _____

STAGE I / STAGE II / STAGE III		
Date	Hours	Lesson
	1.2	Lesson 1 - Introduction to instrument flying , FAR's for IFR flight operations
	1.2	Lesson 2 - Advanced human concepts, ADM, CRM Crew Communications & Coordination
	1.2	Lesson 3 - Flight instruments
	1.2	Lesson 4 - Attitude instrument flying
	1.2	Lesson 5 - Instrument navigation by use of navigation system
	1.2	Lesson 6 - Airports, airspace and flight information
	1.2	Lesson 7 - Air traffic control system and procedures for instrument flight operations
	1.2	Lesson 8 - Air traffic control system - Instrument Clearances
	1.2	Lesson 9 - IFR departure charts and procedures
	1.2	Lesson 10 - Exam I
	1.2	Lesson 11 - Use of Low altitude enroute charts and area charts
	1.2	Lesson 12 - Enroute procedures
	1.2	Lesson 13 - Holding procedures
	1.2	Lesson 14 - Use of arrival charts and arrival procedures
	1.2	Lesson 15 - Use of Instrument Approach charts and approach procedures
	1.2	Lesson 16 - Instrument worksheet
	1.2	Lesson 17 - VOR and NDB approaches
	1.2	Lesson 18 - Review for exam II - Lessons 11-17
	1.2	Lesson 19 - Exam II
	1.2	Lesson 20 - Use of instrument approach procedures - ILS approaches
	1.2	Lesson 21 - Use of Instrument Approach Procedures - RNAV approaches
	1.2	Lesson 22 - Elementary Meteorology
	1.2	Lesson 23 - Weather hazards - Recognition of Critical Weather Situations and windshear
	1.2	Lesson 24 - Printed weather products -Procurement aviation weather reports & forecasts, elements of forecasting weather trends, personal observation of weather
	1.2	Lesson 25 - Graphic Weather Products -Procurement aviation weather reports & forecasts, elements of forecasting weather trends, personal observation of weather conditions
	1.2	Lesson 26 - Sources of weather information
	1.2	Lesson 27 - IFR emergencies
	1.2	Lesson 28 - IFR decision making and Judgment
	1.2	Lesson 29 - Safe and efficient operations of aircraft under instrument flight rules and conditions
	1.2	Lesson 30 - Exam 3 - Final
TOTAL	36	

	Grade	Instructor Signature
Exam I		
Exam II		
Final Exam		

Revision 2: December 01, 2013