Washington International Flight Academy

Training Course Outline

Private Pilot Airplane
Single Engine Land

Paperless141

US Department of Transportation
Federal Aviation Administration

APPLICATION FOR PILOT SCHOOL CERTIFICATION

Form approved: OMB No. 2120-0009
03/31/2007

CERT NO. *For FAA Use Only*

APPLICANT - Read submittal and signature instructions on reverse.

NAME OF SCHOOL	TELEPHONE NO.	ADDRESS OF PRINCIPAL BUSINESS OFFICE
Acme Flight School, Inc.	**(666) 555-1212**	**123 Entrance Drive, Looney Tunes, AZ 88130**

LOCATION OF MAIN OPERATIONS BASE	LOCATION OF SATELLITE BASE(S)
123 Entrance Drive, Looney Tunes, AZ 88130	**N/A**

APPLICATION IS HEREBY MADE FOR:

☒ Issuance of a Pilot School Certificate and associated ratings to conduct the training courses identified below, and for the approval of these courses *(three copies of each course outline are attached)*; also, examining authority is requested for the courses appropriately checked.

☐ Renewal of a Pilot School Certificate and associated ratings currently numbered _____, which expires on _____

☐ without changes to the curriculum or course outlines. ☐ with addition of course(s) identified below for which approval is requested (three copies of each course outline is attached), including request for examining authority for the course(s) appropriately checked. ☐ with deletion of course(s) identified below from the curriculum.

☐ Amending the current Pilot School Certificate and associated ratings numbered _____, which expires on _____

☐ by adding the course(s) identified below for which approval is requested (three copies of each course outline are attached), including request for examining authority where appropriately checked. ☐ for deletion of the course(s) identified below from the curriculum.

IDENTIFICATION OF TRAINING COURSES

NOTE.- Where examining authority for a course is desired, place and "X" in the box adjacent to the course identification. s

☐	**Private Pilot Airplane Single Engine Land**	☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	
☐		☐	

(If more space is needed, continue on reverse in space provided)

I (WE) certify that I am (we are) familiar with Part 141 of the Federal Aviation Regulations, and, to the best of my (our) knowledge, believe that my (our) school meets the requirements for certification as prescribed therein.

Sign Here

Date

Signature(s) and Title(s)

Elmer Fudd, President - Acme Flight School

Date

Do NOT Check this box

Check Here

FOR FAA USE ONLY

☐ APPROVED- ☐ a Provisional Pilot School Certificate ☐ a Pilot School Certificate, either with associated ratings bearing the number shown above is issued effective _____ and which expires on _____ ☐ DISAPPROVED

☐ Renewal ☐ without amendments ☐ with amendments ☐ Amendments

SIGNATURE OF APPROVING OFFICIAL	TITLE	DATE

FAA Form 8420-8 (1-82)

Recommendations of Inspector(s) on reverse

US Department
of Transportation
Federal Aviation
Administration

APPLICATION FOR PILOT SCHOOL CERTIFICATION

Form approved: OMB No. 2120-0009
03/31/2007

APPLICANT - Read submittal and signature instructions on reverse.

CERT NO. *For FAA Use Only*

NAME OF SCHOOL TELEPHONE NO.	ADDRESS OF PRINCIPAL BUSINESS OFFICE
LOCATION OF MAIN OPERATIONS BASE	LOCATION OF SATELLITE BASE(S)

APPLICATION IS HEREBY MADE FOR:

☐ Issuance of a Pilot School Certificate and associated ratings to conduct the training courses identified below, and for the approval of these courses *(three copies of each course outline are attached)*; also, examining authority is requested for the courses appropriately checked.

☐ Renewal of a Pilot School Certificate and associated ratings currently numbered _____, which expires on _____

☐ without changes to the currently approved course outlines, ☐ with addition of course(s) identified below for which approval is requested (three copies of each course outline is attached), including request for examining authority for the course(s) appropriately checked; ☐ with deletion of course(s) identified below from the curriculum.

☐ Amending the current Pilot School Certificate and associated ratings numbered _____, which expires on _____

☐ by adding the course(s) identified below for which approval is requested (three copies of each course outline are attached), including request for examining authority where appropriately checked; ☐ for deletion of the course(s) identified below from the curriculum.

IDENTIFICATION OF TRAINING COURSES

NOTE.- Where examining authority for a course is desired, place and "X" in the box adjacent to the course identification.s

☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____

(If more space is needed, continue on reverse in space provided)

I (WE) certify that I am (we are) familiar with Part 141 of the Federal Aviation Regulations, and, to the best of my (our) knowledge, believe that my (our) school meets the requirements for certification as prescribed therein.

Signature and Title(s) _____

_____

_____

Date _____

FOR FAA USE ONLY

☐ APPROVED - ☐ a Provisional Pilot School Certificate ☐ a Pilot School Certificate, either with ☐ DISAPPROVED
associated ratings bearing the number shown above is issued effective _____
and which expires on _____
☐ Renewal ☐ without amendments ☐ with amendments ☐ Amendments

SIGNATURE OF APPROVING OFFICIAL	TITLE	DATE

FAA Form 8420-8 (1-82)

Recommendations of Inspector(s) on reverse

INSTRUCTIONS TO THE APPLICANT:

Submit an original and one copy of this application, completed in full, along with the required number of attachments where specified on the face of this form, to the FAA District Office having jurisdiction over the area in which the school is located.

Signatures on the application should be as follows:

a. Application from a person acting as an individual should be signed by the owner;

b. Application from a partnership should be signed by all partners;

c. Application from a corporation should be signed by the president or such other officers as authorized by the corporation by-laws to sign for the corporation and certified to by the corporate secretary attesting to the authority of the individuals to sign such a document;

d. Application from a company, club, or association should be signed by the president or such other officer or director as authorized by the organization's by-laws, and attested to by the secretary.

IDENTIFICATION OF TRAINING COURSES (Continued)

NOTE: Where examining authority for a course is desired, place and "X" in the box adjacent to the course identification. s

☐	_____	☐	_____
☐	_____	☐	_____
☐	_____	☐	_____
☐	_____	☐	_____
☐	_____	☐	_____
☐	_____	☐	_____
☐	_____	☐	_____

THE FOLLOWING SPACE FOR FAA USE ONLY

Recommendations of Inspector(s)

INSPECTORS' SIGNATURES AND DATES	FOR OPERATIONS	FOR MAINTENANCE	FOR AVIONICS
	DATE	DATE	DATE

PAPERWORK REDUCTION ACT STATEMENT: The information collected is used to certificate pilot schools. The information is required to determine qualification and compliance. We estimate that it will take one half hour to complete. Use of this form is mandatory. No assurance of confidentiality is necessary or promised. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The control number for this collection of information is 2120-0009. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave. SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, ABA-20.

Washington International Flight Academy
7940 Airpark Rd.
Gaithersburg, Md, 20879

3/30/2012
Federal Aviation Administration
Flight Standards District Office
890 Airport Park Road
Suite 101
Glen Burnie, MD 21061

Dear Ronald J Curtis

This is to notify the Federal Aviation Administration of our intent to become an Approved Pilot School under Part 141 of the Federal Aviation Regulations.

We are prepared to begin operations on 4/23/2012, and are ready for your certification inspection. Enclosed is a copy of FAA Form 8420-8. We anticipate that operations will be conducted from Washington International Flight Academy, Montgomery County Airpark (GAI) Airport. Our address is 7940 Airpark Rd., Gaithersburg, Md 20879.

We intend to operate 2 aircraft, please see the list on the following page of this letter of intent for aircraft designation and respective registration number.

Harry Kraemer, holder of Pilot Certificate number 3517693, is the Chief Instructor for this course and he meets the Chief Flight Instructor requirements of FAR § 141.35. I have attached a copy of his pilot resume that may be verified when your inspection is conducted.

No Assistant Chief instructor is being submitted at this time.

Also enclosed are two copies of our Training Course Outline for your review and approval.

Yours sincerely,

Ziv Levy
Owner
Washington International Flight Academy

Type Aircraft	N-Number
1981 Cessna 172P	N52632
1983 Cessna 172Q	N911AT

Washington International Flight Academy

Training Course Outline

Private Pilot Airplane
Single Engine Land

Paperless141

Overview of How This Training Course Outline is Structured and Written.

This Training Course Outline is written in accordance with Advisory Circular 141-1A and is deliberately written in a particular structure to support the automatic software control of revision changes and automated synchronicity with a current List of Effective Pages for various Sections of the document. Washington International Flight Academy is utilizing the Paperless141 Flight School management and record keeping system. This system automatically manages all revisions and List of Effective Pages preventing any lapse of synchronization.

This Training Course Outline is divided into the following sections for ease of updating by the school and revision/change conformity management ease for the presiding Flight Standards District Office:

The Sections are:

- Section I
    - Facility
    - Airport(s)
    - Aircraft
    - Staffing
    - Sample Certificates
    - Administration and Record Keeping
    - Safety Procedures
    - Operations and Training Areas
    - Student & Instructor Requirements
    - Course Description
    - Stage Exams
    - Pertinent Advisory Circulars
- Section II
    - Course Syllabi

The Paperless141 Flight School management and record keeping system allows the Chief Instructor to extract and modify the built-in individual lesson content for any given lesson and submit the proposed change to their presiding Flight Standards District Office (FSDO), on paper or electronically. When this change is approved by the FSDO, the system automatically generates a newly synchronized List of Effective Pages which the school presents, physically or electronically, to the FSDO for stamp and signature processing. Once a copy of the new List of Effective Pages is returned to the school, the system automatically adopts this new revision in its presentation windows to students and instructor. This system greatly enhances the conformity of the syllabi content built into the system at the school to the approved records kept at the FSDO. As section I of this Training Course Outline is a normal word-processor document with its own automatically linked Table of Contents and List Of Effective Pages combination, it is separate form the Section II Syllabi part which maintained within the Papelress141 Software System, this is the primary reason the TCO must be divided into sections with a List of Effective Pages for each section.

RECORD of REVISIONS

Revision Number	Revision Date	Insertion Date	By	Comments
~Original~	3/31/2010	3/31/2010	Ziv Levy	Original Submission

TABLE of CONTENTS for Sections I and II

List of Effective Pages (for Section I)

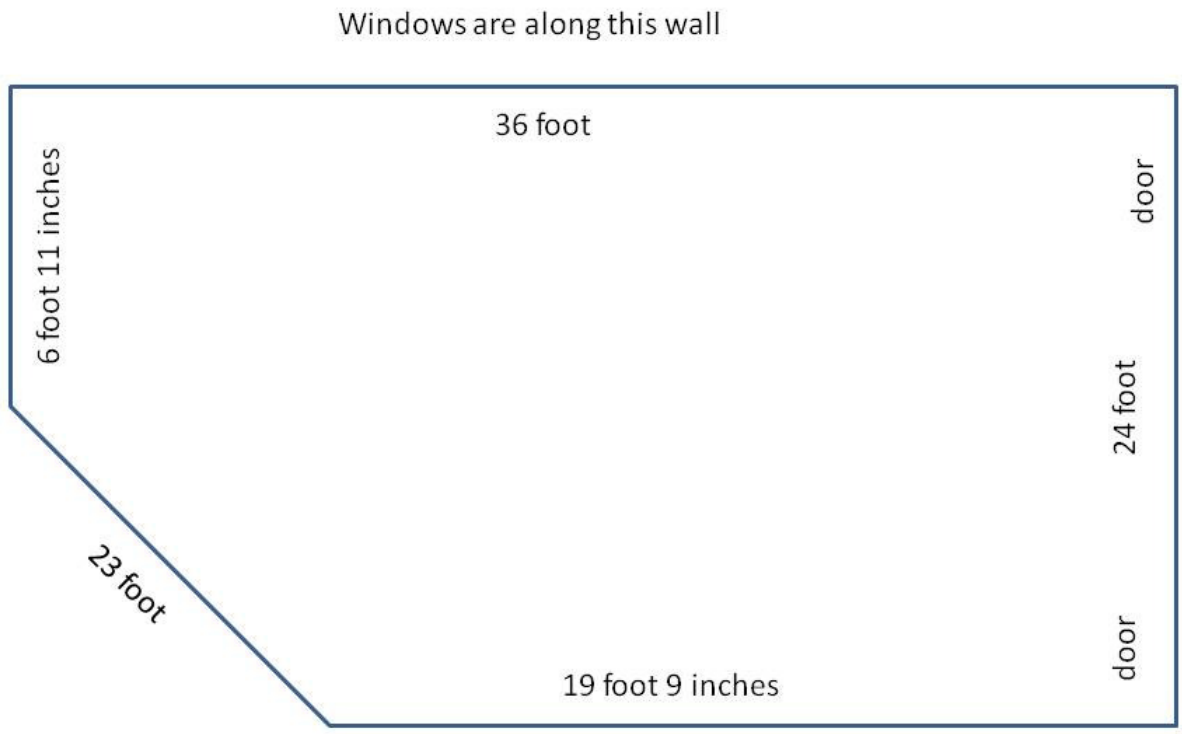
SECTION I

Item Rev. ~Original~ Date 3/31/2010
Washington International Flight Academy Facilities Overview

Washington International Flight Academy, located at Montgomery County Airpark (GAI) Airport, Gaithersburg, MD and operated as:

Washington International Flight Academy
Montgomery County Airpark (GAI) Airport.
7940 Airpark Rd., Gaithersburg, Md 20879

Item Rev. ~Original~ 3/31/2010 GROUND INSTRUCTIONAL FACILITIES. Ground instructional facilities are located in Washington International Flight Academy facility, located at Montgomery County Airpark (GAI) Airport, Gaithersburg, MD. Training space consists of 1 training room with 2 separate cubicals. Each training space has a table and chairs for student and instructor. The classroom has accommodations for group training. The following diagram depicts the facility to be used.

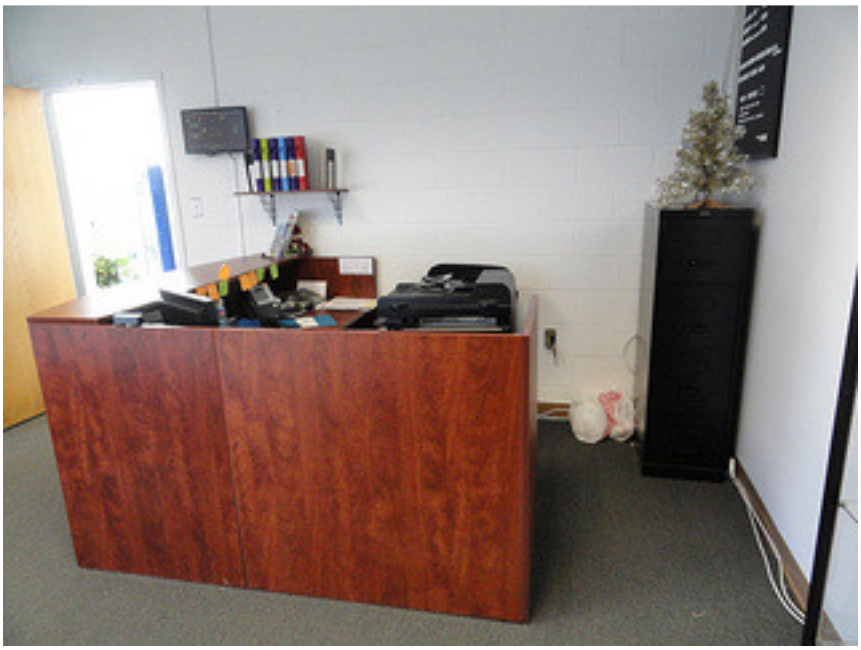


Washington International Flight AcademyOverall Office Layout

All office/classroom/briefing areas are located together in the same building. Aircraft are in tiedowns within 50 feet and in a hangar nearby. A restroom is located within the facility. Air conditioning is provided and available for use as needed in addition to heating.

A view of the front of the classroom

A view of the rear of the classroom



Reception Area

Another view of the reception area

A view of the cubical in the classroom. Each cubical has a computer with internet access for flight planning and obtaining weather briefings.

Item Rev. ~Original~ 3/31/2010 AIRPORT.
Montgomery County Airpark (GAI) Airport is the main operations base for training in this course. It has a hard-surfaced runway which meets the requirements of FAR § 141.38 for day and night flight operations. Maintenance services available 24 hours. Fuel service is available 07:30 - 19:00 EST.

Item Rev. ~Original~ 3/31/2010 AIRPORT FACILITIES.
Washington International Flight Academy facility includes a pilot briefing area; the briefing area is equipped with Internet service, computer, a printer and a standard line telephone for obtaining weather briefings from the Flight Service Station (FSS). The facility is used exclusively by students.

Item Rev. ~Original~ 3/31/2010 AIRCRAFT.
The aircraft listed below will be used for all flight training in this course. These aircraft meet the requirements of FAR § 141.39. Radio equipment will consist of at least one 360 channel transceiver and a 4096 code transponder with Mode C capability. The aircraft is/are equipped for day/night VFR as specified in FARS 91.205.

Type Aircraft	**N-Number**
1981 Cessna 172P	N52632
1983 Cessna 172Q	N911AT

Item Rev. ~Original~ 3/31/2010 CHIEF FLIGHT INSTRUCTOR.
Harry Kraemer

Item Rev. ~Original~ 3/31/2010 ASSISTANT CHIEF FLIGHT INSTRUCTOR.
TBA

Harry Kraemer
21520 Blunt Road
Germantown, MD 20876
301-520-2109 harry@flymall.org

Certificates

Airline Transport Pilot – Airplane Single Engine Land
Commercial Pilot – Single Engine Sea and Multi Engine Land
Gold Seal Instructor since 1989 – Airplane Single & Multi Engine Land, Instrument Airplane 47 signoffs/3 failures
Ground Instructor – Advanced & Instrument
50 hours towards A&P Certificate

Special Training

Garmin Approved G1000 & GFC 700 Line Maintenance Course, March 2007
Cessna CFAI (Cessna FITS Accepted Instructor) training, August 2005
Cessna TAA/G1000 Transition Course, June 2005
Pilot Examiner-Airplane (PEA) written passed, score 98, expired 11/30/2008
Cirrus SR20 & 22 Initial Pilot Training, Cirrus Design Corp, Duluth MN, March 2002
EAA Engine Installation Workshop, June 2000
Exxon Aviation Line Service Training Course, May 2000
Airborne Weather Radar Training by Archie Trammell, March 2000
PC12 Initial Training/Recurrent Training at SIMCOM Training Centers, December 2000
Convective Weather Symposium by Archie Trammell & James Johnson, April 1998
PA-46 Initial Training/Recurrent Training by Aviation Training Management Inc., Feb 1996
Calypso Airways Aircraft Maintenance Course, July 1986
Physiological Training at Andrews Air Force Base, November 1985
Designated Written Test Examiner Standardization Course
FAA Pilot Proficiency Wings – Phase I through XIV

Flight Time **(flown 107 different types of aircraft from all categories)**

Total 8100	Turbine 730	Instrument 750
Multi-Engine 200	Instructor 5081	PIC 7884

Education

Associate of Science in Professional Aeronautics & Corporate Aviation Management Certificate Programs @ Embry-Riddle Aeronautical University (enrolled currently)

Awards

NBAA Professional Development Program Completion Award (Aviation Management Skills) (April 2002)
NBAA Pilot Safety Award, 1500 Accident Free Corporate Flight Hours (2001)
National Association of Flight Instructors – Master Aerobatic Instructor Award (March 2002-2004)
National Association of Flight Instructors – Master Ground Instructor Award (April 2001-2005)
FAA Safety Counselor of the Year Baltimore District (1999)
National Association of Flight Instructors-Master CFI Award (May 1998-2014)
National Business Aviation Association-Corporate Business Flying Safety Award (1998,1999,2000)
National Business Aviation Association-Aviation Support Services Safety Award (1998,1999)
FAA Certificate of Recognition for Outstanding Support & Participation in the General Aviation Accident Program (1993)
FAA Flight Instructor of the Year–Runner-Up, Baltimore District (1992)

Related Activities

NAFI's Sport Pilot NPRM response team (February 2002)
Speaker, Docent and Aircraft Restorer-College Park Aviation Museum (June 1999 to Dec 2003)
Montgomery County Airport Advisory Committee (November 2000 to October 2001)
Board Member-Montgomery County Airport Association (June 1999 to November 2000)
Secretary-Montgomery County Airport Association (January 2000 to June 2000)
EAA Flight Advisor (October 1998 to Present) (Bronze Pin Award, Nov 2002)
FAA Aviation Safety Counselor (January 1992 to December 2005)

Item Rev. ~Original~ Date 3/31/2010 Sample Certificates:

This is to Certify that

John Doe

has successfully completed XX hours of cross-country training, all stages, tests and course requirements, and has graduated from the

Federal Aviation Adminstration

Far Part 141 Private Pilot Certification Course

Conducted by: School Name

The Graduate has completed the training specified in FAR Part 141

I certify the above statements are true

_____

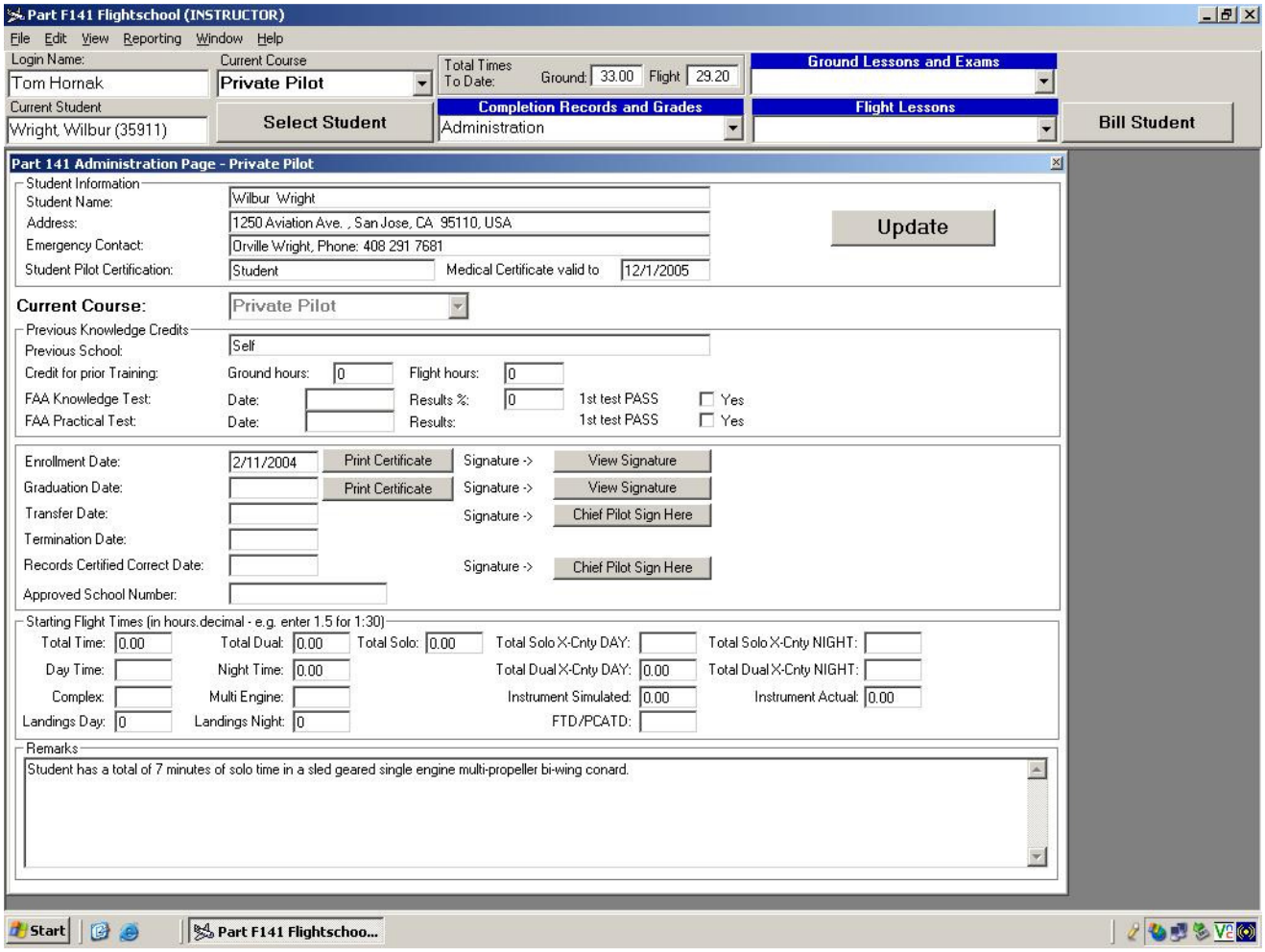
Chief Instructor

School Number:

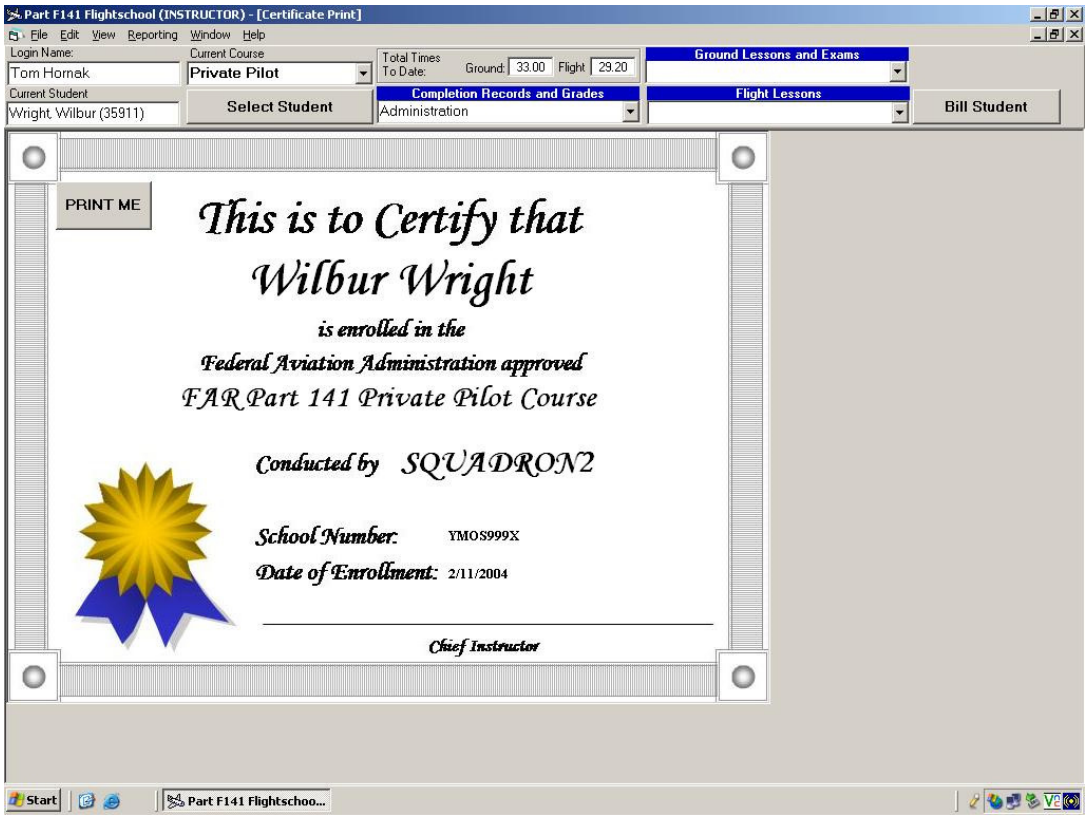
Date of Graduation:

Washington International Flight Academy uses a computerized system for all school administration, record keeping, scheduling, grading, stage examining, aircraft dispatch, aircraft maintenance, accounting and student enrollment/graduation. Please visit www.paperless141.com for more details. The system is provided by Paperless141, the following pages illustrate samples of some key elements and examples.

Student Administration Sample

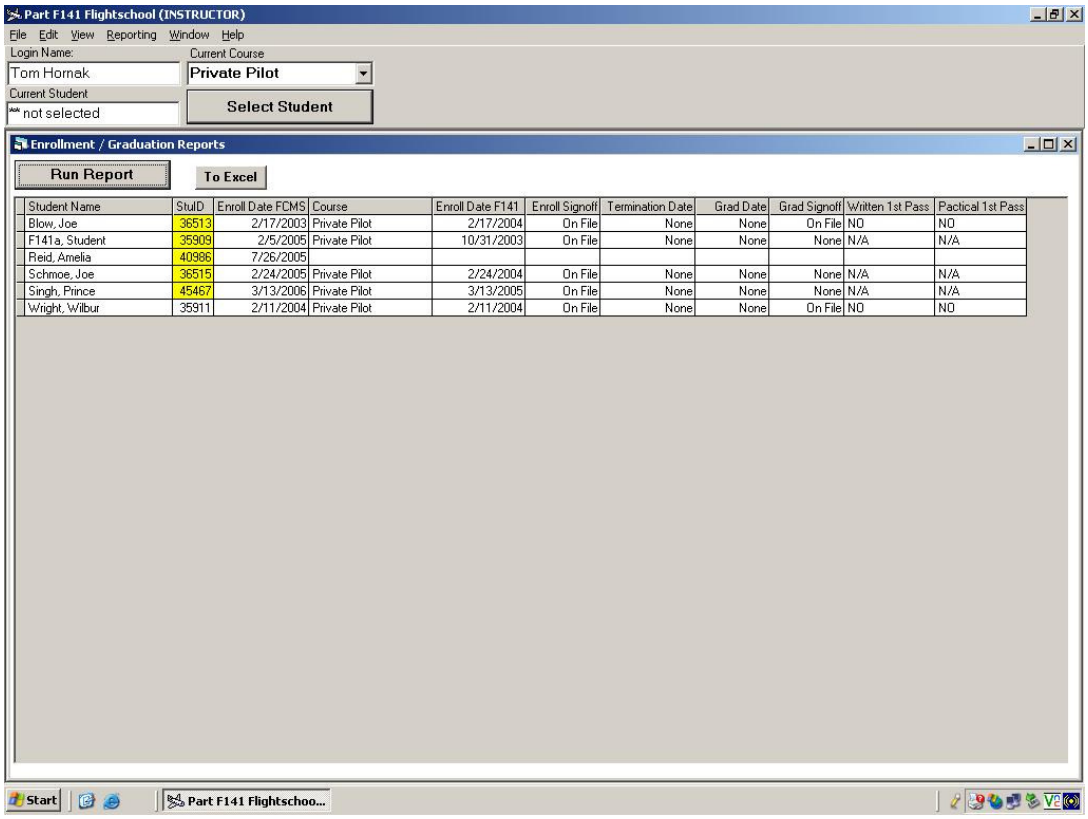


Enrollment Certificate Printing

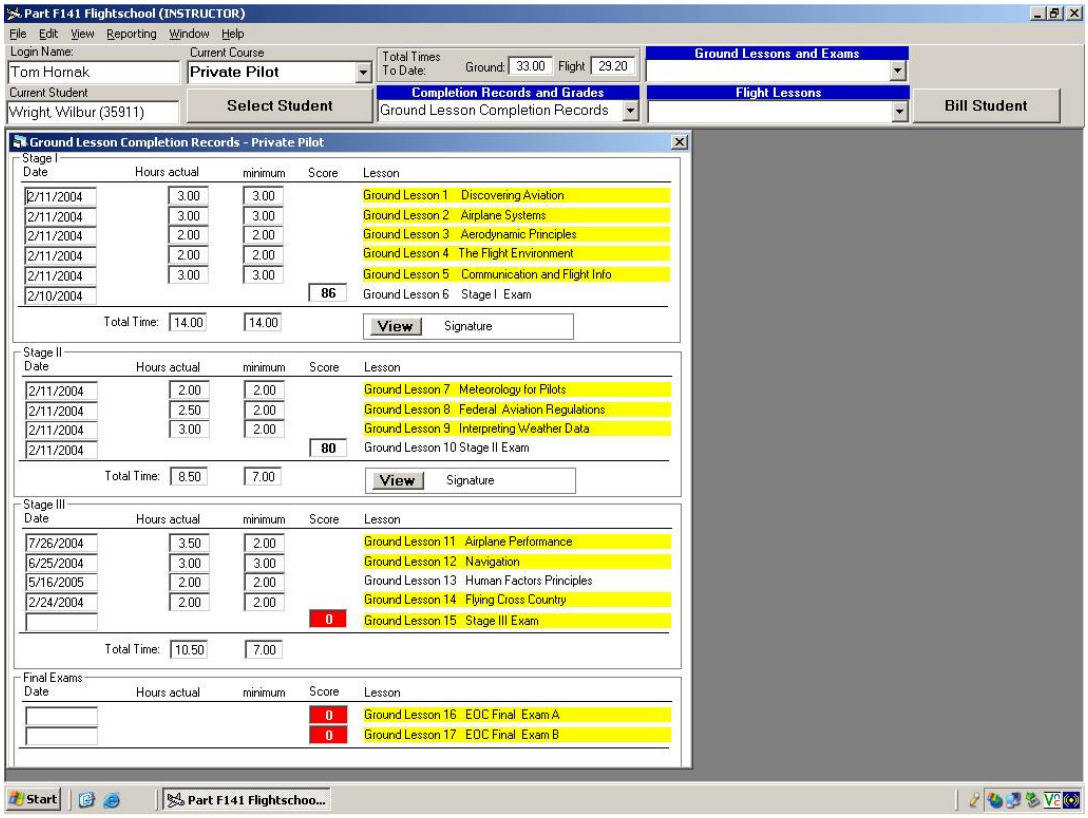


Graduation Certificate

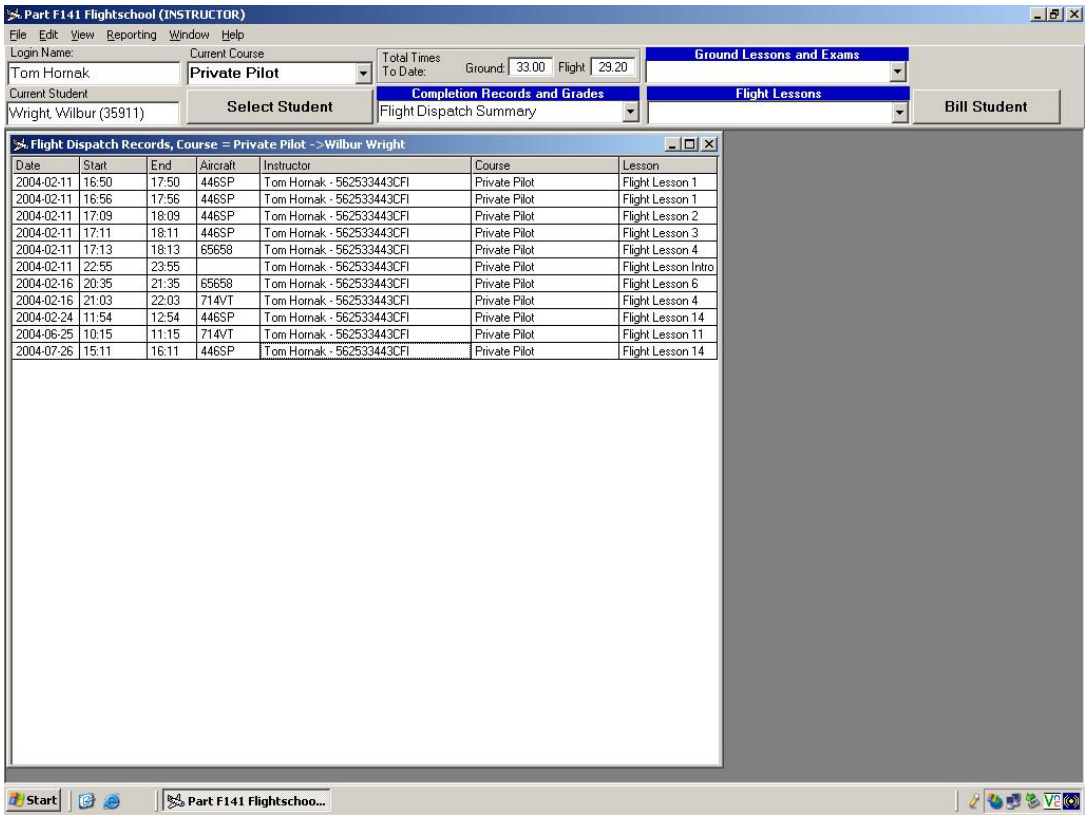
Enrollment/Graduation Summary



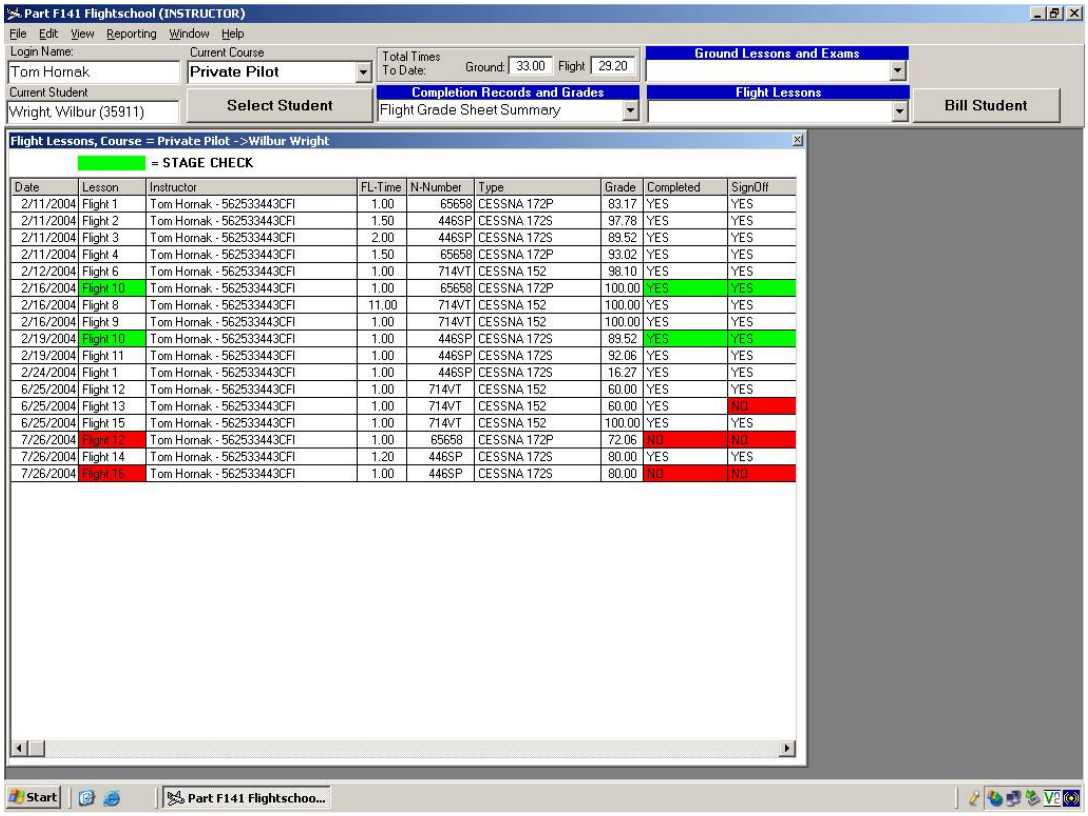
Ground Lesson Summary



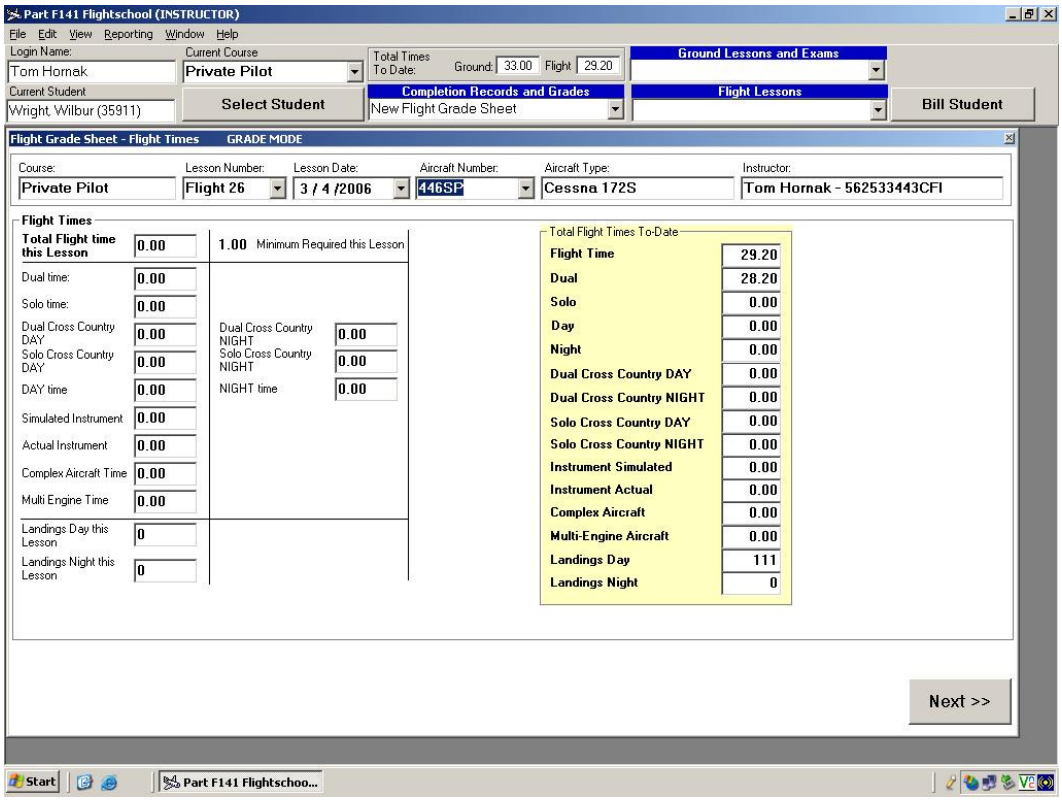
Flight/Aircraft Dispatch Report

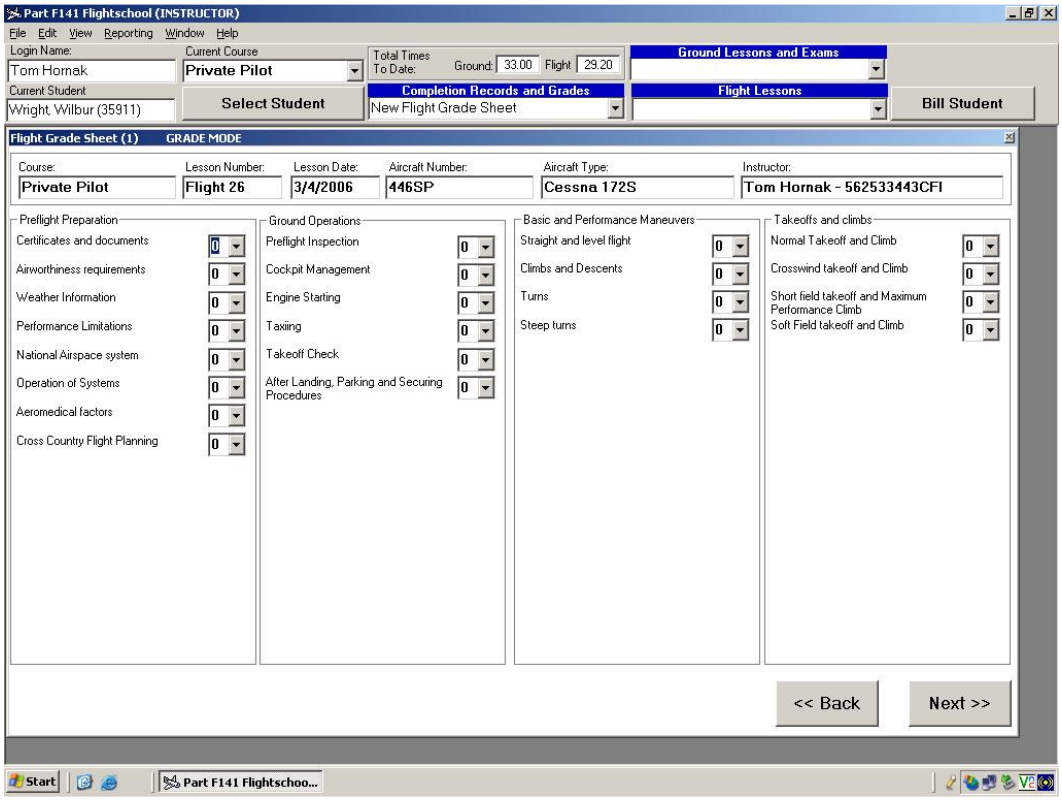


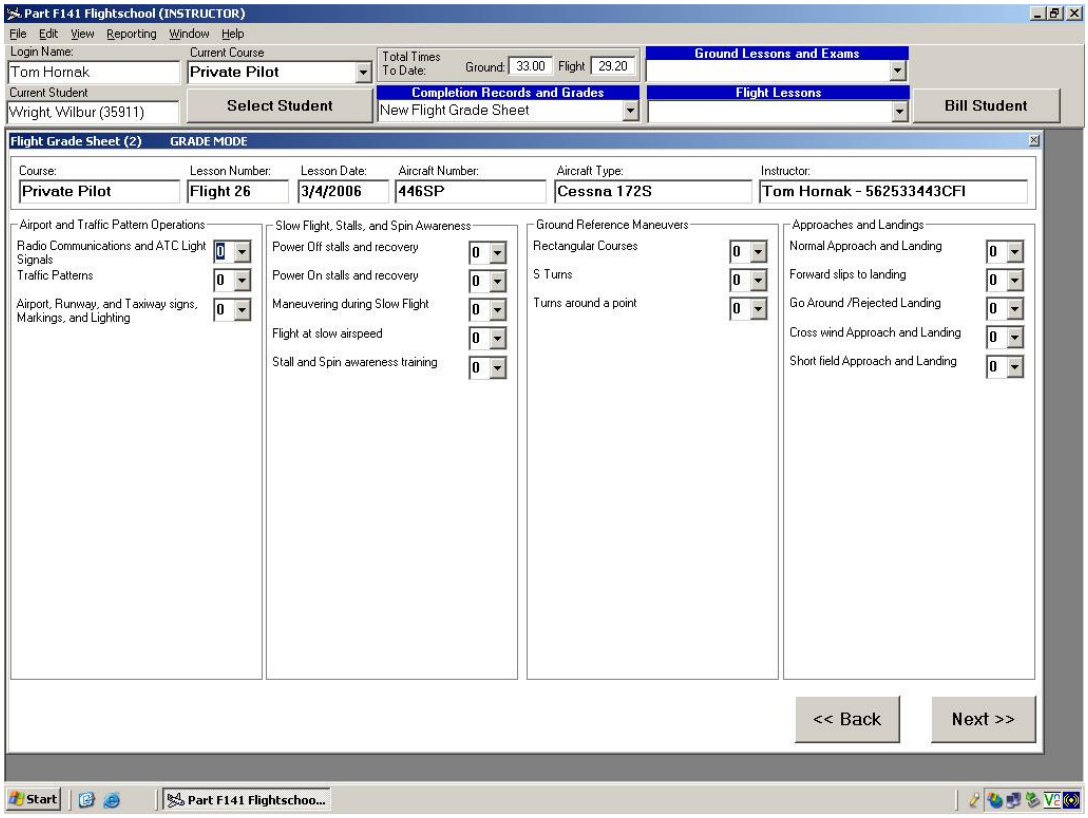
Flight Lesson Summary

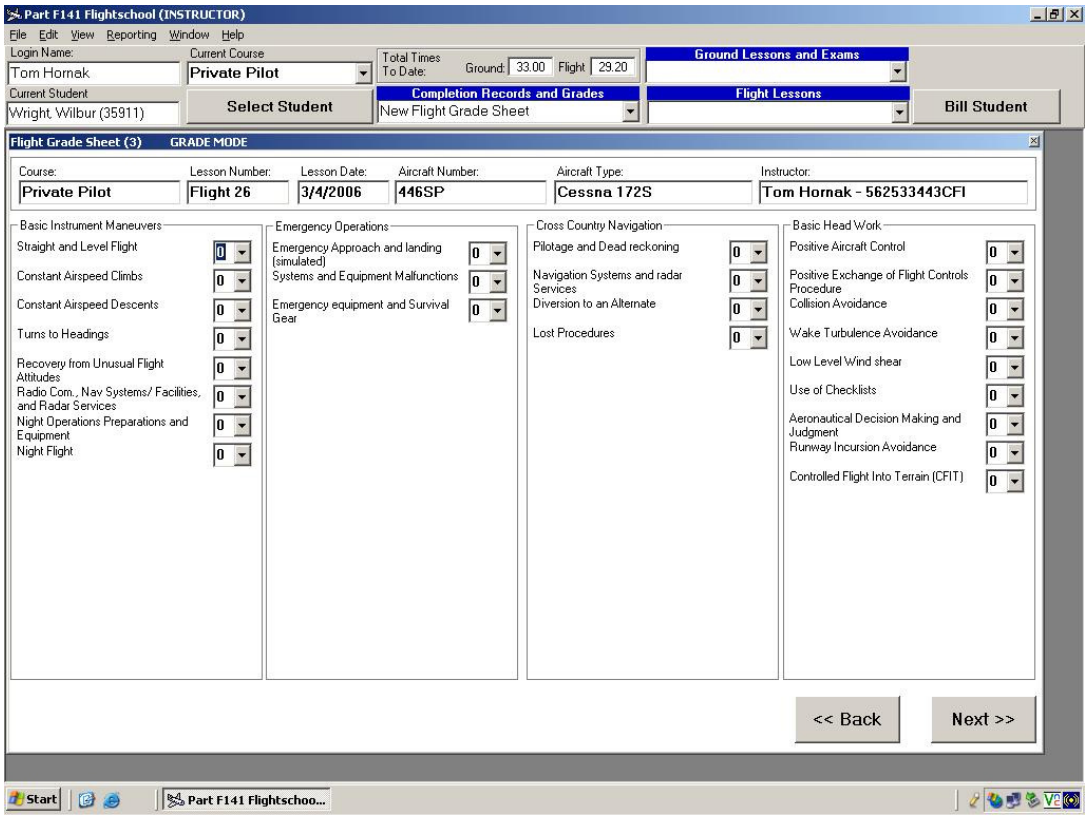


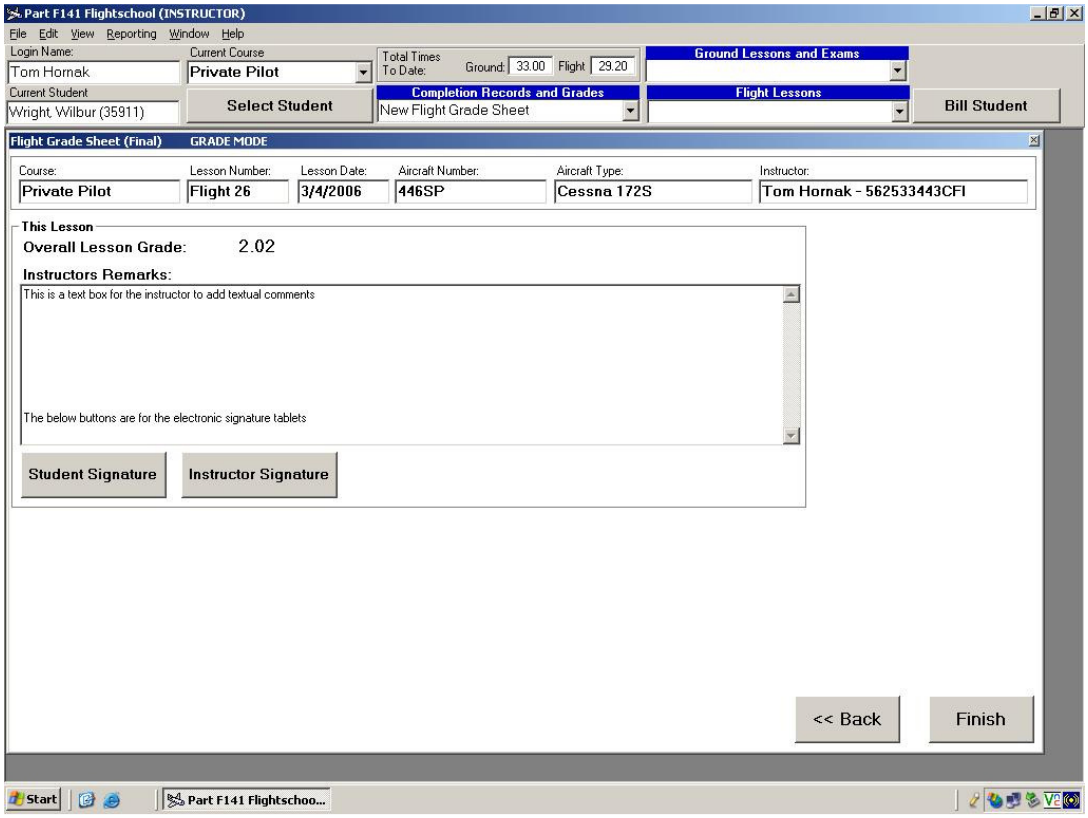
Flight Lesson Grading Screens 1 - 6

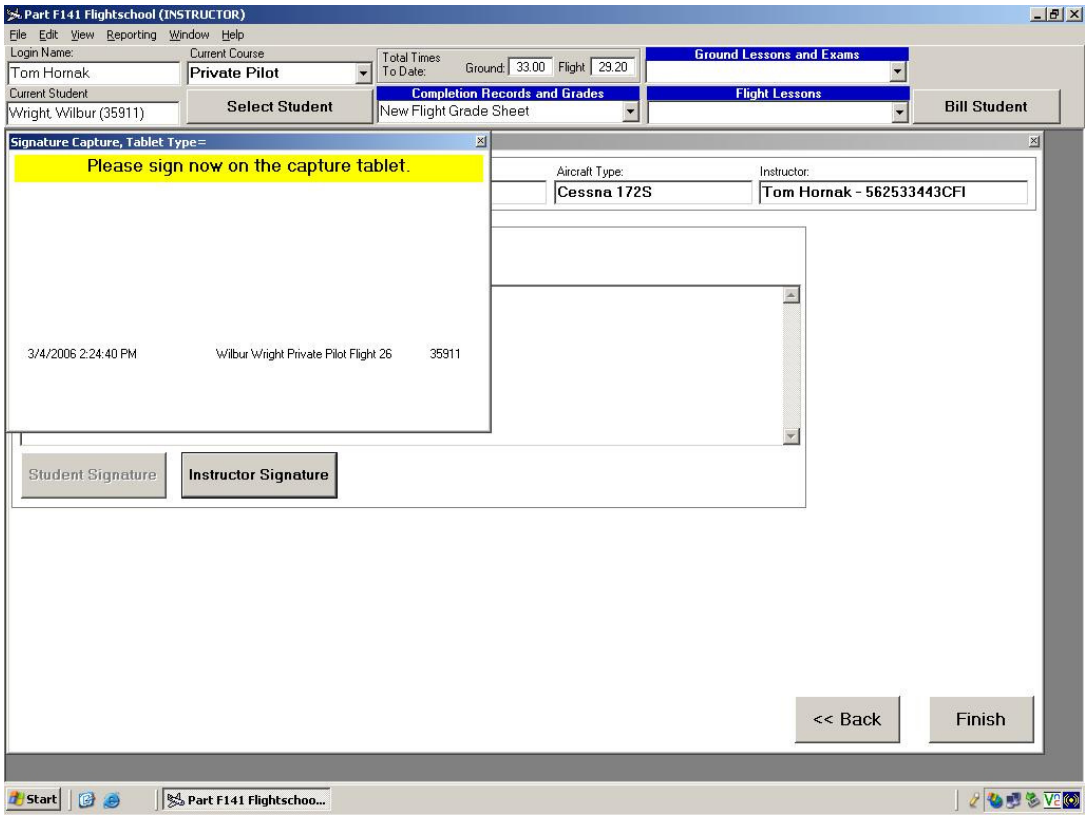





Part F141 Flightschool (INSTRUCTOR)
File Edit View Reporting Window Help
Login Name: Tom Hornak
Current Course: Private Pilot
Total Times To Date: Ground: 33.00 Flight: 29.20
Ground Lessons and Exams
Current Student: Wright, Wilbur (35911)
Select Student
Completion Records and Grades: New Flight Grade Sheet
Flight Lessons
Bill Student
Flight Grade Sheet (2) GRADE MODE
Course: Private Pilot
Lesson Number: Flight 26
Lesson Date: 3/4/2006
Aircraft Number: 446SP
Aircraft Type: Cessna 172S
Instructor: Tom Hornak - 562533443CFI
Airport and Traffic Pattern Operations
Radio Communications and ATC Light Signals
Traffic Patterns
Airport, Runway, and Taxiway signs, Markings, and Lighting
Slow Flight, Stalls, and Spin Awareness
Power Off stalls and recovery
Power On stalls and recovery
Maneuvering during Slow Flight
Flight at slow airspeed
Stall and Spin awareness training
Ground Reference Maneuvers
Rectangular Courses
S Turns
Turns around a point
Approaches and Landings
Normal Approach and Landing
Forward slips to landing
Go Around /Rejected Landing
Cross wind Approach and Landing
Short field Approach and Landing
<< Back
Next >>
Start
Part F141 Flightschoo...


Part F141 Flightschool (INSTRUCTOR)
File Edit View Reporting Window Help
Login Name: Tom Hornak
Current Course: Private Pilot
Total Times To Date: Ground: 33.00 Flight: 29.20
Ground Lessons and Exams
Current Student: Wright, Wilbur (35911)
Select Student
Completion Records and Grades: New Flight Grade Sheet
Flight Lessons
Bill Student
Flight Grade Sheet (3) GRADE MODE
Course: Private Pilot
Lesson Number: Flight 26
Lesson Date: 3/4/2006
Aircraft Number: 446SP
Aircraft Type: Cessna 172S
Instructor: Tom Hornak - 562533443CFI
Basic Instrument Maneuvers
Straight and Level Flight
Constant Airspeed Climbs
Constant Airspeed Descents
Turns to Headings
Recovery from Unusual Flight Attitudes
Radio Com., Nav Systems/ Facilities, and Radar Services
Night Operations Preparations and Equipment
Night Flight
Emergency Operations
Emergency Approach and landing (simulated)
Systems and Equipment Malfunctions
Emergency equipment and Survival Gear
Cross Country Navigation
Pilotage and Dead reckoning
Navigation Systems and radar Services
Diversion to an Alternate
Lost Procedures
Basic Head Work
Positive Aircraft Control
Positive Exchange of Flight Controls Procedure
Collision Avoidance
Wake Turbulence Avoidance
Low Level Wind shear
Use of Checklists
Aeronautical Decision Making and Judgment
Runway Incursion Avoidance
Controlled Flight Into Terrain (CFIT)
<< Back
Next >>
Start
Part F141 Flightschoo...


Part F141 Flightschool (INSTRUCTOR)
File Edit View Reporting Window Help
Login Name:
Tom Hornak
Current Course
Private Pilot
Total Times To Date:
Ground: 33.00
Flight 29.20
Ground Lessons and Exams
Current Student
Wright, Wilbur (35911)
Select Student
Completion Records and Grades
New Flight Grade Sheet
Flight Lessons
Bill Student
Flight Grade Sheet (Final)
GRADE MODE
Course:
Private Pilot
Lesson Number:
Flight 26
Lesson Date:
3/4/2006
Aircraft Number:
446SP
Aircraft Type:
Cessna 172S
Instructor:
Tom Hornak - 562533443CFI
This Lesson
Overall Lesson Grade:
2.02
Instructors Remarks:
This is a text box for the instructor to add textual comments
The below buttons are for the electronic signature tablets
Student Signature
Instructor Signature
<< Back
Finish
Start
Part F141 Flightschoo...


Part F141 Flightschool (INSTRUCTOR)
File Edit View Reporting Window Help
Login Name:
Tom Hornak
Current Course
Private Pilot
Total Times To Date:
Ground: 33.00
Flight 29.20
Ground Lessons and Exams
Current Student
Wright, Wilbur (35911)
Select Student
Completion Records and Grades
New Flight Grade Sheet
Flight Lessons
Bill Student
Signature Capture, Tablet Type=
Please sign now on the capture tablet.
3/4/2006 2:24:40 PM
Wilbur Wright Private Pilot Flight 26
35911
Aircraft Type:
Cessna 172S
Instructor:
Tom Hornak - 562533443CFI
Student Signature
Instructor Signature
<< Back
Finish
Start
Part F141 Flightschoo...

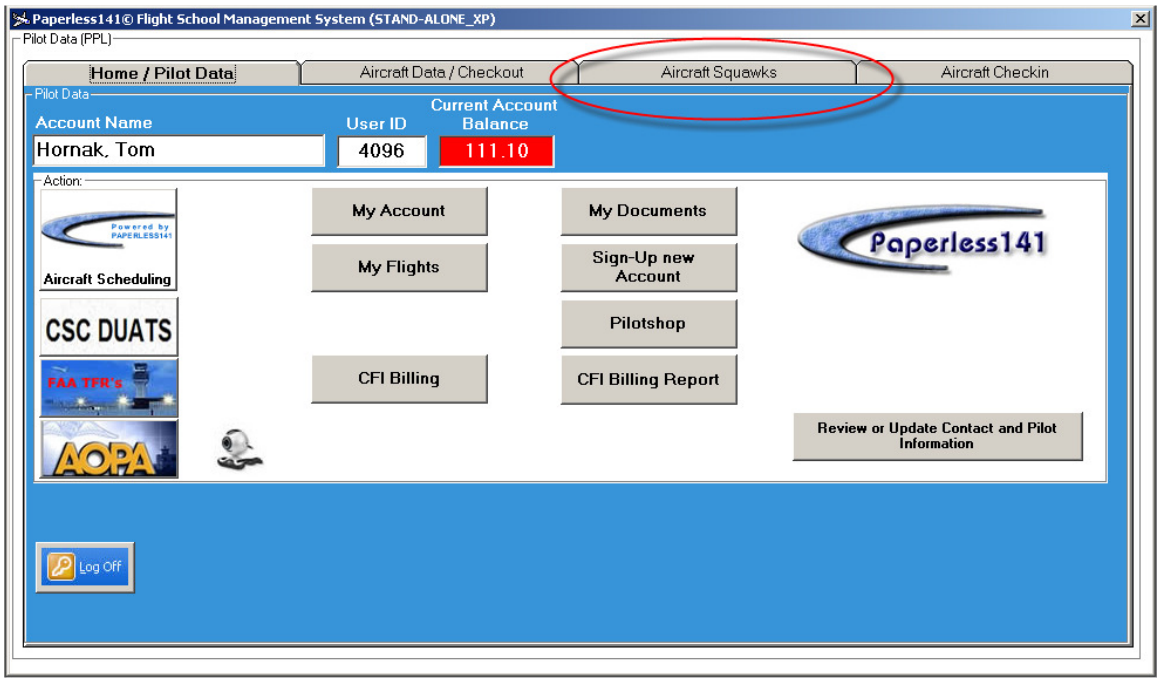
Item Rev. ~Original~ Date 3/31/2010 Aircraft Squawks

Pilots can see any open or closed aircraft squawks in two ways;
1) as an isolated operation, or,
2) as part of Checking the Aircraft Data and Checkout.

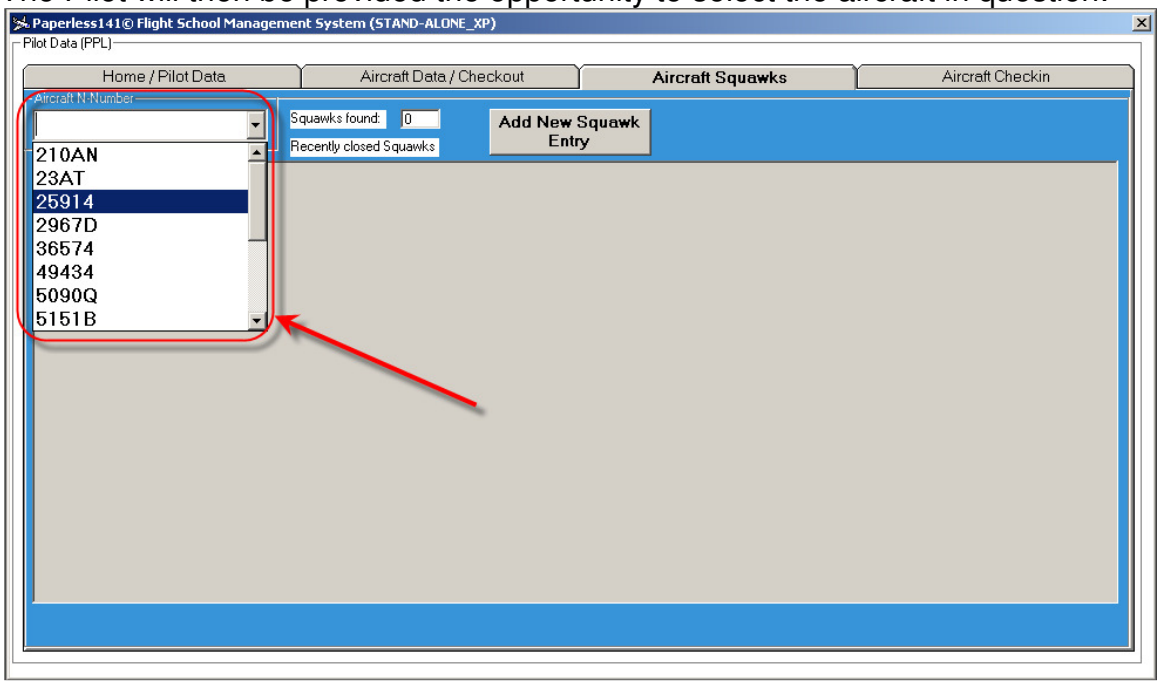
The aircraft must be “Checked-Out” from the system prior to any flight and in some cases prior to obtaining the keys (in the case where an automated key locker is incorporated into the system). In the case of Aircraft Checkout, the pilot is forced to view squawk information.

Viewing Squawks as an isolated operation:

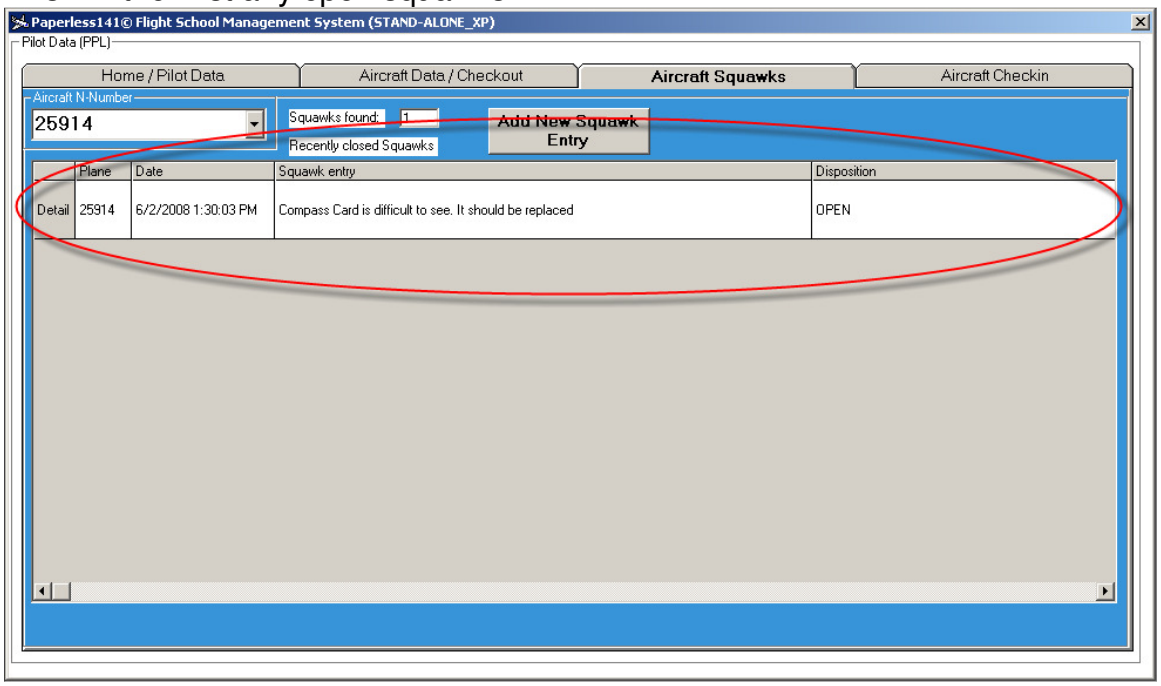
By selecting the “Aircraft Squawks” tab form the Pilot Module of the Paperless141 System:



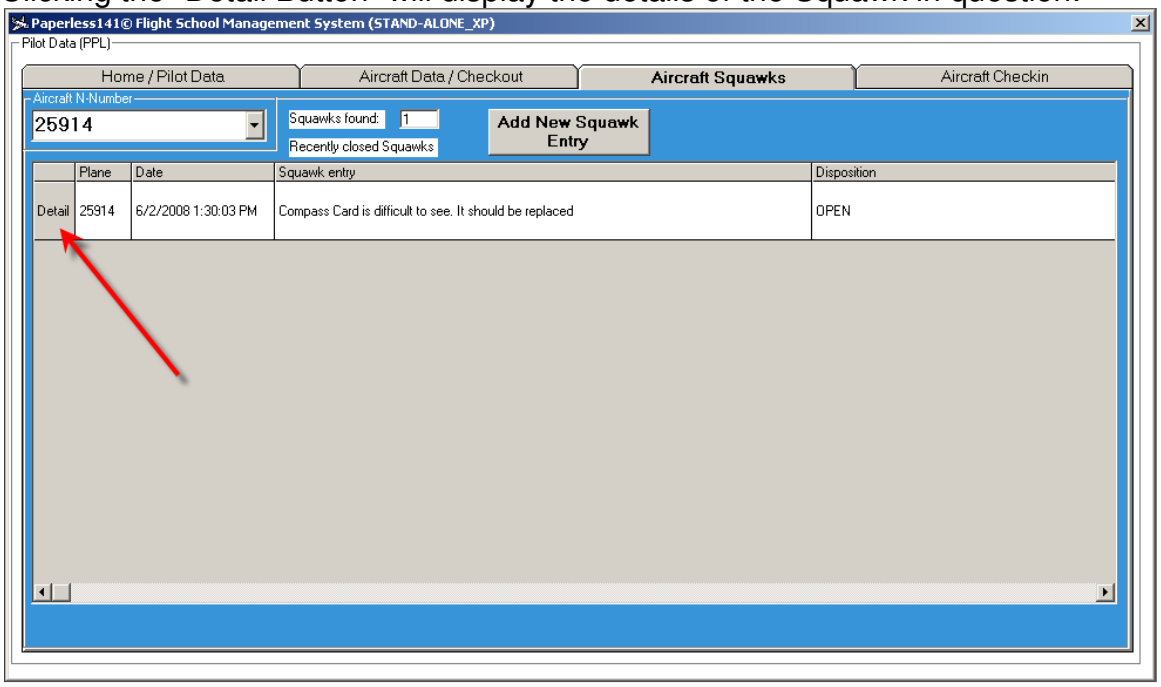
The Pilot will then be provided the opportunity to select the aircraft in question:



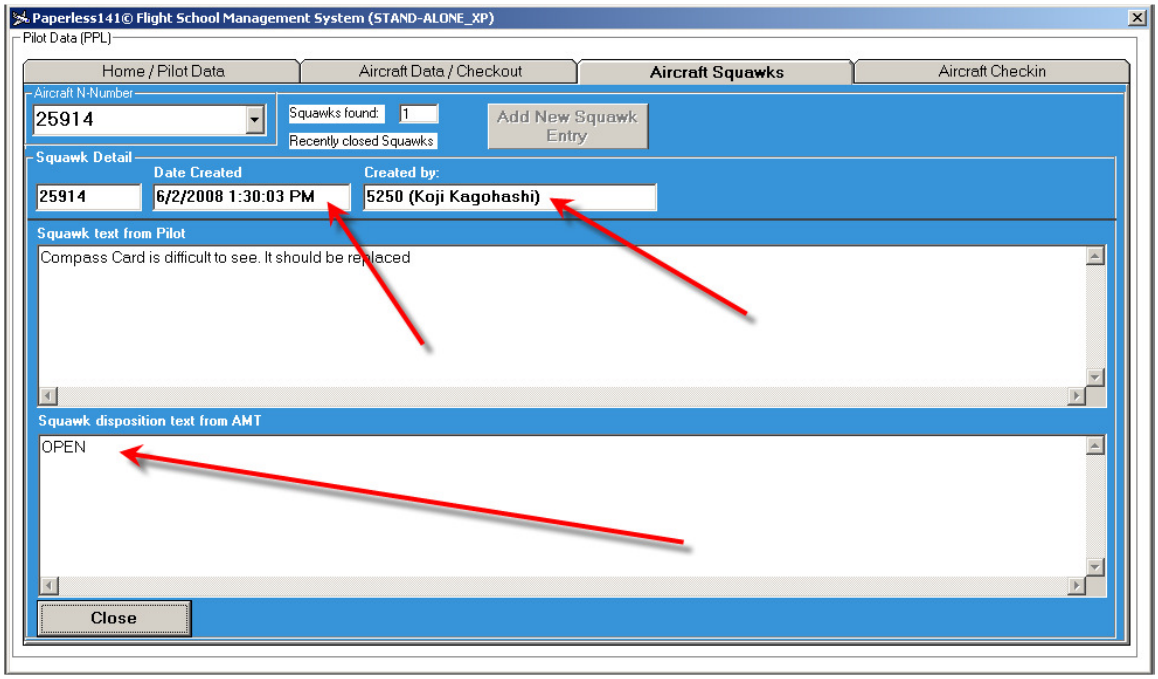
This will then list any open squawks:



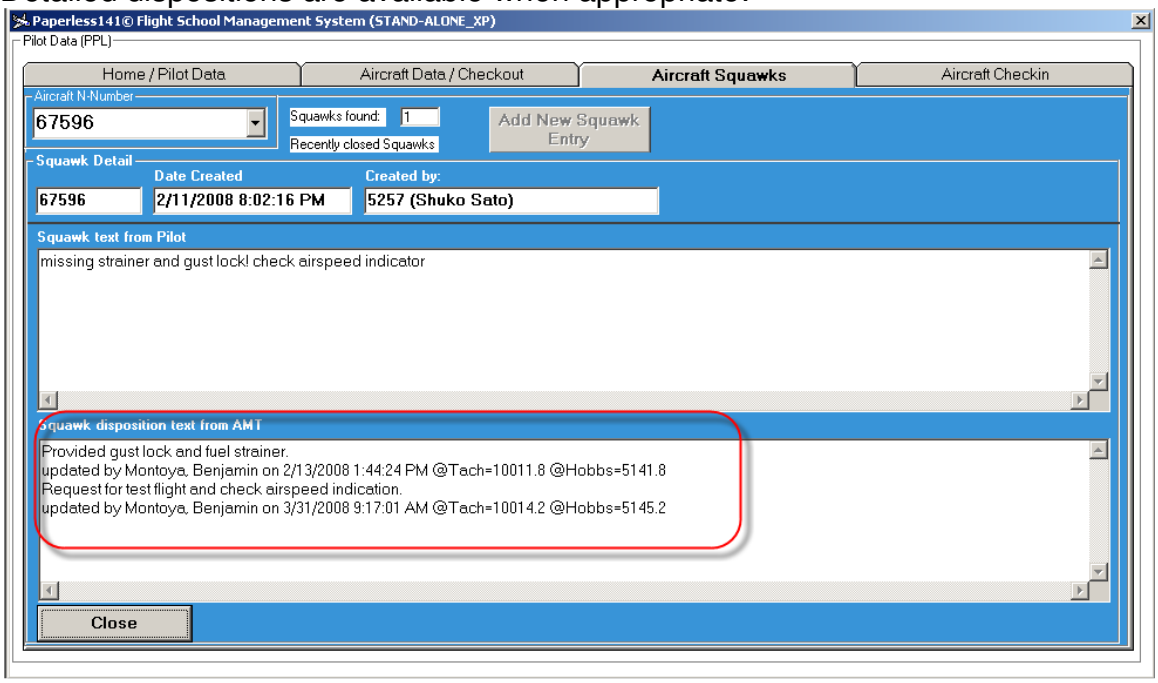
Clicking the “Detail Button” will display the details of the Squawk in question:



The Pilot can then see: The date of creation, who created it and the current disposition and or comments form the AMT.

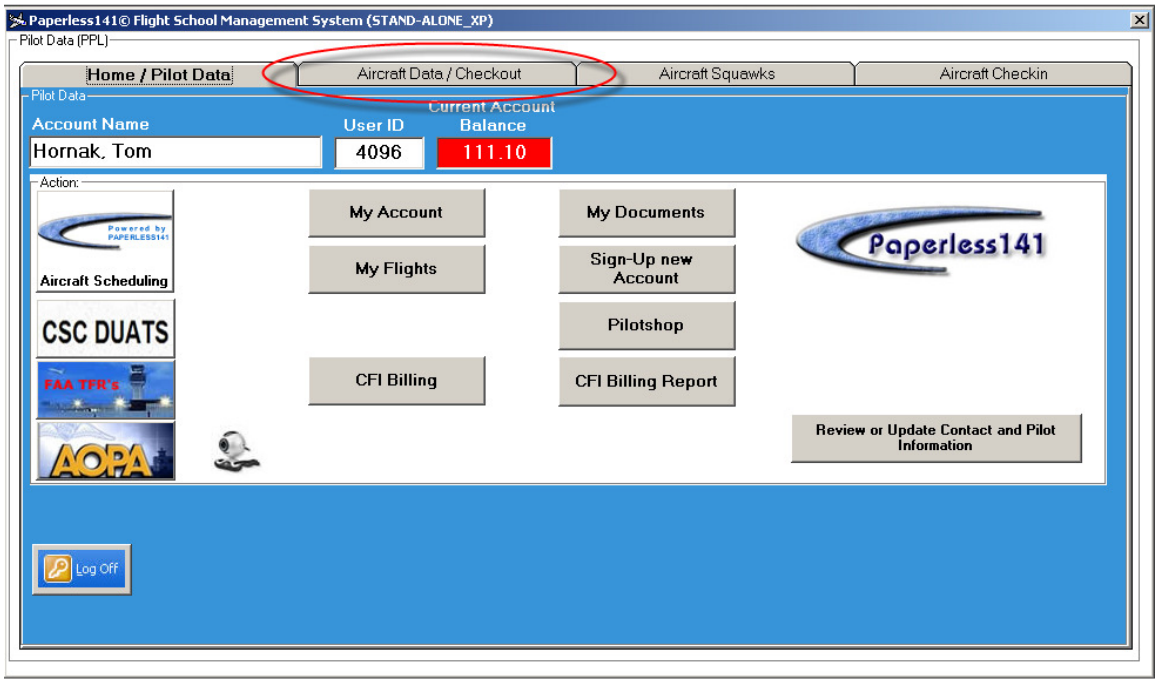


Detailed dispositions are available when appropriate:

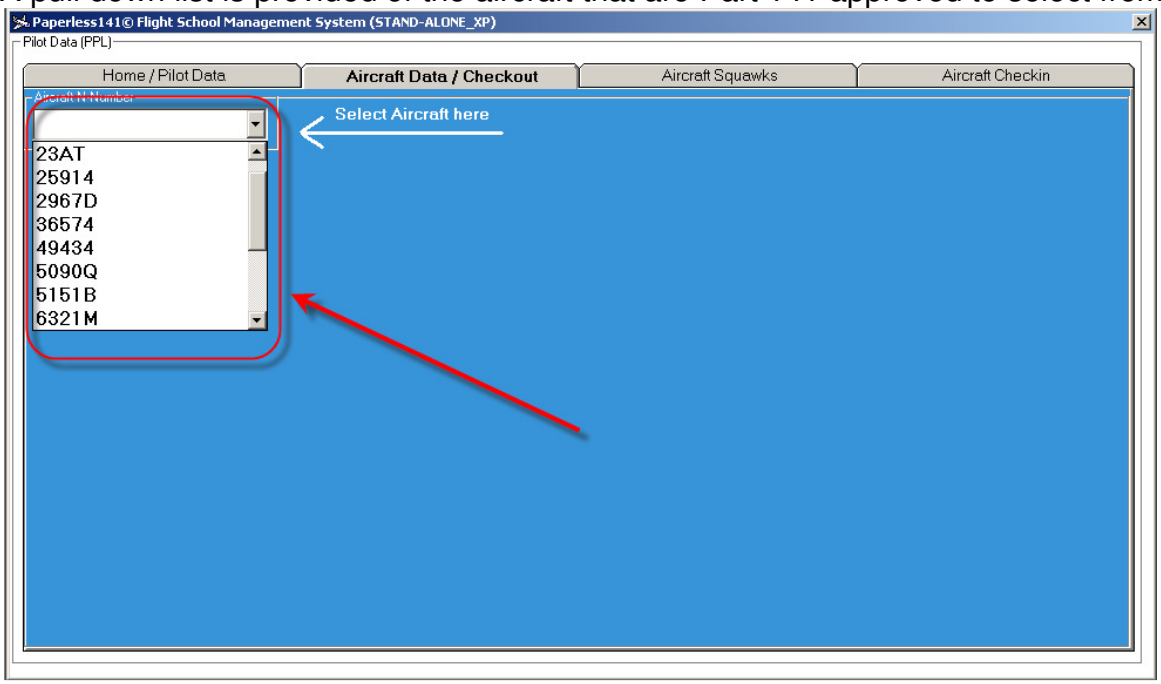


Squawk review as part of Aircraft Checkout:

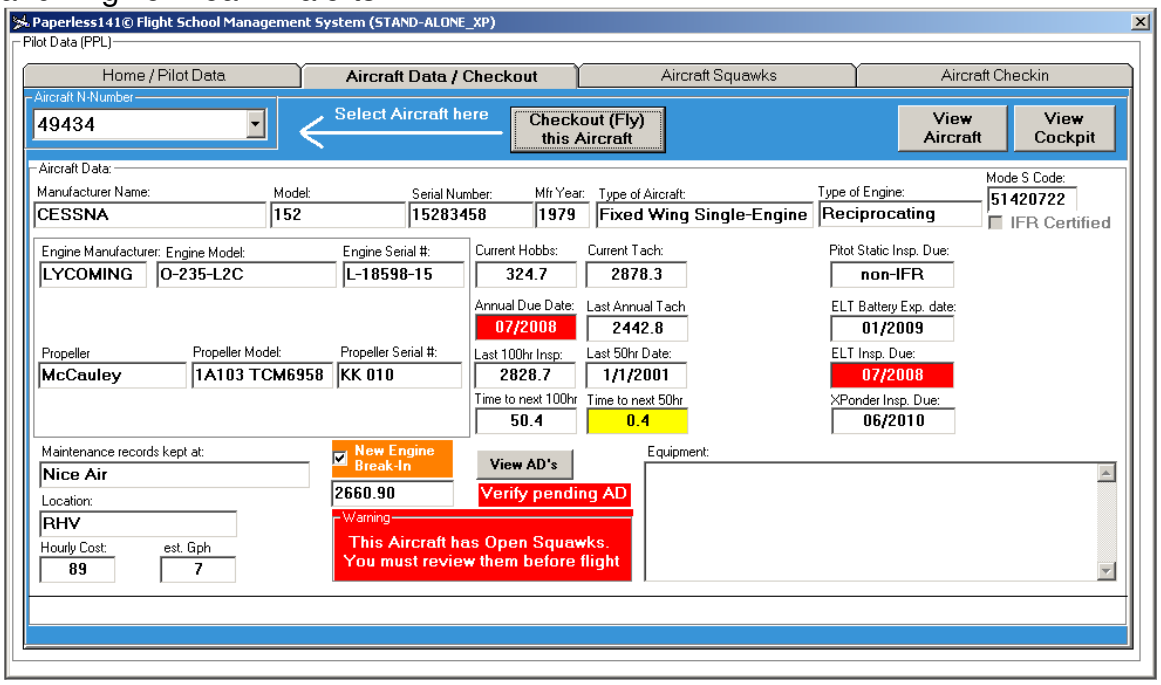
When a Pilot wishes to Checkout the Aircraft, he/she must click on the “Aircraft Data / Checkout” tab:



A pull down list is provided of the aircraft that are Part 141 approved to select from:

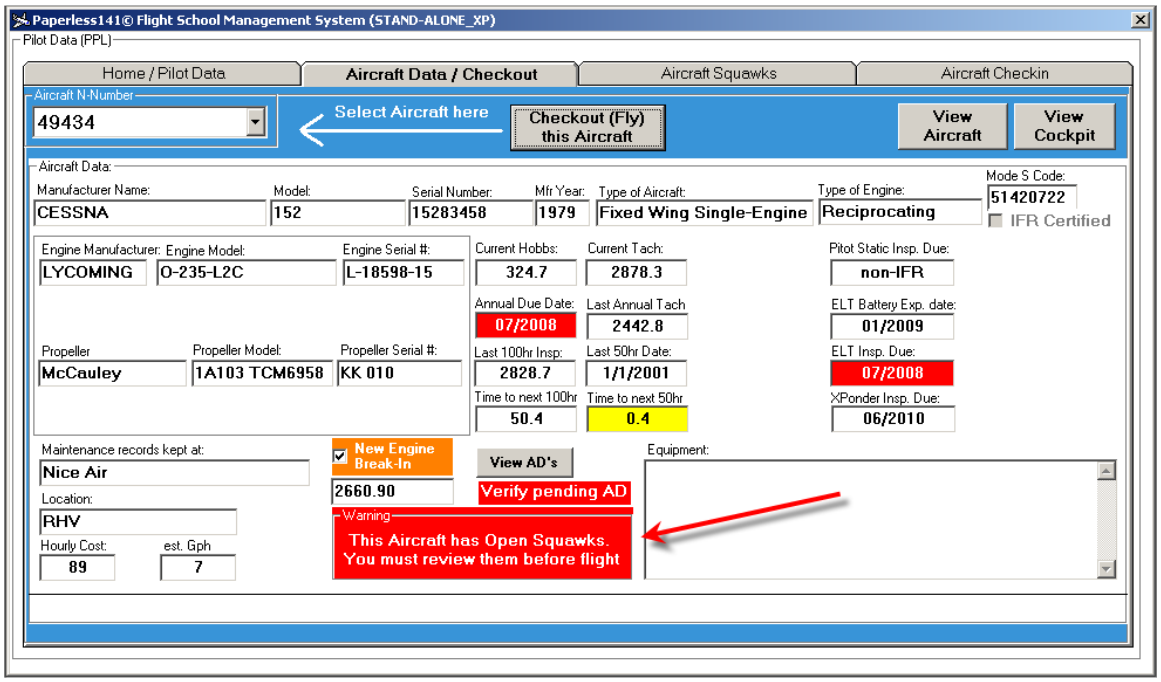


Once the aircraft is selected, the screen presents the current color coded maintenance status of the aircraft indicating any item/inspection that is near or past due as well as pending Ads and Engine Break-in alerts.

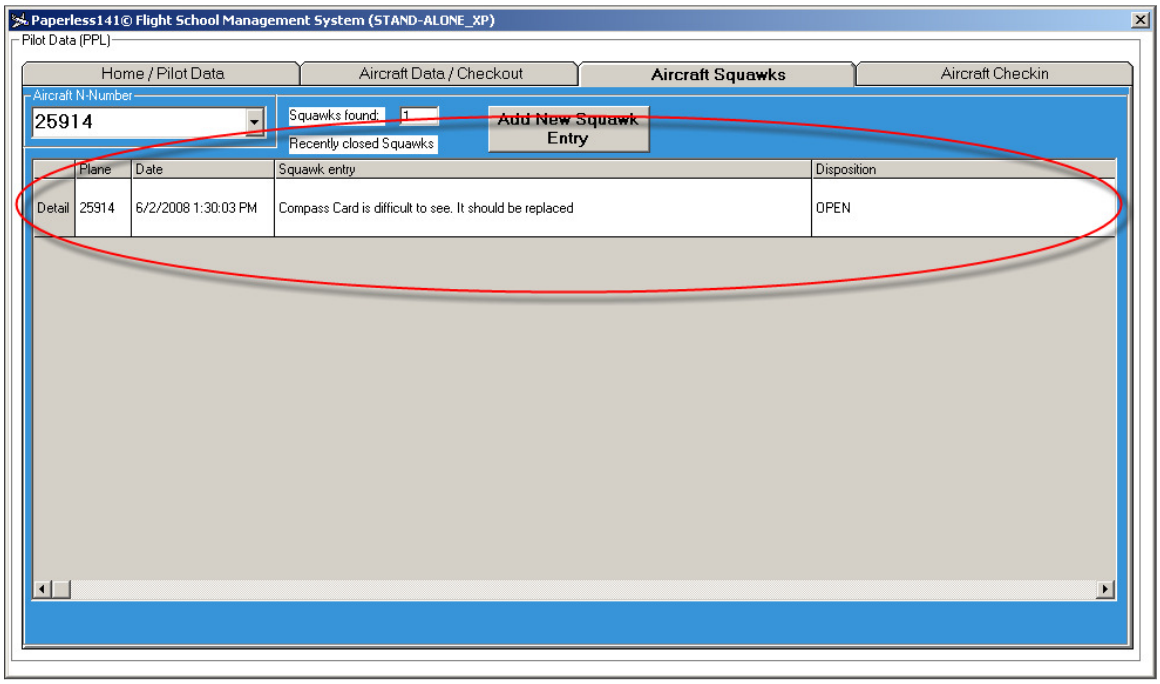


Anything colored in Yellow is a “Near Due” situation and anything Red is “Past Due”.

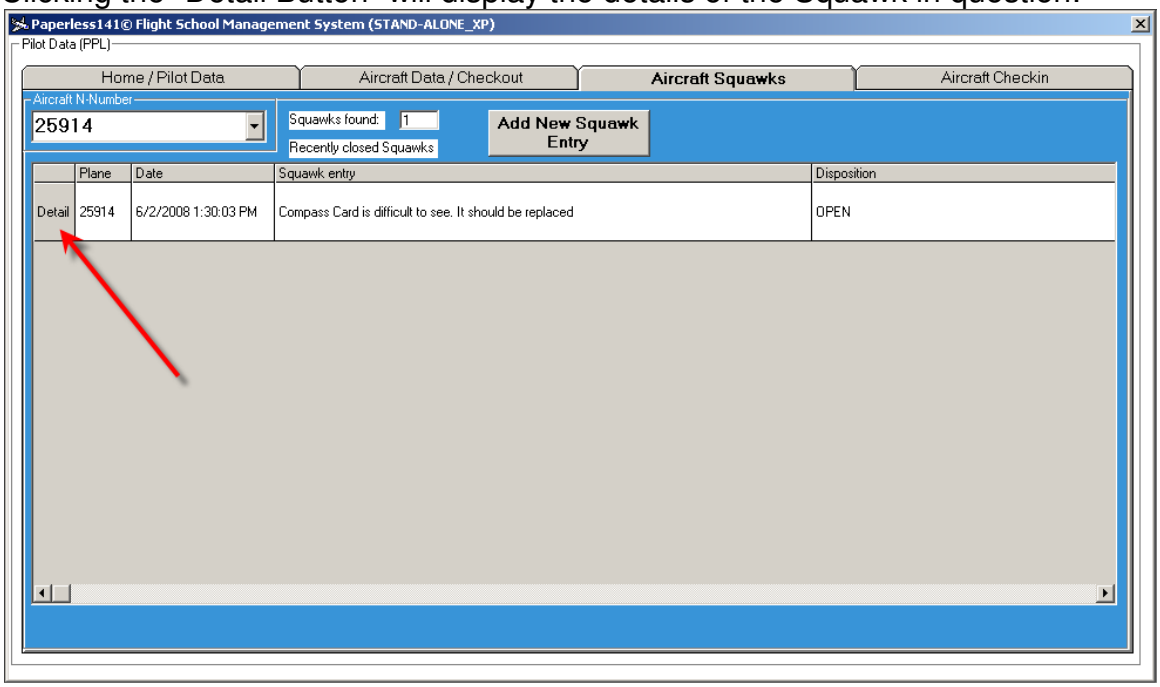
The color coded Squawk Alert is Red when there are ANY open squawks and Green when there are NO open squawks.



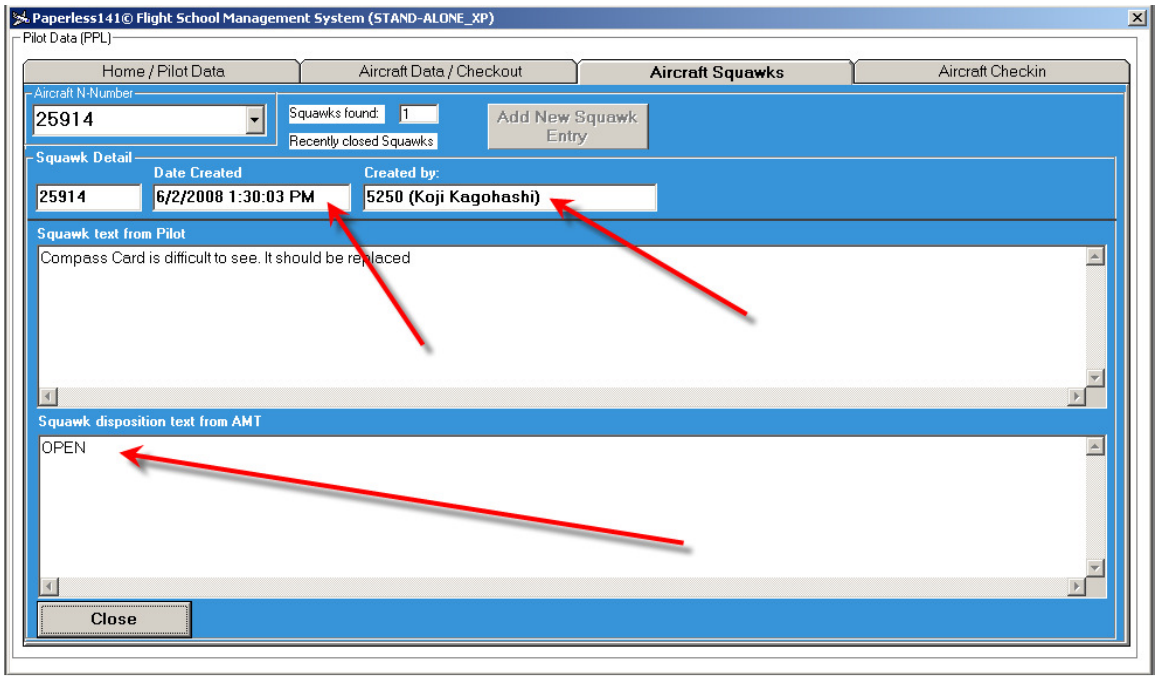
Passing the Mouse over the Squawk Alert Area, automatically brings up the Squawk window:



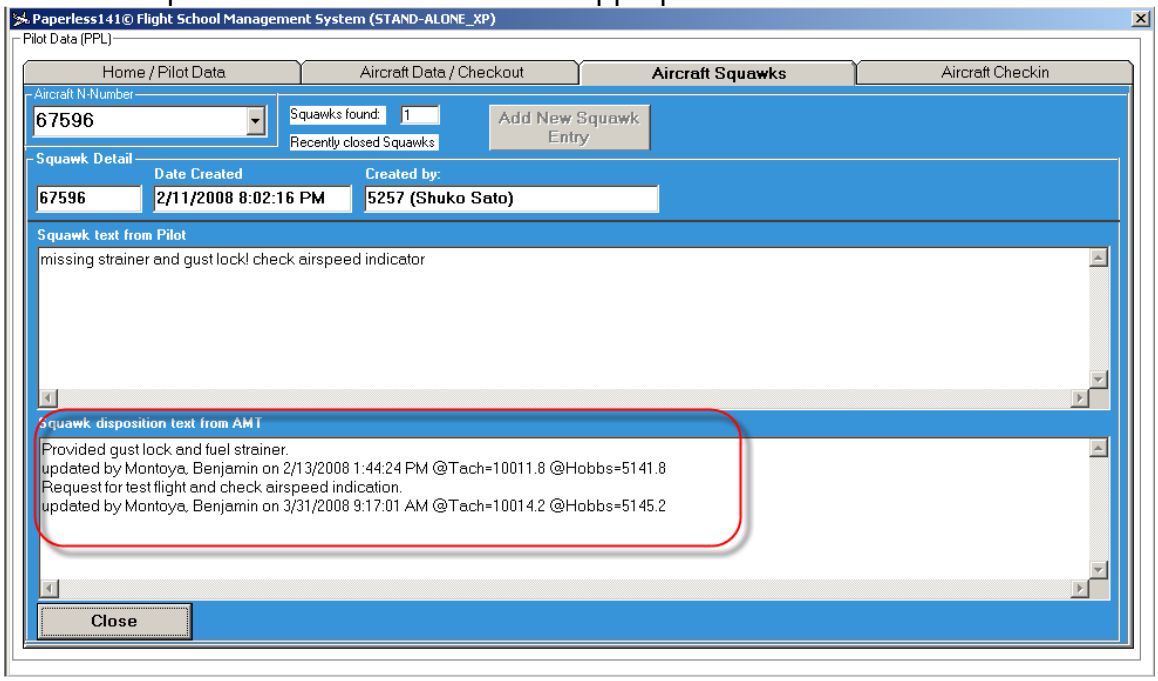
Clicking the “Detail Button” will display the details of the Squawk in question:



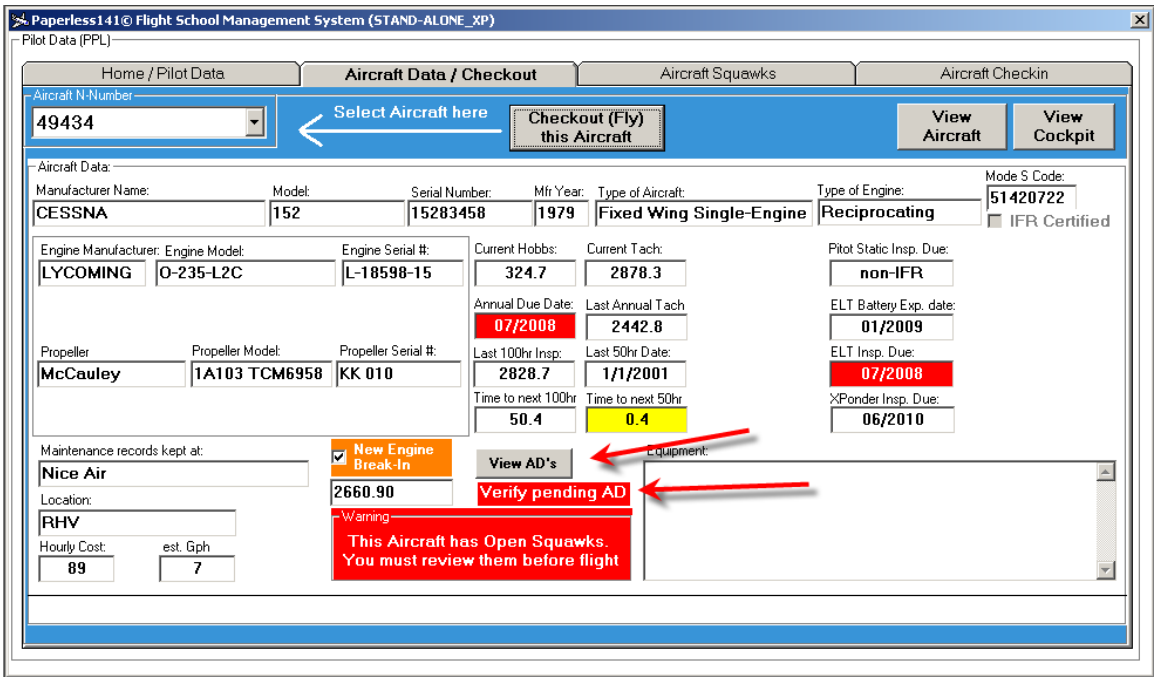
The Pilot can then see: The date of creation, who created it and the current disposition and or comments form the AMT.



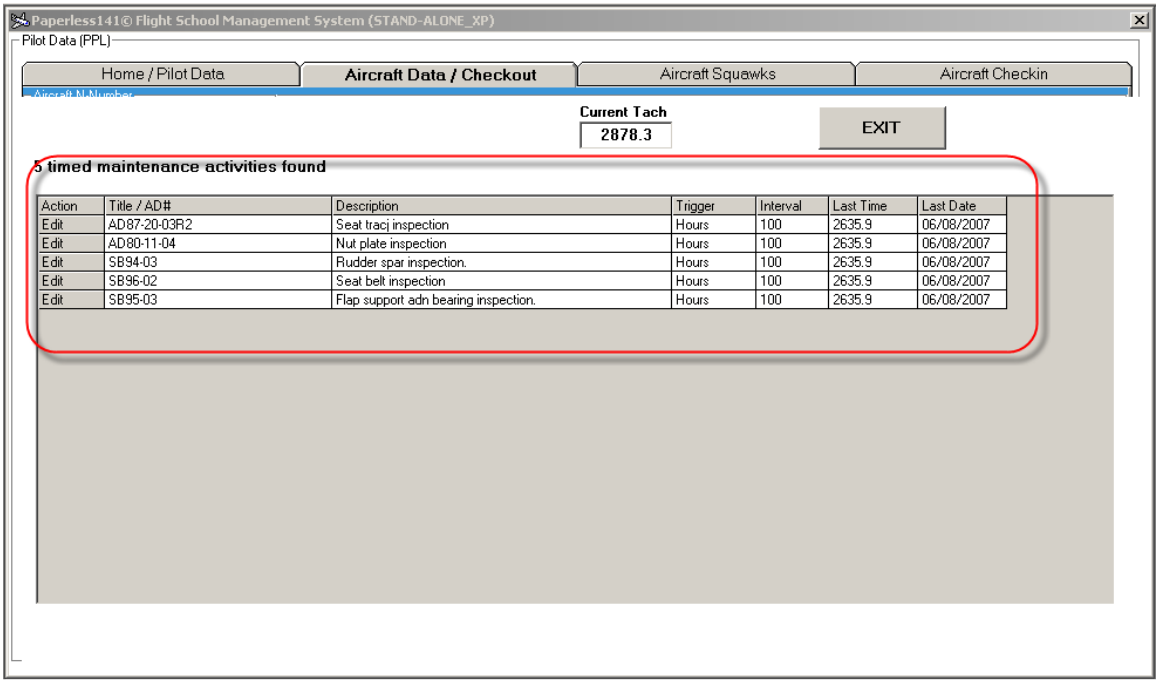
Detailed dispositions are available when appropriate:



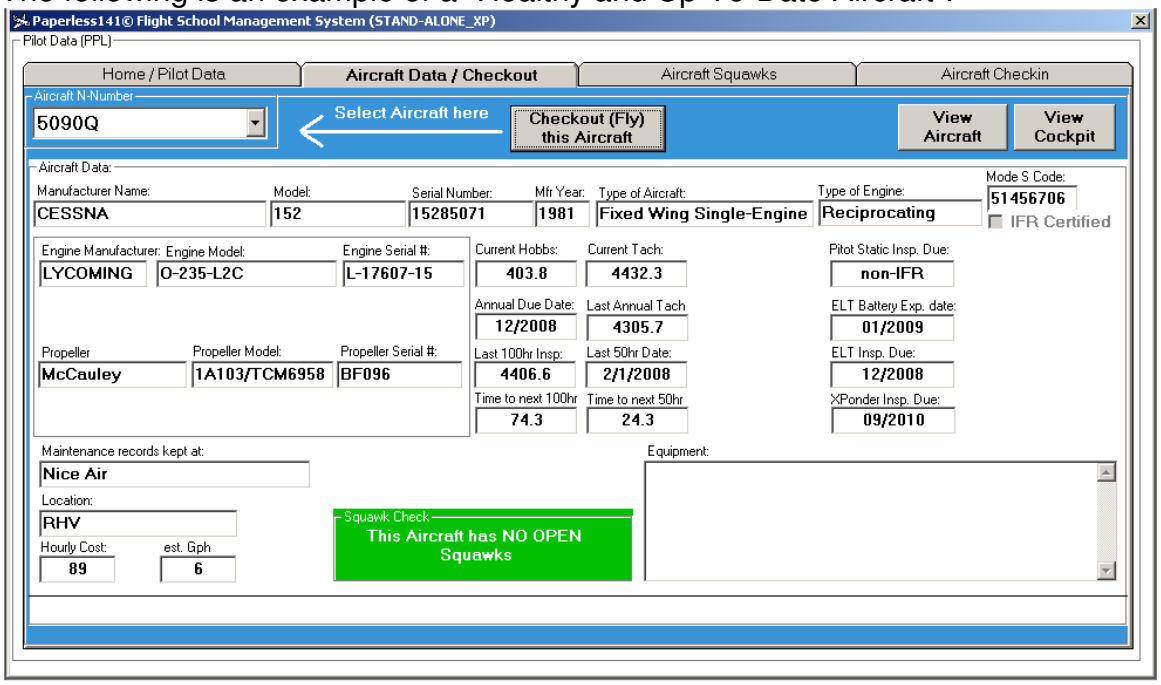
Passing the mouse over the Red “Verify pending AD” area will bring up a window containing AD information about the aircraft:



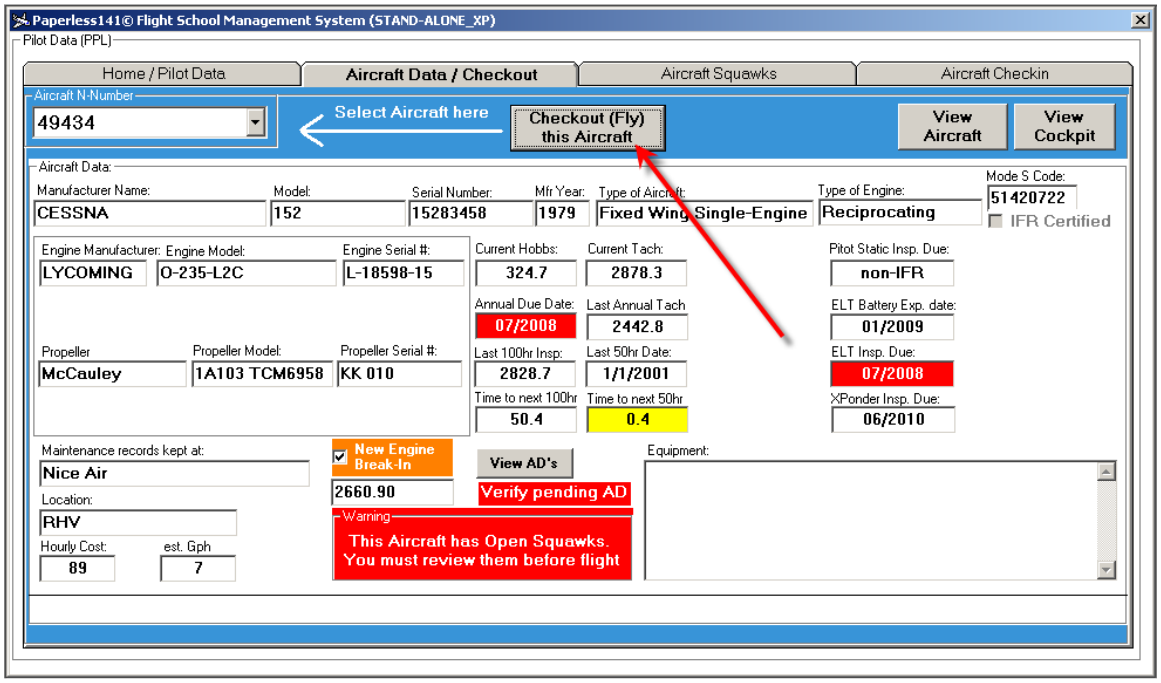
This window then shows the status and “Due Times” of specific ADs along with a reminder of the current Tach Time:



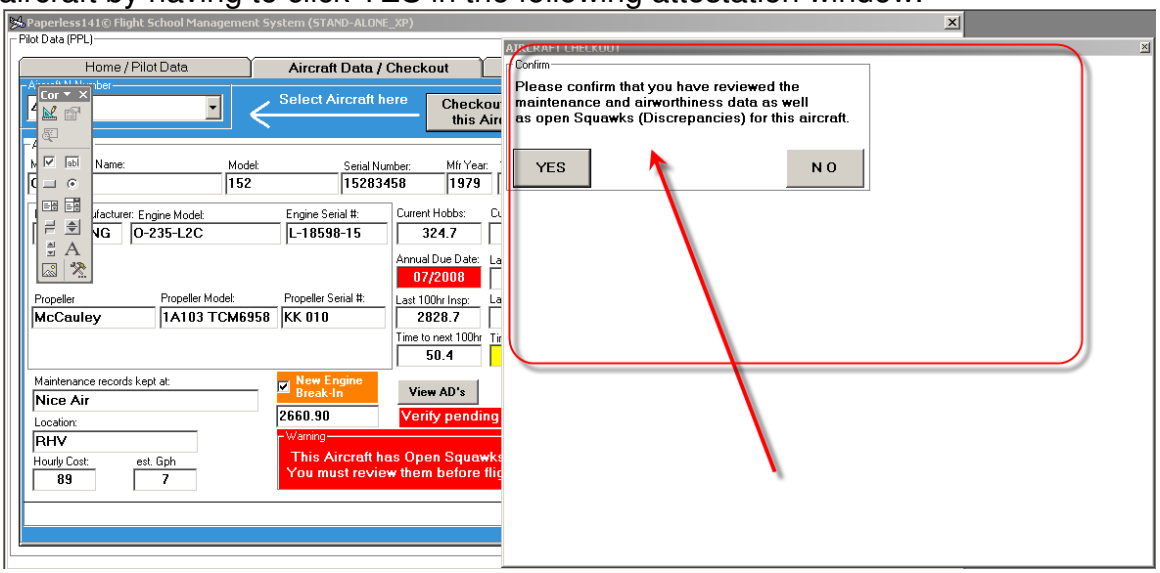
The following is an example of a “Healthy and Up-To-Date Aircraft”:



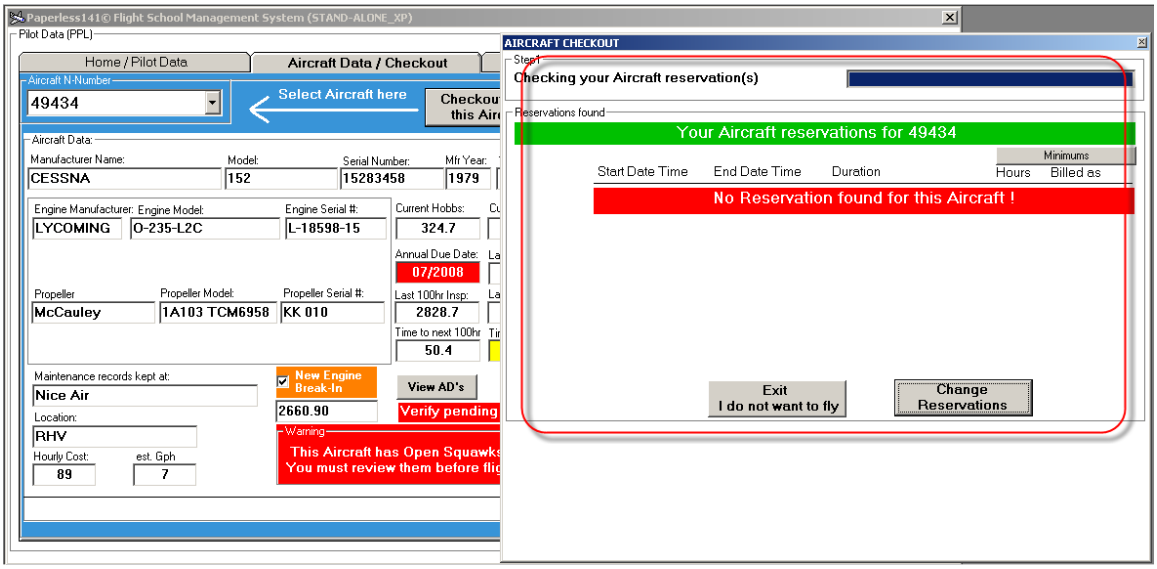
If/When the pilot is satisfied with the condition of the aircraft, he/she can click the “Checkout This Aircraft” button:



The Pilot is then required to confirm that they have reviewed the squawks and status of the aircraft by having to click YES in the following attestation window.

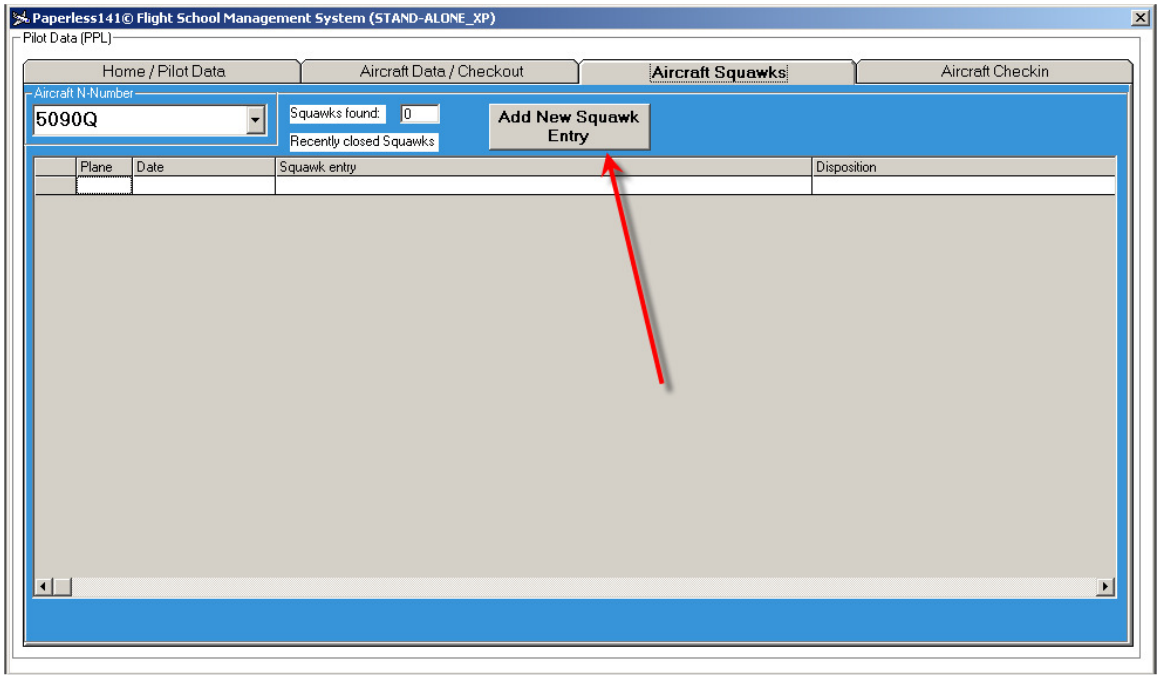


The system will then verify that the CFI/Dispatcher has dispatched the aircraft to the Pilot and that the Pilot indeed has a current reservation for said aircraft.

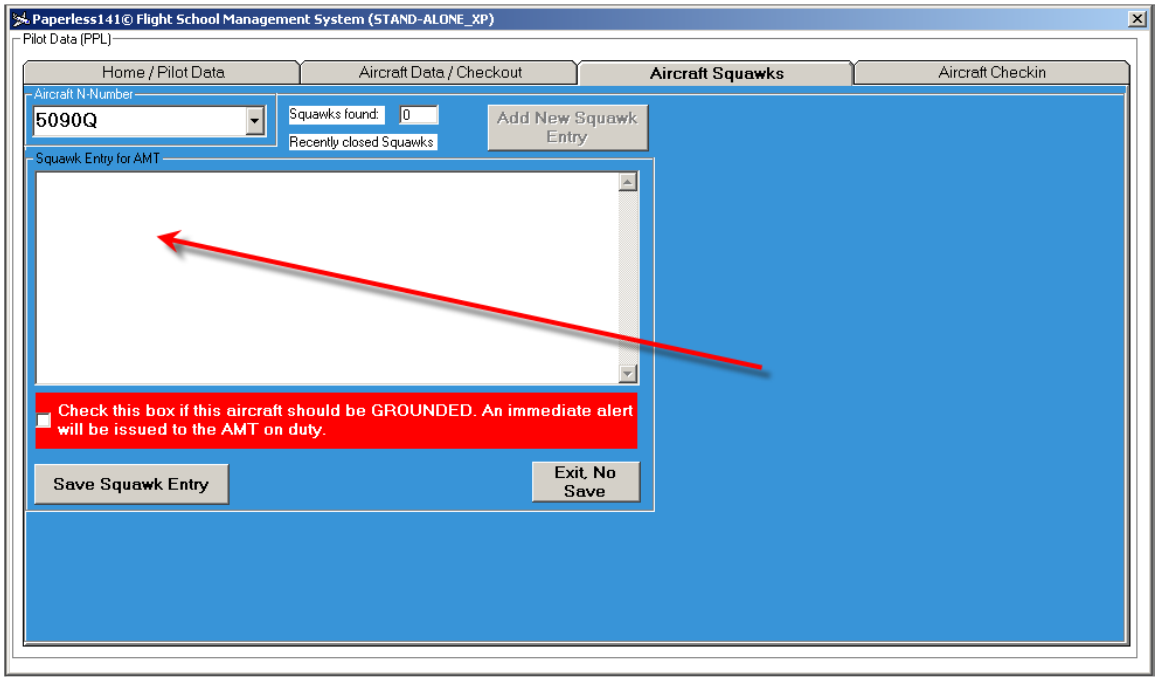


Entering of Squawks:

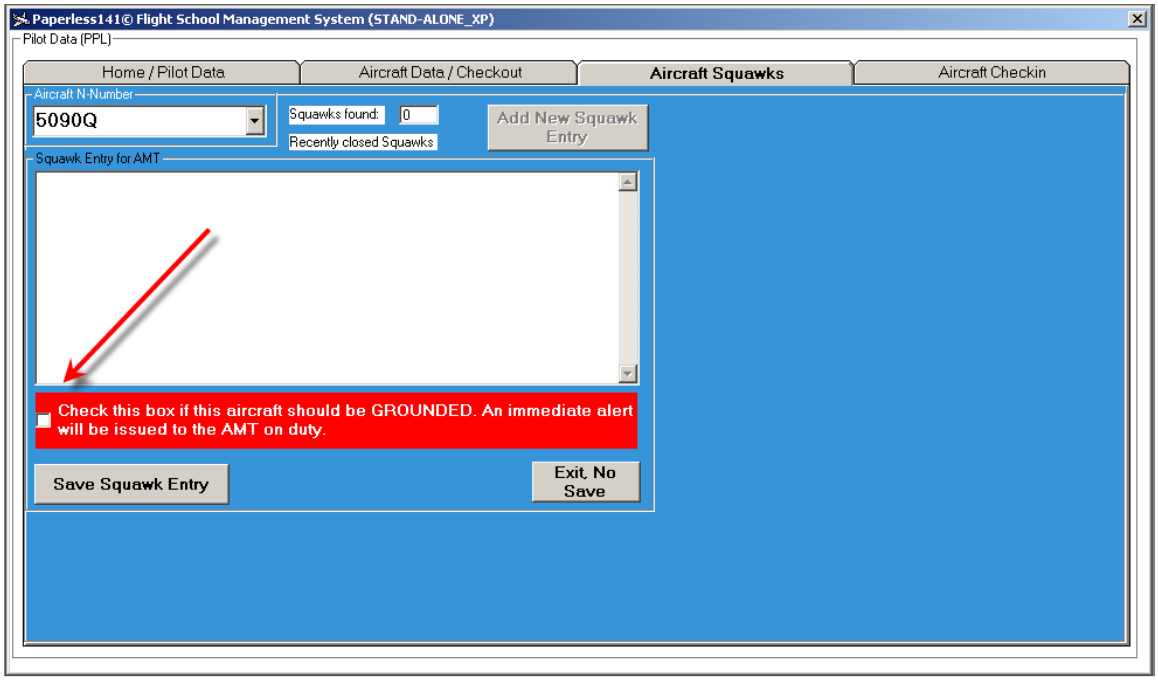
When a Pilot returns from a flight, he/she can enter aircraft squawks during the aircraft Checkin Process. After entering the ending Hobbs and Tach times, the Pilot can click the "Aircraft Squawks" tab followed by selecting the "Add New Squawk Entry" button.



The Pilot then gets a window that enables the textual authoring of any squawk and it's description into the provided text window.

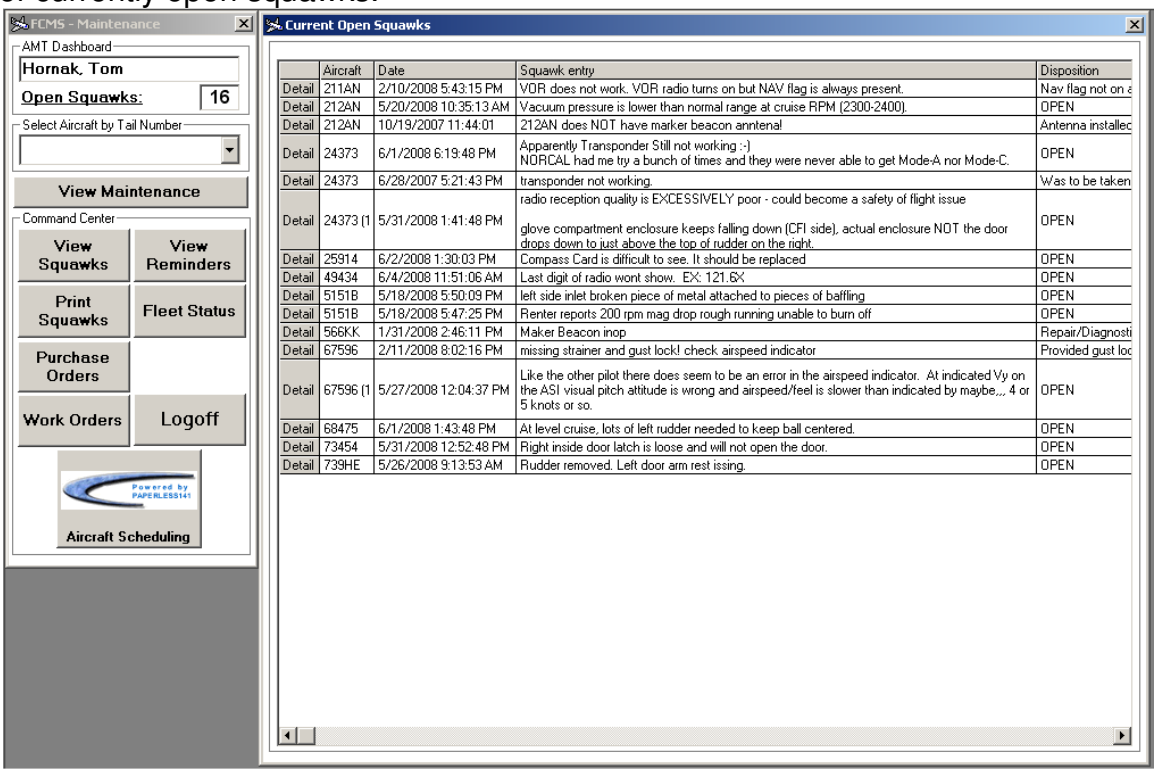


Should the Pilot feel that the squawk they just entered is a "Grounding Squawk", they can check the "Grounding Alert" box to automatically send an alert to the AMT on duty and/or Chief Instructor and/or Manager for immediate disposition. These alerts are sent to Cell Phones and E-Mails. The authorized party can then determine the appropriate course of action for the aircraft.


Paperless141© Flight School Management System (STAND-ALONE_XP)
Pilot Data (PPL)
Home / Pilot Data
Aircraft Data / Checkout
Aircraft Squawks
Aircraft Checkin
Aircraft N-Number
5090Q
Squawks found:
0
Recently closed Squawks
Add New Squawk Entry
Squawk Entry for AMT
Check this box if this aircraft should be GROUNDED. An immediate alert will be issued to the AMT on duty.
Save Squawk Entry
Exit, No Save

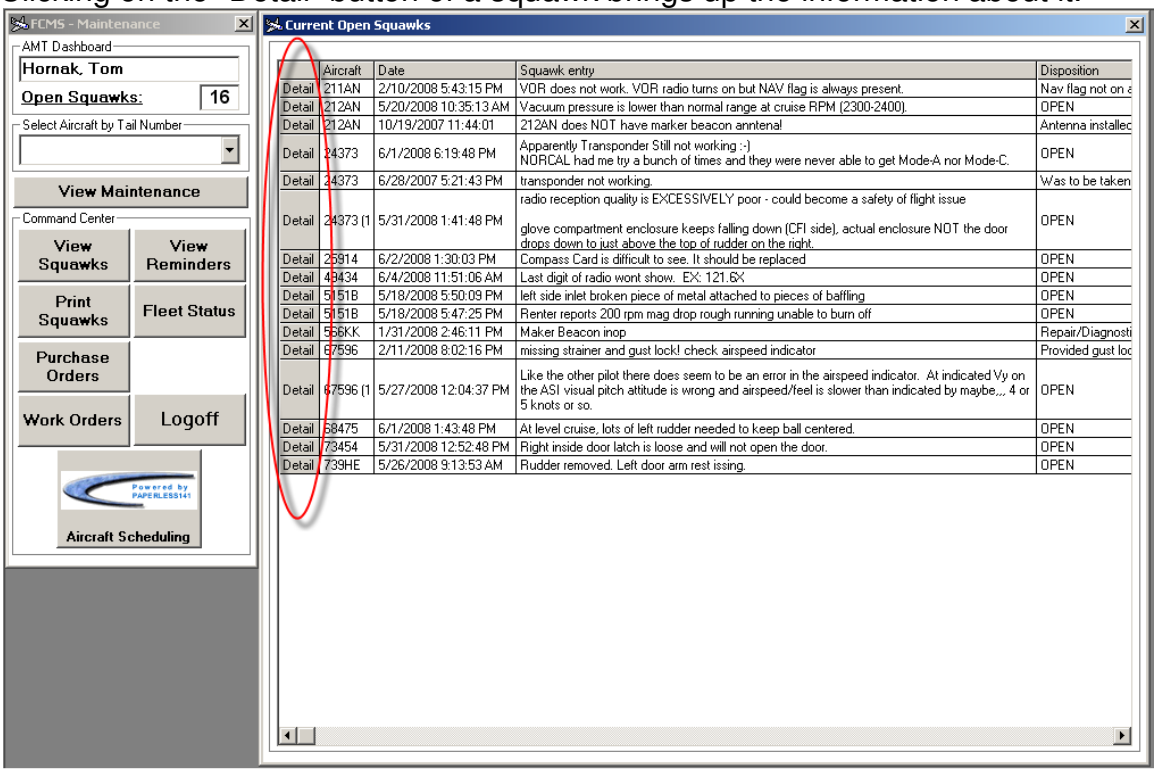
Squawk Management Administration:

When the AMT opens the Paperless141 Maintenance application, the default window is a list of currently open squawks.

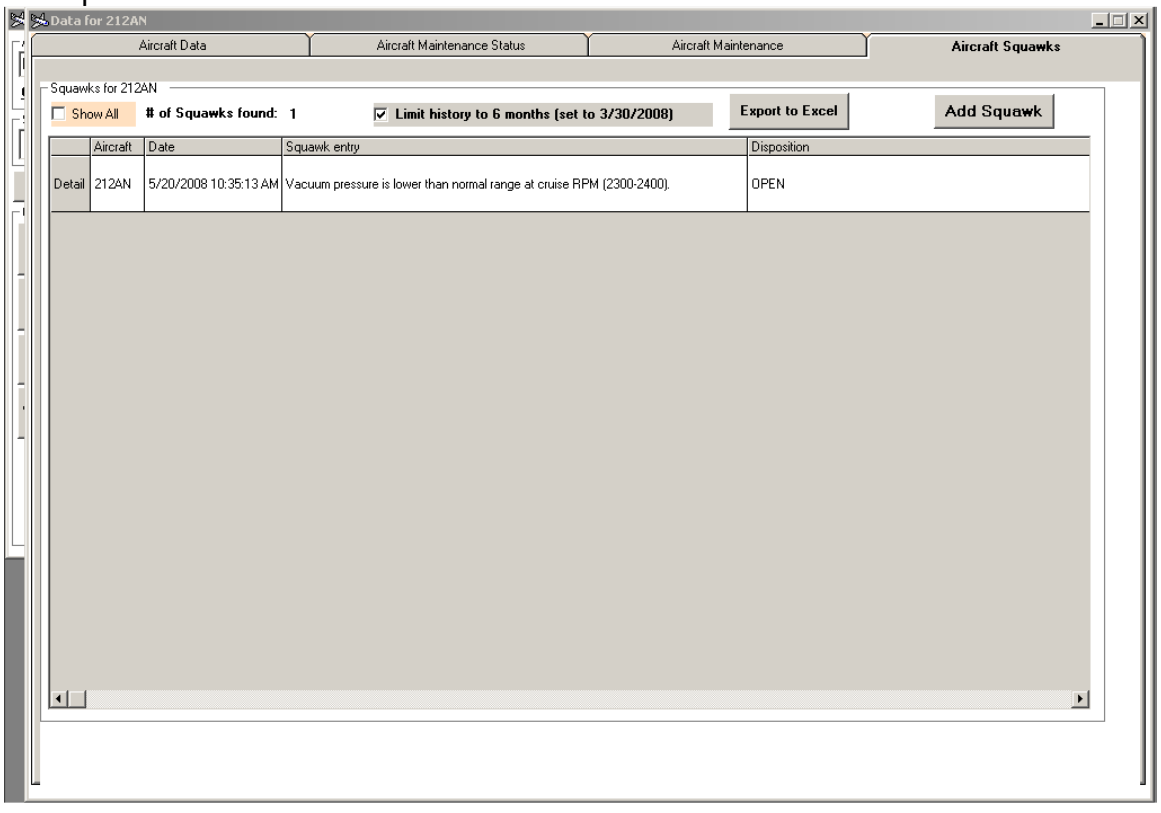


	Aircraft	Date	Squawk entry	Disposition
Detail	211AN	2/10/2008 5:43:15 PM	VOR does not work. VOR radio turns on but NAV flag is always present.	Nav flag not on a
Detail	212AN	5/20/2008 10:35:13 AM	Vacuum pressure is lower than normal range at cruise RPM (2300-2400).	OPEN
Detail	212AN	10/19/2007 11:44:01	212AN does NOT have marker beacon anntena!	Antenna installec
Detail	24373	6/1/2008 6:19:48 PM	Apparently Transponder Still not working :-) NORCAL had me try a bunch of times and they were never able to get Mode-A nor Mode-C.	OPEN
Detail	24373	6/28/2007 5:21:43 PM	transponder not working.	Was to be taken
Detail	24373 (1	5/31/2008 1:41:48 PM	radio reception quality is EXCESSIVELY poor - could become a safety of flight issue glove compartment enclosure keeps falling down (CFI side), actual enclosure NOT the door drops down to just above the top of rudder on the right.	OPEN
Detail	25914	6/2/2008 1:30:03 PM	Compass Card is difficult to see. It should be replaced	OPEN
Detail	49434	6/4/2008 11:51:06 AM	Last digit of radio wont show. EX: 121.6X	OPEN
Detail	5151B	5/18/2008 5:50:09 PM	left side inlet broken piece of metal attached to pieces of baffling	OPEN
Detail	5151B	5/18/2008 5:47:25 PM	Renter reports 200 rpm mag drop rough running unable to burn off	OPEN
Detail	566KK	1/31/2008 2:46:11 PM	Maker Beacon inop	Repair/Diagnosti
Detail	67596	2/11/2008 8:02:16 PM	missing strainer and gust lock! check airspeed indicator	Provided gust loc
Detail	67596 (1	5/27/2008 12:04:37 PM	Like the other pilot there does seem to be an error in the airspeed indicator. At indicated Vy on the ASI visual pitch attitude is wrong and airspeed/feel is slower than indicated by maybe,,, 4 or 5 knots or so.	OPEN
Detail	68475	6/1/2008 1:43:48 PM	At level cruise, lots of left rudder needed to keep ball centered.	OPEN
Detail	73454	5/31/2008 12:52:48 PM	Right inside door latch is loose and will not open the door.	OPEN
Detail	739HE	5/26/2008 9:13:53 AM	Rudder removed. Left door arm rest issing.	OPEN

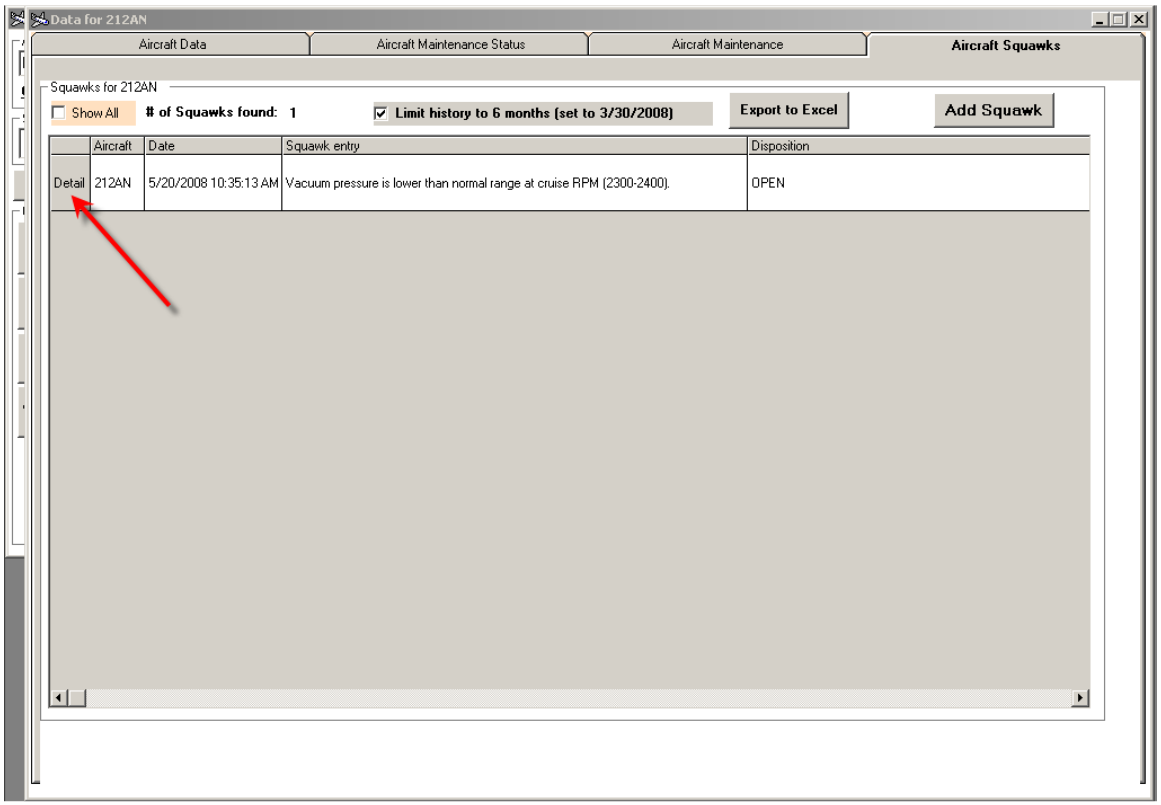
Clicking on the “Detail” button of a squawk brings up the information about it.



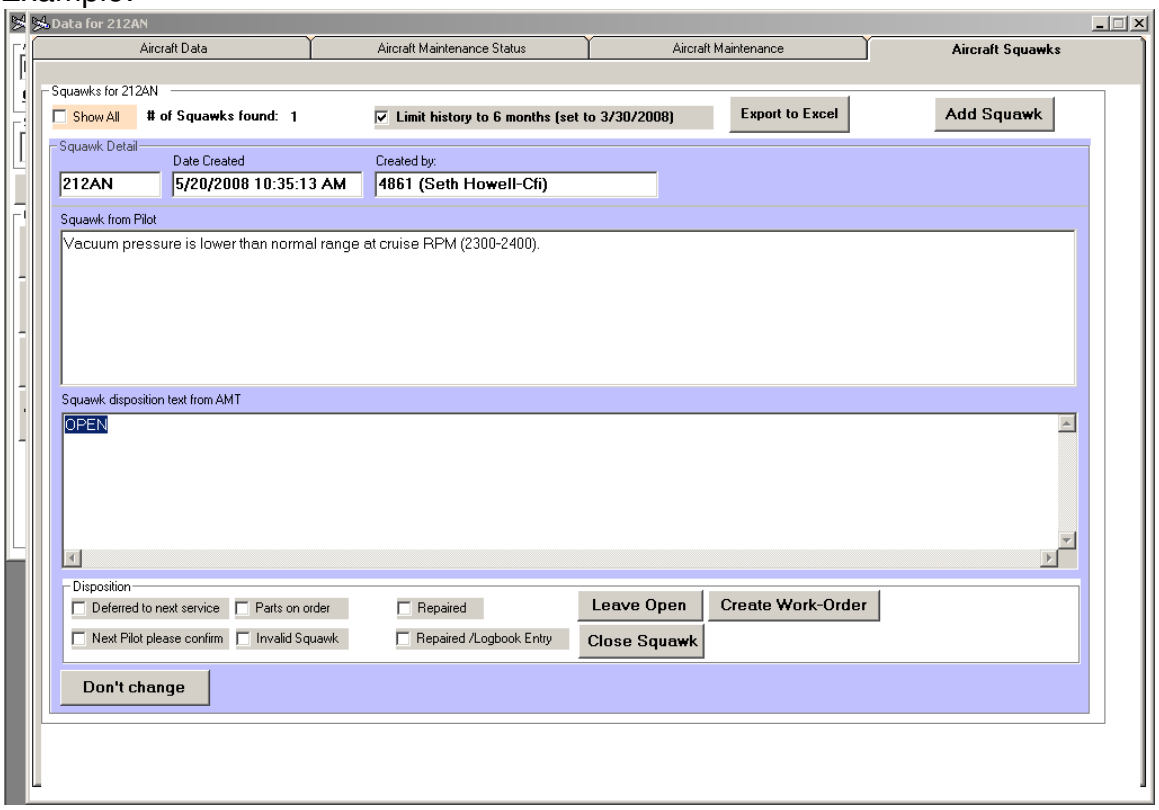
Example:



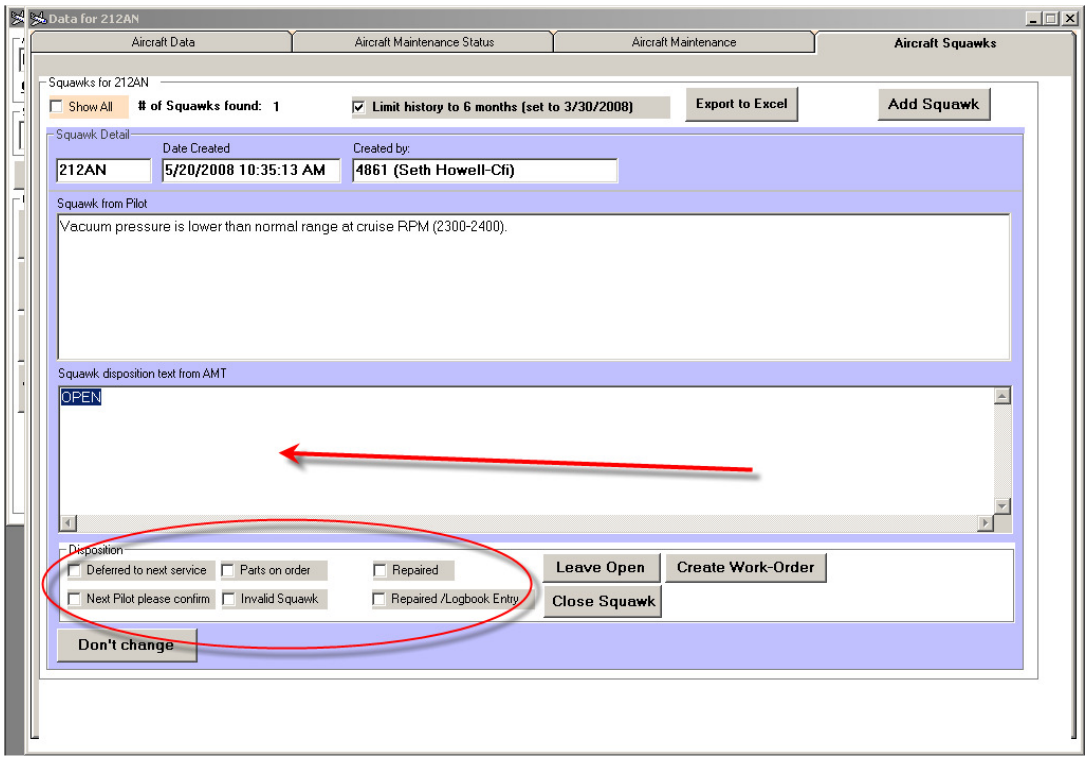
Further detail can be seen by the “Detail” here:



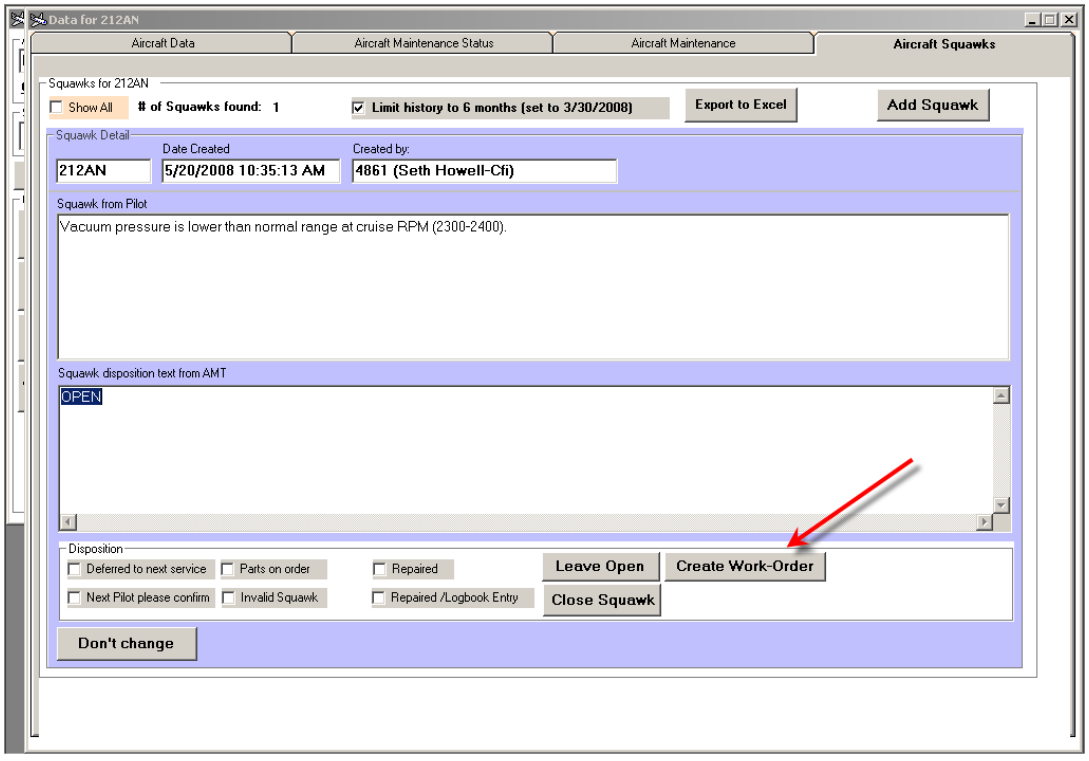
Example:



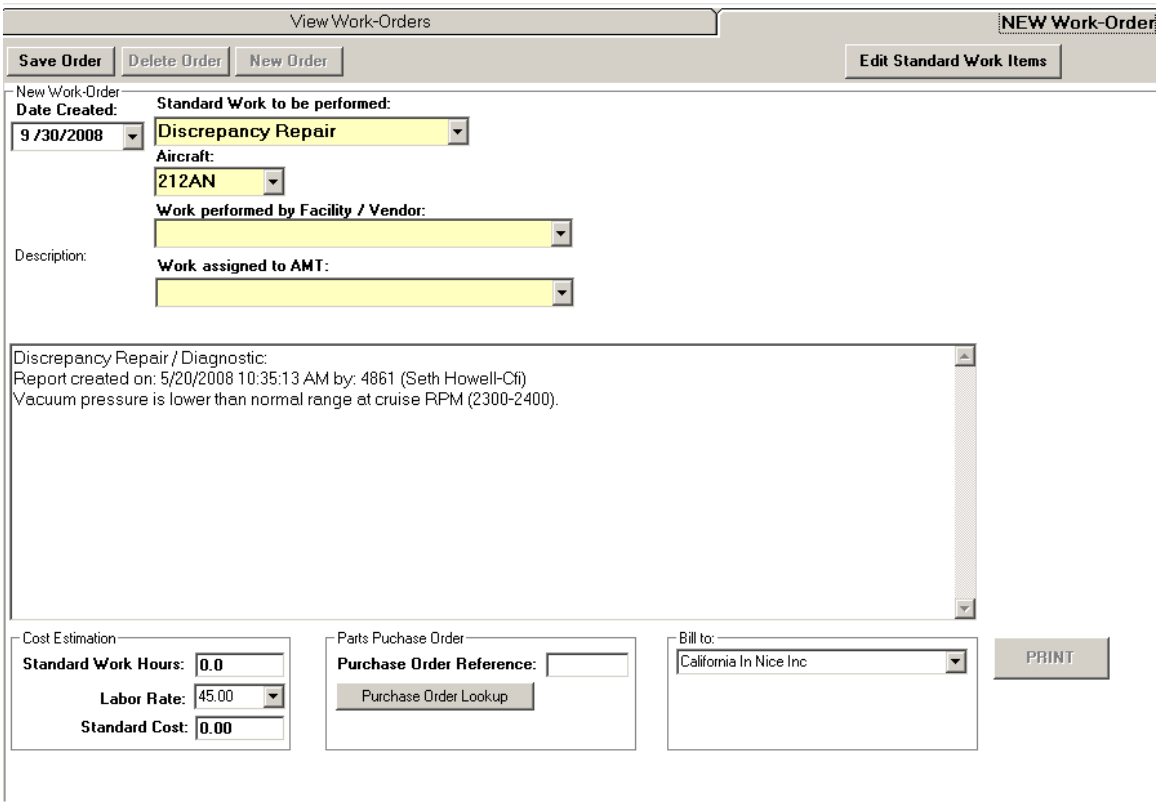
From here the AMT can type any desired textual disposition into the area shown by the red arrow, or choose one of the “pre-canned” dispositions circled.



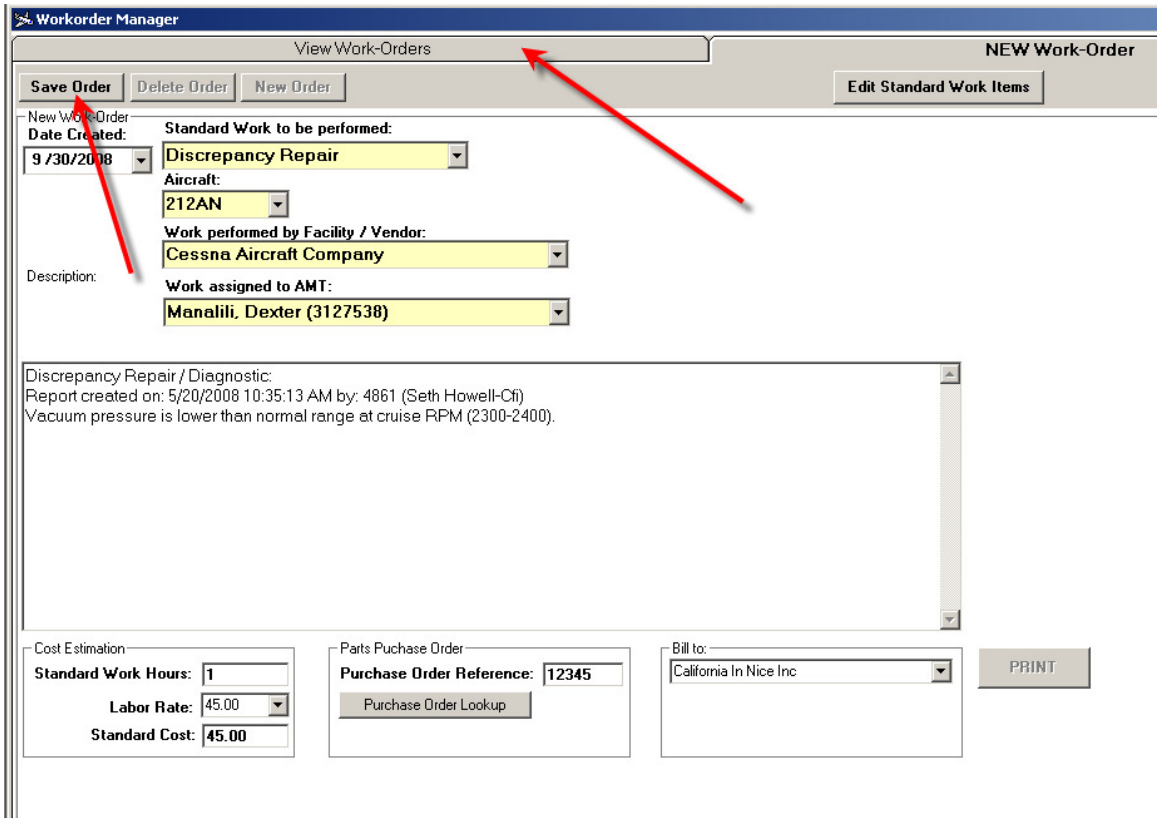
Should the AMT determine that an action must be taken, he/she can open a work order for the action.

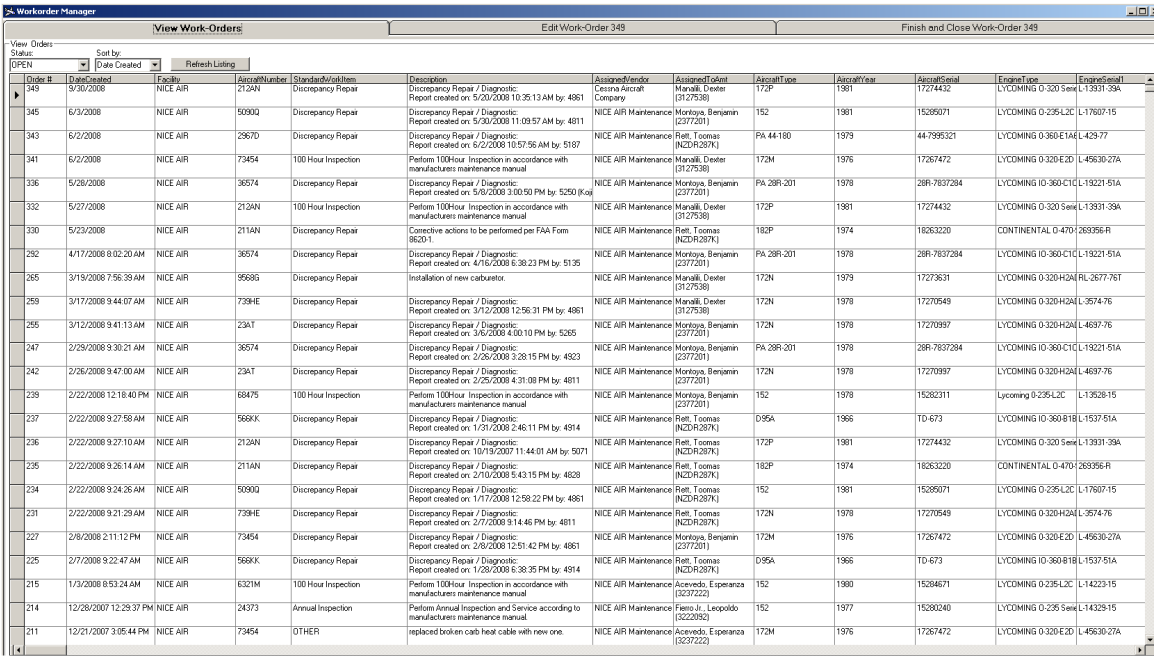


A window then opens allowing the AMT to: Describe the work to be done, list the aircraft, select where the work will be done and who will do the work. All combined with a textual description of the work to be preformed, time estimates, costs, parts Purchase Order references and bill to selection.

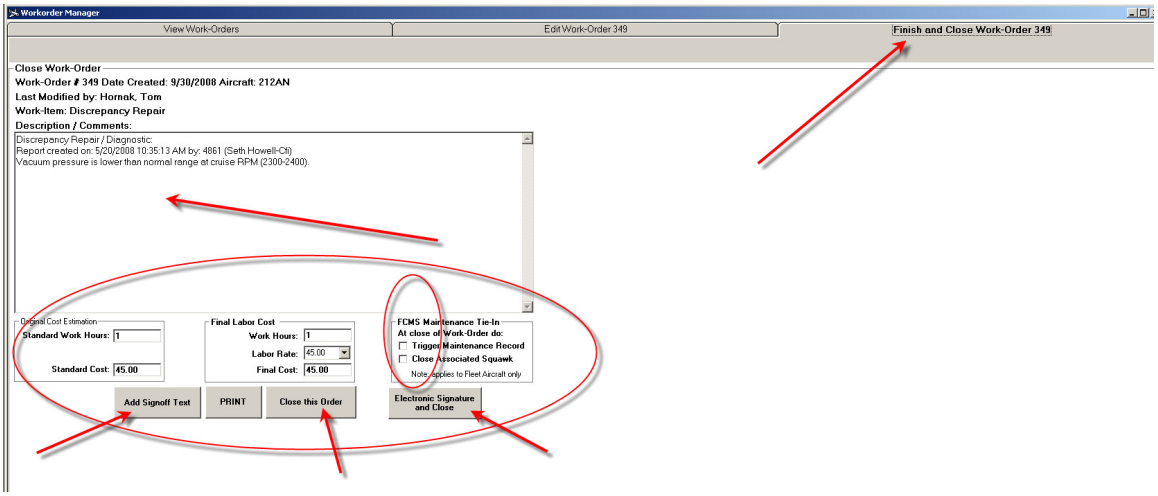


The Work Order can then be saved and others can be viewed:





The work order can be selected to be “Finished and Closed” by the upper tab. Then within it, Finial Disposition/Description and comments can be added into the Text Box, Canned “Sign off Text” can be automatically added with a button push to save typing time. If so desired the Work Order can be electronically signed off and before closing the AMT can choose to automatically trigger a Maintenance record and log book sticker(s) and to automatically close the associated squawk.



All aspects of squawks and their dispositions and progress through the system including closure and final disposition are automatically e-mailed to the originating Pilot for tracking.

Full sets of reports for Squawks and Work Orders and Maintenance histories are available in the system, both locally as well as by remote access. Details about these reports are beyond the scope of this TCO and can be reviewed and demo’ed during the facility inspection.

Data Back Up, Local and Offsite:

Local Back Up:

All of the record data in the system is automatically backed up every three (3) hours to an external USB connected Hard Drive. These back ups are compressed and encrypted by DES (the long accepted U.S. Government encryption algorithm known as; the Data Encryption Standard) for data security in case of a hard disk possession breach. Depending on the size of the hard disk, the back ups are maintained for multiple years before the disk gets full and the oldest files beginning getting overwritten by new files. A typical example of storage time is:

School with:

- 30 Aircraft
- 300 active students
- 20 instructors
- 25,000 flight hours/year

Using a 500 Gigabyte hard drive can expect 4 to 5 years of data retention before overwrite begins on the oldest files.

Offsite Back Up:

At 03:00 local time everyday the system completes a full back up, independent of the local back up, to a secure offsite facility. This facility is located in Santa Clara California and is fed by two independent power feeds from two separate power companies. The building has 6 diesel generators capable of providing 200% of the power required by the building for up to a minimum 30 days without additional fuel being delivered. One quarter of one of the four floors of the building is dedicated to battery banks capable of delivering 100% of the building's power requirement for up to a minimum of 30 days with no generators in service. The exterior walls are 6 foot thick reinforced concrete capable of withstanding conventional bombs. This same facility is used by Verizon and AT&T Cellular as the west coast switching base of their networks. The primary transpacific fiber cable between the U.S. West coast and Asia also terminates in this same facility. These back ups serve as disaster recovery in case of the school's facility being devastated by local circumstance. Every 24 hour back up is over written by the next day's back up if one occurs.

Item Rev. ~Original~ Date 3/31/2010

SAFETY PROCEDURES AND PRACTICES MANUAL

SAFETY PROCEDURES AND PRACTICES (Fixed Wing)

Weather Minimums:

- **Dual Flights**: The weather minimums for dual flights will at least be per the below listed "Dual Minimums" and any higher minimums will be left to the discretion of the flight instructor. He/She will assure that the weather conditions do not violate any of the applicable Federal Aviation Regulations or limitations stated in the Pilot's Operating Handbook. The flight instructor **must** consider the benefit to, or adverse effect upon, the student's training and learning ability when making a go/no-go decision based on the weather conditions.

Dual:

	Ceiling AGL	Visibility	Wind
Traffic Pattern	1600 feet	3 miles	20 knot - total peak gusts – 25 knot
Local Flight	1500 feet	5 miles	20 knot - total peak gusts – 25 knot
Cross Country	3000 feet	5 miles	20 knot - total peak gusts – 25 knot

- **Solo Flights**: The weather minimums for solo flights will be as shown in the following chart.

First Solo:

	Ceiling AGL	Visibility	Wind
Traffic Pattern	1600 feet	5 miles	10 knot peak gusts - none

Subsequent Solo:

	Ceiling AGL	Visibility	Wind
Traffic Pattern	1600 feet	5 miles	20 knot - total peak gusts - none
Local Flight	2500 feet	5 miles	20 knot - total peak gusts - none
Cross Country	5000 feet	6 miles	20 knot - total peak gusts - none

For solo flights the maximum cross wind is 7 knots.

Any or all flights may be grounded when, at the discretion of the Chief Instructor or Assistant Chief Instructor, the weather conditions do not fall within the parameters set forth in this section, or are not conducive to effective flight training.

Starting and Taxiing

- All pilots will conduct a thorough preflight of the aircraft before each and every flight. This will be accomplished with the use of the POH checklist for that aircraft or company approved checklist.
- Starting procedures will be as outlined in the starting engine checklist.
- Each student preparing to start an aircraft will look around carefully, turn the rotating beacon on prior to start, and shout "CLEAR" before attempting engine start.
- At no time will a student hand prop and aircraft.
- No aircraft engine will be started in the hangar or inside any structure. Aircraft being moved into and out of the hangar will be towed, by at least two persons, with an approved tow bar only. Taxiing within 20 feet of any hangar is prohibited.
- If the aircraft fails to start after several attempts, discontinue starting procedures and get assistance from a flight instructor or maintenance personnel.
- No aircraft will be left unattended while unsecured, or while the engine is running.
- Taxi at a speed which is appropriate for the existing conditions. Low power, low speed, and constant vigilance will be maintained when taxiing in congested areas.
- Flight control deflections will be used in accordance with the proper crosswind taxiing technique.
- Pilots will read back all taxi clearances to ground control.
- Pilots will read back to air traffic control on hold short, line up and wait, takeoff and landing clearances, and runway crossings. Pilots will read back the entire instruction or clearance to tower including the runway designation.

Fire Precautions and Refueling Procedures:

- All students will be instructed (before their first solo) on precautions against ground and in-flight fires, and the procedures to be taken if they should occur.
- All students will be instructed in the location and use of the fire extinguisher in the aircraft (if installed).
- Students must be familiar with the emergency procedures relating to fires in the Pilot's Operating Handbook for the particular aircraft being operated.
- Extreme care should be taken to avoid over-priming.

Also when refueling, each aircraft must be chocked and grounded, additionally the following restrictions apply:

- No refueling with persons in the aircraft.
- No refueling inside the hangar.
- No fuel samples will be taken in the hangar.
- No smoking within 50 feet of any aircraft.

Dispatch Procedures:
Students will be dispatched by their primary instructor or the chief instructor and/or assistant chief instructor. Instructors may dispatch students other than their own only if they have flown with that student within the previous 30 days.

Procedures after Unscheduled Landings:

- On-airport: In the event of an unscheduled landing (a landing at any airport other than the airports indicated on the flight plan or authorized by the flight instructor in the solo cross country endorsement), the student will secure the airplane by installing the control lock, closing the doors and securing the aircraft with whatever means is available, and contact Washington International Flight Academy for instructions—**call collect**. At no time will the student continue the flight without the specific authorizations of either their primary flight instructor, the Chief Instructor or the Assistant Chief Instructor.

- Off-airport: The student will assess personal injury and damage to the aircraft first, assure fuel is shut off and all fire potential has been eliminated. If possible, secure the aircraft and

determine location. Immediately report to the Washington International Flight Academy flight center [**call collect**] providing as much information as possible (injuries, damage, location, etc.)]. **At no time will the student attempt to take off from an unprepared landing area.**

Aircraft Discrepancies and Squawks:

Anytime the student discovers a discrepancy (squawk) with the aircraft it will be recorded in the squawk entry window of the Paperless141 system. The following procedure will be followed:

- Additionally, the student will give as detailed a description as possible of the problem to both the dispatcher and the mechanic—if the mechanic is available and report it to their CFI as well or the chief instructor.
- The aircraft will not be dispatched for flight until it has been inspected by a mechanic or a flight instructor.
- If the aircraft is determined to be un-airworthy it will not be dispatched for flight until signed off by a certified mechanic.
- If the discrepancy is found to not affect the safety of flight, it will be deferred to the next scheduled inspection and returned to flight status.

Securing of Aircraft:

After every flight, the aircraft will be tied down at wings and the tail. In addition, a gust lock and pitot tube cover will be in place whenever the aircraft is secured after a flight. After securing the aircraft, the student and/or instructor will assure that all seat belts are stowed and all personal items and trash are removed from the aircraft. The aircraft will be post flight inspected per the aircraft's POH post flight checklist.

Fuel Reserves:

Pilots shall not begin a flight unless there is sufficient fuel to complete the flight to the intended landing destination, fly from that airport to an alternate (if an alternate is required), and then fly after that for at least one hour at normal cruise. All cross-country flights must begin with at least the maximum required by regulations.

Collision Avoidance and Wake Turbulence:

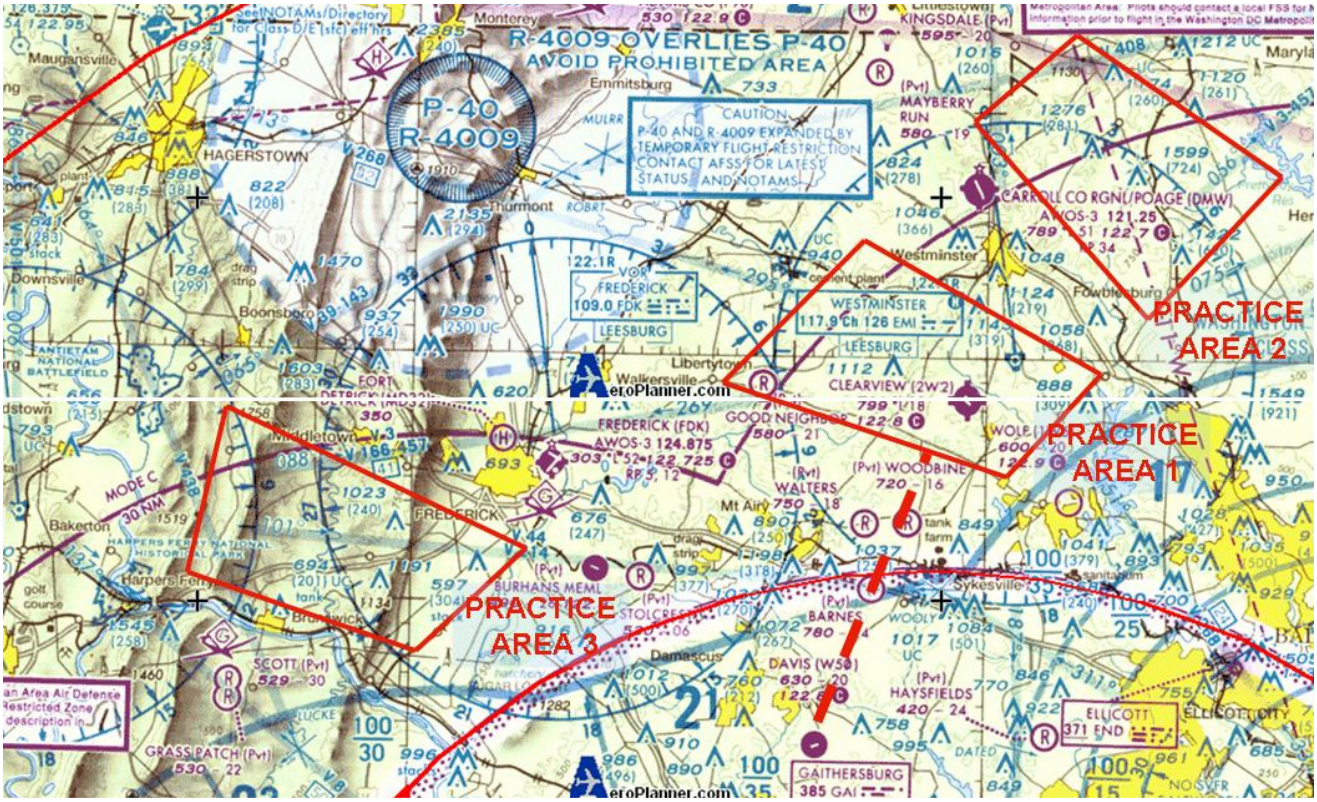
- Pilots should be alert for other aircraft at all times—in the air and on the ground.
- All pilots will adhere to the "see and avoid" concept and be particularly vigilant when in radar contact and under ideal weather conditions.
- Pilots will clear the area, both left and right, prior to making any turns or performing any maneuvers.
- Pilots will contact Air Traffic Control when available for traffic advisories while maneuvering in the practice area.
- Pilots will always scan the approach area prior to taking the runway and when turning from base to final.
- When taxiing in a congested area and in doubt about wing tip clearance, the pilot will shut down the engine and maneuver the aircraft by hand until sufficient clearance of the obstacle is assured or utilize ground marshalling.
- All school members should read **Appendix D FAA advisory circular 90-48C, "Pilots Role in Collision Avoidance"**, also available in the flight planning room.
- Pilots are required to be aware of the perils associated with wake turbulence and low-level wind shear. All training pilots should read **Appendix E FAA advisory circular 90-23E, "Aircraft Wake Turbulence"**, also available in the flight planning room.

Minimum Altitudes and Simulated Emergency Landings:

- Except for takeoff and landing, no Washington International Flight Academy aircraft will be operated at an altitude below 500 feet AGL. Pilots will climb to locally mandated altitudes before turning crosswind on takeoff to comply with local Airport Noise Abatement Procedures.
- Minimum altitudes for all maneuvers will be as outlined in the Practical Test Standards for the certificate or rating for which training is being done.
- **Solo students will not practice simulated forced landings.**
- Stalls, steep turns, slow flight, and unusual attitudes shall not be initiated deliberately below 2,500 feet above ground level.

Assigned Practice Area:

Before a solo flight, the student will be briefed by his instructor in regard to the location and limits of the practice area. Except when on an authorized cross-country flight, students must remain within the designated practice area. The description of the practice area for Washington International Flight Academy at Gaithersburg is found in Appendix A and also illustrated below.



Student Pilot Solo Flight:

- No student may begin a solo practice flight until it has been approved by a Washington International Flight Academy instructor who is present at the airport.
- Passengers will not be carried on any student pilot solo flights.
- Solo night cross-country flights will not be allowed. All solo cross-country flights must be back at Washington International Flight Academy no later than one hour prior to official sunset.

Cross-Country Flight:

- Destination airports for dual cross-country flights will be at the discretion of the flight instructor.
- Destination airports for solo cross-country flights will be chosen from the list of approved cross-country airports or those airports approved by the Chief Instructor or the Assistant Chief Instructor (list of approved airports for Washington International Flight Academy at Gaithersburg is found in Appendix A).
- No round robin flight plans will be allowed. A separate flight plan must be filed and activated for each leg of the flight.
- When planning a Cross-Country Flight all students will call Flight Service for a standard weather briefing including all NOTAMs pertinent to the flight in addition to gathering weather information from TAFs, METARs, FAs and any other weather and airport data necessary to insure the safety of the flight.
- A cross country log is maintained at flight dispatch which must be completed prior to departure (destination, route, expected time of return). The log will be signed by both the student and flight instructor.
- The solo cross-country flight must occur within fifteen (15) days of the dual flight. A renewal may be accomplished by reviewing cross-country procedures/requirements on a local dual flight. The renewal must be documented in the student's logbook and training folder.

Additional Safety Practices:

- All flights will be conducted and accomplished in accordance with the Federal Aviation Regulations.
- Aircraft will not be operated in a careless or reckless manner.
- Formation flight is prohibited.
- Spins will be practiced only with an instructor.
- The Pilot-In-Command is responsible for all Washington International Flight Academy aircraft and equipment when it is in their possession. The flight instructor is the PIC for all dual flights.
- An operable flashlight must be carried when flying at night.

Item Rev. ~Original~ Date 3/31/2010

Operations Specific to Washington International Flight Academy at Gaithersburg

Item Rev. ~Original~ Date 3/31/2010 **DESIGNATED TRAINING/PRACTICE AREAS**:

Washington International Flight Academy utilizes a practice area(s) defined by depiction in the included VFR Chart excerpt. If water is within the depicted area, at no time shall any aircraft fly beyond its power-off gliding range from shore. Aircraft will contact Approach Control when available for traffic advisories while operating in the practice area. Aircraft operating within the inland portion (if applicable) of the practice area will maintain an altitude sufficient to ensure safe terrain clearance at all times.

The following airports will be used for training Flights:

Non Cross Country:
KFDK, KDMW, KHGR, KTHV, KMRB, KFME

Day Dual Cross Country:
KLNS, KESN, KILG, W35, KCXY, W29, KOXB

Day Solo Cross Country:
KLNS, W35, KCXY, KFDK, KDMW

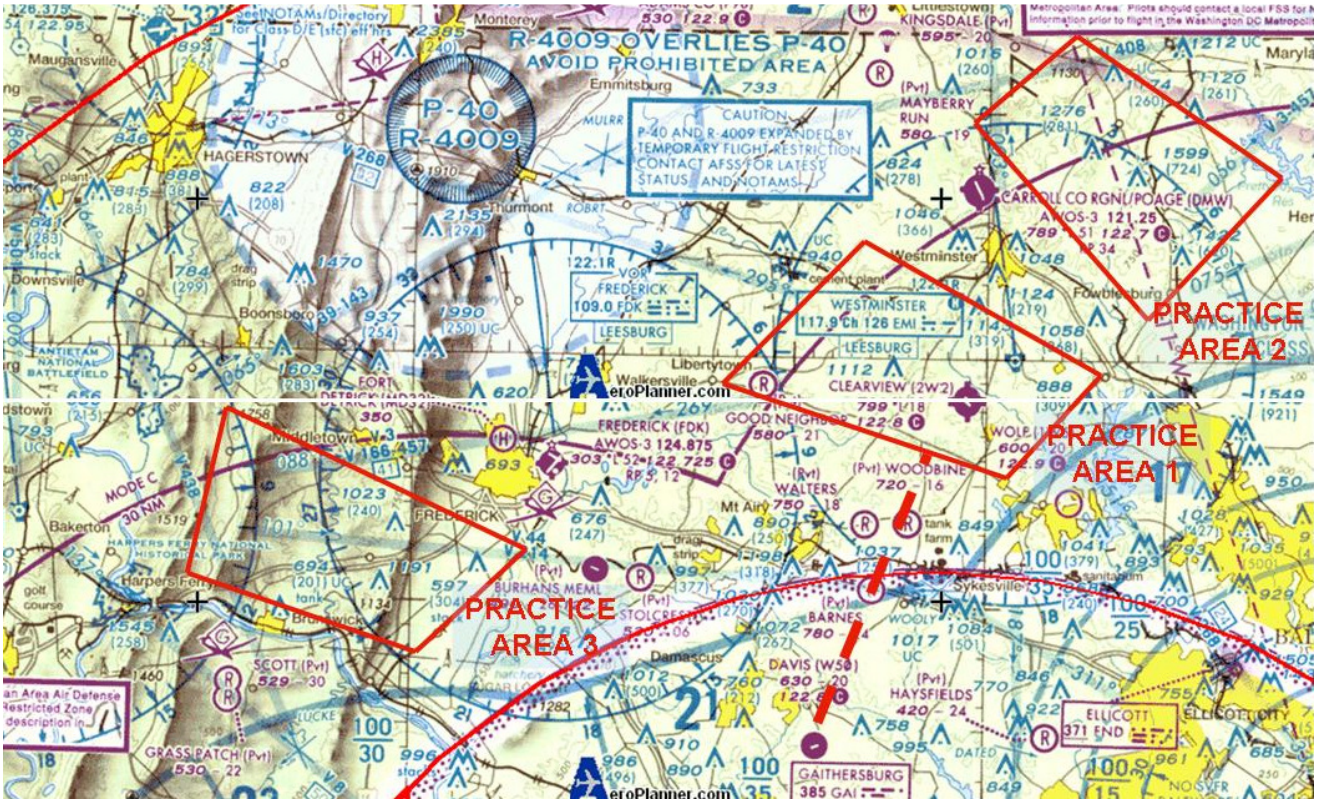
Dual Night Cross Country:
KESN, KOXB, KLNS, KMQS, KCXY

Additional Intermediate Airports for all flights:
KHGR, KDMW, KFDK, KTHV, KHGR, KMRB

See next page for VFR Chart excerpt illustration(s).

Washington International Flight Academy utilizes a practice area(s) defined by depiction in the included VFR Chart excerpt. If water is within the depicted area, at no time shall any aircraft fly beyond its power-off gliding range from shore. Aircraft will contact Approach Control when available for traffic advisories while operating in the practice area. Aircraft operating within the inland portion (if applicable) of the practice area will maintain an altitude sufficient to ensure safe terrain clearance at all times.

Item Rev. ~Original~ 3/31/2010 VFR Chart excerpt illustration(s).



I have read and I understand and agree to comply with the instructions, procedures, terms, and conditions set forth in Washington International Flight Academy's
SAFETY & PROCEDURES MANUAL.

Student Signature

Print Name Date

Private Pilot Airplane

Single Engine Land Course

Item Rev. ~Original~ Date 3/31/2010 STUDENT and INSTRUCTOR REQUIREMENTS

Student Enrollment:

Minimum Age for Initial Enrollment – 16 Years Old
Medical Requirements – Third Class Medical and valid Student Pilot Certificate or Recreational Pilot Certificate.

Minimum Chief Instructor Requirements:

Holds Current: Commercial Pilot Certificate, Flight Instructor Certificate; inclusive of appropriate category privileges, Third Class Medical Certificate. Has held the above described Flight Instructor Certificate with all aforementioned privileges for at least 24 months and has at least 500 hours of instruction given and at least 1,000 of PIC time logged.

Minimum Assistant Chief Instructor Requirements:

Holds Current: Commercial Pilot Certificate, Flight Instructor Certificate; inclusive of appropriate category privileges, Third Class Medical Certificate. Has held the above described Flight Instructor Certificate with all aforementioned privileges for at least 12 months and has at least 250 hours of instruction given and at least 500 of PIC time logged.

Minimum Flight and Ground Instructor Requirements:

Holds Current: Commercial Pilot Certificate, Flight Instructor Certificate; inclusive of appropriate category privileges, Third Class Medical Certificate. Has logged 300 hours total time in appropriate category.

Chief Instructor

Chief Instructor; Michael Hounslow, meets and/or exceeds the above listed requirements.

Assistant Chief Instructor

Assistant Chief Instructor; Not applicable at this time.

 PRIVATE PILOT CERTIFICATION COURSE

INTRODUCTION

The Private Pilot Course is designed to coordinate the academic study assignments and flight training required by pilots operating in an increasingly complex aviation environment. New subject matter is introduced during the ground lessons, which include five items:

1. In-depth textbook assignments
2. Selected video presentations
3. Thorough instructor/student discussions
4. Comprehensive exercise book questions
5. Stage exams for evaluation and reinforcement

After completing the ground lesson, the student will apply these new principles in the Airplane during the flight lesson. It is required that each student purchase/provide their own copy of the Jeppesen *Private Pilot Manual* as a study textbook and of the Jeppesen Private Pilot Syllabus as reference to this Paperless141 software 141 course.

Optimum effectiveness is realized when ground lessons are completed just prior to the respective flight lessons, as outlined in the syllabus. However, it is also acceptable to present lessons in a formal ground school before the student is introduced to the Airplane. If a considerable length of time has elapsed between the ground lesson and the associated flight, the instructor may wish to conduct a short review of essential material. One rule dictated by sound educational philosophy is that the flight lesson not be conducted until the related ground lesson has been completed.

In the flight syllabus, the content portion contains areas of operation which are italicized. Listed under the areas of operation are the tasks which should be emphasized for that flight. When no tasks are listed, the instructor should assign the tasks, as appropriate, for that area of operation.

COURSE OBJECTIVE

The student will obtain the knowledge, skill, and aeronautical experience necessary to meet the requirements for a private pilot certificate with an airplane category rating.

COURSE COMPLETION STANDARD

The student must demonstrate through knowledge tests, flight tests, and show through appropriate records that (s)he meets the knowledge, skill, and experience requirements necessary to obtain a private pilot certificate with an airplane category rating.

REQUIREMENTS FOR SOLO FLIGHT

Before you can fly solo, you must hold a student pilot certificate and at least a current third- class medical certificate. You also must be at least 16 years of age in order to obtain a student pilot certificate and be able to read, speak, write, and understand the English language. Remember that solo flight operations require specific training, successful completion of a presolo written exam, and endorsements from your flight instructor. Stage check I must be completed prior to solo flight.

REQUIREMENTS FOR GRADUATION

You must be at least 17 years of age to graduate, be able to read, speak, write, and understand the English language, meet the same requirements listed in the time table for dual and solo flight, and satisfactorily complete the training outlined in this syllabus. When you meet the minimum requirements of FAR Part 141, Appendix B, you may be considered eligible for graduation.

LESSON DESCRIPTION AND STAGES OF TRAINING

Each lesson is fully described within the syllabus, including the objectives, standards, and measurable units of accomplishment and learning. The stage objectives and standards are described at the beginning of each stage within the syllabus.

TESTS AND CHECKS

The syllabus incorporates stage checks and end-of-course tests in accordance with FAR 141, Appendix B. The chief instructor is responsible for ensuring that each student accomplishes the required stage checks and end-of-course tests in accordance with the schools approved training course. However, the chief instructor may delegate authority for stage checks and end-of-course tests to the assistant chief or check instructor. You also must complete stage exams, pilot briefings, and final examinations that are described within the syllabus.

FLIGHT TRAINING								
	DUAL					**SOLO**		
	Local Day	Day Cross Country	Local Night	Night Cross Country	Instrument	Local Day	Cross Country	Dual/Solo Combined Totals
Stage I	9.0				(1.0)	0.5		9.5
Stage II	4.0	2.0	1.0	2.0	(2.0)	2.0	2.5	13.5
Stage III	6.0						6.0	12.0
Totals	19.0	2.0	1.0	2.0	(3.0)	2.5	8.5	35.0

GROUND TRAINING						
	Maneuvers Video and Class Discussion	PCATD	Manual Video and Class Discussion	Pilot Briefings	Stage Final Exams	Exam Debriefings
Stage I	3.0	3.0	10.0		1.0	As Req.
Stage II	3.0		6.0	2.0	1.0	As Req.
Stage III	3.0	2.0	8.0	2.0	4.0	1.0
Totals	9.0	5.0	24.0	4.0	6.0	1.0

NOTE: Any reference to a PCATD is only listed here for preservation of the accurate replication and copyrights of the Jeppesen Course Text as a PCATD is listed therein. Washington International Flight Academy does not intend to utilize a PCATD in the implementation of this course. All replicated Jeppesen references to PCATD in this document should be ignored as they do not apply to Washington International Flight Academy.

THE PRIVATE PILOT COURSE DESCRIPTION

GROUND TRAINING

In accordance with 14 CFR PART 141, ground school training is an integral part of pilot certification courses. The ground training syllabus has been designed to meet this requirement and may be conducted concurrently with flight training. This is the most effective method for course utilization, because the academic knowledge is obtained immediately prior to its application during flight training. When the course is presented as a formal classroom program, lessons should be followed in numerical order as listed in the ground training segment of the syllabus. However, to provide a degree of flexibility for adapting to individual student needs and the training environment, the syllabus lessons may be altered with approval of the chief flight instructor. Any deviation should not disturb the course continuity or objective. Lessons may be completed out of order within the same stage but not between stages. Each lesson may be presented in one classroom session, or it may be divided into two sessions, as necessary.

USING THE GROUND LESSON

The ground lessons generally are divided into two sections: Lesson Introduction and Class Discussion. Some of the ground lessons also incorporate a video presentation which aids in the introduction of the material. During the introduction, the instructor should outline the subject material to be covered during the training session, the objective for learning that information, and the performance standards necessary for successful lesson completion. Each ground lesson also includes a Study Assignment for the next lesson.

TEXTBOOK

Prior to each ground lesson, the student should read and study the assigned textbook chapter. The *Private Pilot Manual* is comprehensive and well illustrated for easier study and understanding. It, along with other publications indicated by the Chief flight instructor, contains the information necessary to complete the academic stages of the Private Pilot Syllabus.

EXERCISE BOOK AND STAGE EXAMS

The final step of each lesson is for the students to complete the appropriate questions in the exercise book and discuss any incorrect responses with the instructor. This ensures student understanding of the subject material prior to beginning the next ground lesson. When the lesson is complete, the instructor assigns the next chapter for out-of-class reading. At the end of each ground training stage, the students are required to complete the stage exam successfully before entering the next stage.

END-OF-COURSE EXAMS

When all of the appropriate ground lesson assignments are complete, the student will take the end-of-course exam. After a thorough review of the end-of-course exam material, the actual FAA *Airplane Private Pilot Airmen Knowledge Test* should be completed without delay.

COURSE IMPLEMENTATION

The Private Airplane Syllabus are designed to fulfill the requirements of a Private Pilot Certification Course in accordance with 14 CFR PART 141, Appendix B.

PRIVATE PILOT CERTIFICATION COURSE

The *Private Pilot Airplane Syllabus* is presented first in both an overview and a lesson by-lesson format. The combined flight and ground training includes the entire outline from Stage I through the completion of Stage III. The lesson sequence and content have been designed to provide the student with maximum academic and flight training prior to the introduction of new maneuvers or procedures. Therefore, the sequence shown in the syllabus outline should not be altered when the coordinated program is utilized. If absolutely necessary, the placement of ground lesson assignments in the coordinated program may be changed to allow the student to progress more rapidly in his academic study than is outlined in the course. If this method is used, the student should not be allowed to progress into the ground lesson assignments of the next stage until he has completed the flights in the current stage of training. This is important, because the student's recall of academic knowledge decreases with an increase in time between subject introduction during ground training and its application in flight training. The private course consists of 35 hours of ground training and 35 hours of flight training.

NOTE: It is important to note that the Syllabus Outline referred to above and presented on the next page is represented in this TCO exactly as written by Jeppesen for copyright preservation, however, the optional references therein to Video and PCATD are not part of this TCO as they are optional by Jeppesen specification and those materials are not presented in this TCO. The CD-ROM will be used in preparation for the FAA written exam.

All replicated Jeppesen references Video, PCATD and CD-ROM in this document should be ignored as they do not apply to Washington International Flight Academy.

Syllabus Outline

LESSON TIME ALLOCATION													
Ground Training							Flight Training						
							Dual					Solo	
Private Pilot Maneuvers discussion, video, and/or CD-ROM	PCATD	Private Pilot Manual class discussion and video	Pilot Briefings	Stage/Final Exams	Exam Debrieings		Day Local	Day Cross Country	Night Local	Night Cross Country	Instrument	Day Local	Cross-Country
GROUND STAGE I, II and FLIGHT STAGE I													
	1.0	2.0				Ground Lesson 1 -- Discovering Aviation							
	1.0	2.0				Ground Lesson 2 -- Airplane Systems							
						Flight 1	0.5						
		2.0				Ground Lesson 3 -- Aerodynamic Principals							
1.0						Flight 2	1.0						
		2.0				Ground Lesson 4 -- The Flight Environment							
1.0						Flight 3	1.0				0.2		
	1.0	2.0				Ground Lesson 5 -- Communications & Flight Info.							
1.0						Flight 4	1.0				0.2		
				1.0		Ground Lesson 6 -- Stage Exam I							
1.0						Flight 5	1.0				0.2		
		2.0				Ground Lesson 7 -- Meteorology for Pilots							
1.0						Flight 6	1.0						
		2.0				Ground Lesson 8 -- Federal Aviation Regulations							
1.0						Flight 7	1.0				0.2		
		2.0				Ground Lesson 9 -- Interpreting Weather Data							
			2.0			Presolo Written Exam and Briefing							
						Flight 8	1.0				0.2		
						Flight 9	0.5					0.5	
				1.0		Ground Lesson 10 -- Stage Exam II							
						Flight 10 -- Stage Check I	1.0						
6.0	**3.0**	**16.0**	**2.0**	**2.0**		**Stage Totals**	**9.0**				**1.0**	**0.5**	
GROUND STAGE III and FLIGHT STAGE II													
		2.0				Ground Lesson 11 -- Airplane Performance							
1.0						Flight 11	1.0						
	1.0	2.0				Ground Lesson 12 -- Navigation							
						Flight 12						1.0	
		2.0				Ground Lesson 13 -- Human Factors in Aviation							

LESSON TIME ALLOCATION														
Ground Training							Flight Training							
							Dual					Solo		
Private Pilot Maneuvers discussion, video, and/or CD-ROM	PCATD	Private Pilot Manual class discussion and video	Pilot Briefings	Stage/Final Exams	Exam Debrieings		Day Local	Day Cross Country	Night Local	Night Cross Country	Instrument	Day Local	Cross-Country
	1.0	2.0				Ground Lesson 14 -- Flying Cross Country							
1.0						Flight 14	1.0				0.5		
				1.0	▮	Ground Lesson 15 -- Stage Exam III							
						Flight 15	1.0				0.5		
						Flight 16			1.0				
1.0						Flight 17		2.0			0.5		
						Flight 18				2.0	0.5		
			2.0			Briefing -- Solo Cross Country							
						Flight 19							2.5
				3.0	1.0	Ground Lesson 16 & 17 -- Final Exams A & B							
						Flight 20 -- Stage Check II	1.0						
3.0	**2.0**	**8.0**	**2.0**	**4.0**	**1.0**	**Stage Totals**	**4.0**	**2.0**	**1.0**	**2.0**	**2.0**	**2.0**	**2.5**
FLIGHT STAGE III													
						Flight 21							2.0
						Flight 22							4.0
						Flight 23	2.0				▮		
						Flight 24	2.0				▮		
						Flight 25 -- Stage Check III	1.0						
			▮			Briefing -- Private Pilot Practical Test							
						Flight 26 End-of-Course Flight Check	1.0				▮		
						Stage Totals	**6.0**						**6.0**
9.0	**5.0**	**24.0**	**4.0**	**6.0**	**1.0**	**Private Pilot Course -- Overall Totals**	**19.0**	**2.0**	**1.0**	**2.0**	**3.0**	**2.5**	**8.5**

▮ = As Required

Note:

1. The first column shows the recommended *Private Pilot Maneuvers* discussion, video, and/or CD-ROM training time.
2. The second column shows the maximum PCATD training time when a PCATD is part of the approved course
3. The third column shows the minimum recommended training time for *Private Pilot Manual* class discussion, and video. Times shown in columns 1 and 2 may be credited toward the total time shown in column 3 as follows
    - Up to 9 hours of *Private Pilot Maneuvers* class discussion, video and/or CD-ROM and/or
    - Up to 5 hours of PCATD training

To receive credit for CD-ROM and/or PCATD training time, the associated course approval must be obtained.

The prior page's replicated Jeppesen references Video, PCATD and CD-ROM and associated approval in this document should be ignored as they do not apply to Washington International Flight Academy. Washington International Flight Academy is NOT applying for approval for said materials.

Private Pilot Airplane

Single Engine Land Course

Training Course Description

Private Pilot Certification Course Airplane Single-Engine Land

Ground Training Portion: 35 Hours

GROUND TRAINING OBJECTIVES.

The student will obtain the knowledge, skill, and aeronautical knowledge necessary to meet the requirements for a private pilot certificate with an airplane category rating and a single-engine land class rating.

GROUND TRAINING COMPLETION STANDARDS.

The student must compete the 35 hours of ground training and demonstrate through knowledge tests and show through appropriate records that he / she has the necessary knowledge to pass the FAA Private Pilot Knowledge Test.

STAGE I

STAGE OBJECTIVES

During this stage, the student will be introduced to pilot training, aviation opportunities, human factors in aviation, and become familiar with airplane systems and aerodynamic principles, as well as the flight environment. The student also will obtain a basic knowledge of safety of flight, airports, aeronautical charts, airspace, radio communications, and air traffic control services, including the use of radar. In addition, the student will learn radio procedures and the common sources of flight information.

STAGE COMPLETION STANDARDS

This stage is complete when the student has completed the Stage I written exam with a minimum passing score of 80%, and the instructor has reviewed each incorrect response to ensure complete understanding before the student progresses to Stage II.

STAGE II

STAGE OBJECTIVES

During this stage, the student will become familiar with weather theory, typical weather patterns, and aviation weather hazards. In addition to meteorological theory, the student will learn how to obtain and interpret various weather reports, forecasts, and graphic charts. Finally, the student will become familiar with FARs as the apply to private pilot operations.

STAGE COMPLETION STANDARDS

This stage is complete when the student has completed the Stage II written exam with a minimum passing score of 80%, and the instructor has reviewed each incorrect response to ensure complete understanding before the student progresses to Stage III.

STAGE III

STAGE III OBJECTIVES

During this stage, the student will learn how to predict performance and control the weight and balance condition of the airplane. In addition, the student will be introduced to pilotage, dead reckoning, and navigation equipment. This includes understanding the basic concepts of how to use aeronautical charts, plotters, flight computers, and flight publications to plan cross-country flight. The student also will learn how to use VOR, ADF, and advanced navigation systems. In addition, the student will obtain an understanding of the physiological factors which can affect both pilot and passengers during flight. Finally, the student will learn how to conduct comprehensive preflight planning for cross-country flights and gain insight into factors affecting aeronautical decision making.

STAGE COMPLETION STANDARDS

This stage is complete when the student has completed the Stage III written exam with a minimum passing score of 80%, and the instructor has reviewed each incorrect response to ensure complete understanding.

Private Pilot Certification Course Airplane Single-Engine Land

Flight Training Portion: 35 Hours

FLIGHT TRAINING OBJECTIVES.

The student will obtain the necessary aeronautical skill and experience necessary to meet the requirements for a private pilot certificate with an airplane category rating and a single-engine land class rating.

FLIGHT TRAINING COMPLETION REQUIREMENTS.

The student must demonstrate through flight tests and school records that the necessary aeronautical skill and experience requirements to obtain a private pilot certificate with an airplane category rating and single-engine land class rating have been met.

STAGE I

STAGE OBJECTIVES

During this stage, the student obtains the foundation for all future aviation training. The student becomes familiar with the training airplane and learns how the airplane controls are used to establish and maintain specific flight attitudes and ground tracks. The student will also gain the proficiency to solo the training airplane in the traffic pattern.

STAGE COMPLETION STANDARDS

At the completion of this stage, the student will demonstrate proficiency in basic flight maneuvers, and will successfully soloed in the traffic pattern. In addition, the student will have the proficiency required for introduction of maximum performance takeoff and landing procedures in Stage II.

STAGE II

STAGE OBJECTIVES

This stage allows the student to expand the skills learned in the previous stage. The student is introduced to short-field and soft-field takeoff and landing procedures, as well as night flying, which are important steps in preparation for cross-country training. Additionally, greater emphasis is placed on attitude control by instrument reference to increase the student's overall competence. In the cross-country phase, the student will learn to plan and conduct cross-country flights using pilotage, dead reckoning, and radio navigation systems, and how to safely conduct flights in the National Airspace System.

STAGE COMPLETION STANDARDS

This stage is complete when the student can accurately plan and conduct cross-country flights. In addition, the student will have the proficiency to safely demonstrate consistent results in performing short-field and soft-field takeoffs and landings and night operations. The proficiency level must be such that the successful and safe outcome of each task is never seriously in doubt.

STAGE III

STAGE OBJECTIVES

During this stage, the student will gain additional proficiency in solo cross-country operations and will receive instruction in preparation for the End-of-Course Flight Check.

STAGE COMPLETION STANDARDS

This stage is complete when the student demonstrates performance of private pilot operations at a standard that meets or exceeds the minimum performance criteria established in the practical test standards for a private pilot certificate.

Item Rev. ~Original~ Date 3/31/2010

Exam Questions

The actual questions in the course are selected from the FAA Knowledge Test database and are either Rotorcraft Helicopter or Fixed-Wing specific depending on the selected course. The Exam Questions presented herein are meant as a sample representation of the type of questions used in the course exams. We prefer not to publish the actual course questions for security reasons.

Exam Questions

Exam	Q #	Question	Answer 1	Answer 2	Answer 3	Illustration	Answer
STG 1	1	What are the characteristics of a monocoque airplane structure?	all structural loads are carried by the outer skin of the airplane.	A lightweight substructure stiffens the skin to provide strength and rigidity.	An internal framework carries structural loads, while the skin provides aerodynamic streamlining		1
STG 1	2	Which control surfaces are usually located on the empennage?	Rudder, elevator, stabilator	Stabilator, antiservo tab, canard	Ailerons, vertical stabilizer, horizontal stabilizer		1
STG 1	3	What condition must be present for carburetor ice to form?	High relative humidity	Power setting less than 5O%	Outside air temperature near freezing		1
STG 1	4	A power loss occurs when you apply carburetor heat because	less dense air is entering the engine	the amount of fuel flowing to the engine is reduced	the flow of air in the carburetor venturi is restricted.		1
STG 1	5	Detonation can be described as	fuel in the cylinders exploding instead of burning smoothly	the uncontrolled combustion of fuel in advance of normal ignition	the process where the compressed fuel/air mixture is ignited to begin the power stroke.		1
STG 1	6	If the engine magneto switch is turned to the "OFF" position, but the engine continues to run, the probable cause is	a broken magneto ground wire	spontaneous combustion due to an overheated engine	an overvoltage condition within the magneto causing the current to arc across the open contacts		1
STG 1	7	Excessive cylinder head and engine oil temperatures can be caused by	using a lower than normal fuel grade.	using a higher-than-normal fuel grade.	operating at a richer-than-normal mixture setting.		1
STG 1	8	The three pressure instruments connected to the pitot-static system are the	airspeed indicator, turn coordinator, and altimeter.	attitude indicator, heading indicator, and turn coordinator.	airspeed indicator, altimeter, and vertical speed indicator.		3
STG 1	9	According to the markings on the accompanying airspeed indicator, what is the maximum speed with flaps fully extended?	40 knots	85 knots	111 knots	PVT_StageI_Q9.jpg	2

STG 1	10	Assume that you land at an airport with the altimeter set to 29.92 instead of the current setting of 30.00. What will the altimeter read if the field elevation is 2,000 feet MSL?	1,920 feet MSL	2,080 feet MSL	2,800 feet MSL	1
STG 1	11	The turn coordinator provides a direct indication of aircraft	bank angle.	rate of turn.	pitch attitude, as well as rates of roll and turn	2
STG 1	12	The attitude indicator reflects the airplane's movement about the	lateral axis only	lateral and vertical axes.	longitudinal and lateral axes.	3
STG 1	13	How often should you check the heading indicator and align it with the magnetic compass?	Every 15 minutes	Every 30 minutes	Whenever it precesses 15 degrees	1
STG 1	14	After departing runway 36, you make a left turn to a heading of 180 degrees. If the magnetic compass initially indicates a turn in the opposite direction, you should know that this reaction is	an indication that the compass is not functioning properly.	normal for all magnetic compasses under similar conditions.	unusual, but it can be corrected by adjusting the set screws on the compass.	2
STG 1	15	What two conditions normally cause an increase in lift?	Increased angle of attack and increased speed	Decreased angle of attack and increased angle of relation	Decreased angle of incidence and increased angle of relation	1
STG 1	16	What causes the separation of air over the wing during a stall?	The angle between the chord of the wing and the longitudinal axis of the airplane is too great.	The angle formed by the wing chord line and the relative wind is excessive, regardless of the airspeed or attitude.	The angle formed by the relative wind and the longitudinal axis of the airplane is too great for very low airspeeds	2
STG 1	17	How are the lift and drag components of the wing affected when you lower the flaps?	Both lift and drag increase	Lift increases and drag decreases	Lift decreases and drag increases	1
STG 1	18	Wingtip vortices contribute to the production of	form drag	induced drag.	parasite drag	2
STG 1	19	What are the control characteristics of an aircraft with the CG forward of limits?	Light elevator forces, unstable pitch, and tendency to stall	Heavy elevator forces, unstable pitch, and tendency to stall	Very stable pitch, inadequate elevator control for landing, longer takeoff run, and greater noseover tendency	3
STG 1	20	Dihedral is used to stabilize the airplane about the	lateral axis	vertical axis	longitudinal axis.	3

STG 1	21	P-factor is one of the forces that causes the airplane to	turn.	yaw to the left.	float in ground effect		2
STG 1	22	What is the primary force that causes an airplane to turn?	Centrifugal force	Vertical component of lift	Horizontal component of lift		3
STG 1	23	The recommended method of scanning for other aircraft during the day is to use	off-center viewing and peripheral vision by scanning small sectors.	regularly spaced concentration on the 3, 9, and 12 o'clock positions	a series of short, regularly spaced eye movements to search each 10 degree sector of the viewing area.		3
STG 1	24	The most practical way to compensate for blind spots in aircraft design while climbing or descending is to make	360 degree turns.	shallow S turns.	90 degree clearing turns.		2
STG 1	25	Except when necessary for takeoff and landing, when you fly over congested areas, you must maintain an altitude of at least 1,000 feet	above any obstacle.	vertically and 1,000 feet horizontally from the nearest obstacle.	above the highest obstacle within a horizontal distance of 2,000 feet of the aircraft.		3
STG 1	26	Refer to the illustration and determine the appropriate landing runway and traffic pattern direction.	Runway 18, left hand traffic	Runway 18, right hand traffic	Runway 36, right hand traffic	PVT_StageI_Q26.jpg	3
STG 1	27	The purpose of a displaced threshold is to	cause aircraft to touch down farther down the runway.	cause aircraft to land in full view of the control tower personnel	ensure that aircraft clear the threshold lights before touching down		1
STG 1	28	A Large letter "X" placed near the runway threshold indicates the	runway is closed.	airport is closed	threshold is displaced		1
STG 1	29	An airport beacon with two white flashes and one green flash indicates	a military airport	a lighted water airport.	a lighted private airport.		1
STG 1	30	When using two bar VASI Lights, what will you see when you are on the proper glide slope?	Near barred, far bar white	Near bar white, far bar red	Near bar green, far bar red		2
STG 1	31	This symbol (see Illustration) is used on sectional charts to represent an airport which has	UNICOM.	runway lights.	a hard surfaced runway between 1,500 and 8,069 feet long.	PVT_StageI_Q31.jpg	3

STG 1	32	What is the minimum ceiling requirement for VFR operations in the airspace represented in Illustration C?	1,000 feet	1,500 feet	2,000 feet	PVT_StageI_Q32.jpg	1
STG 1	33	What requirements must be met before you enter the airspace represented in Illustration D?	Transponder equipment	Two-way radio communications	Basic cloud clearance and visibility of three miles	PVT_StageI_Q32.jpg	2
STG 1	34	What are the basic VFR weather minimums, if any, for flight at 6,500 feet MSL in the airspace shown by Illustration A?	None apply because of positive radar control	Cloud clearance of 500 feet below, 1,000 feet above, and 2,000 feet horizontally with one nautical mile visibility	Clear of clouds with three statute miles visibility	PVT_StageI_Q32.jpg	3
STG 1	35	What action, if any, is required when you are departing a satellite airport located within Class C airspace?	Contact ATC as soon as practicable.	Obtain a clearance from ATC by telephone or radio prior to departure.	Obtain a clearance from ATC prior to departure if your aircraft is not transponder equipped.		1
STG 1	36	What are the special VFR weather minimums for flight within Class D airspace?	Clear of the clouds with one statute mile visibility	Clear of the clouds with three nautical miles visibility	Cloud clearance of 500 feet below, 1,000 feet above, and 2,000 feet horizontally with three statute miles visibility.		1
STG 1	37	On a sectional chart, what does the notation "NO SVFR" above the airport name indicate?	Not safe for VFR operations.	No special VFR operations are permitted at night.	No special VFR operations are permitted at anytime		3
STG 1	38	What VFR weather minimums are required to take off from Salina Airport?	Visibility one mile and a ceiling of 1,000 feet	Visibility three miles and a ceiling of 1,000 feet, or special VFR	Visibility one mile and no ceiling, provided the pilot is instrument rated	PVT_StageI_Q38.jpg	2
STG 1	39	Penetration of active warning areas by nonparticipating aircraft should be avoided because of	the concentration of fire fighting operations.	a high volume of military jet pilot training activities.	unusual, often invisible, hazards such as aerial gunnery or guided missiles		3
STG 1	40	A controller may issue a safety alert to an aircraft under his control when that aircraft is	near an area with severe thunderstorms	about to enter an alert area or other special use airspace.	unsafe proximity to terrain, obstructions, or another aircraft		3
STG 1	41	When in radar contact, who is primarily responsible for VFR aircraft separation?	Controller	Pilot in command	The controller in terminal areas and the pilot when enroute		2

STG 1	42	When approaching an airport with an operating control tower, you must contact the tower before entering the	Mode C veil.	Class D airspace.	airport traffic pattern		2
STG 1	43	At non-tower airports without an FSS or UNICOM, the CTAF usually is	122.8 MHz	122.9 MHz	VOR channels		1
STG 1	44	The VHF emergency frequency monitored by most ground facilities is	121.5 MHz	122.2 MHz	123.0 MHz		1
STG 1	45	When you use the words "PANPAN" in a radio message, it indicates you have	a distress condition and require immediate radio silence and assistance.	an urgent situation requiring priority on the radio frequency and timely, but not immediate, assistance	either an urgent or a distress condition requiring immediate assistance.		1
STG 1	46	What frequency should you use to announce your position during an approach for a landing at Taos Municipal?	117.6 MHz	122.1 MHz	122.8 MHz	PVT_StageI_Q46.jpg	3
STG 1	47	The length of the longest runway at Portland International Airport is	4,049 feet	6,600 feet	11,000 feet.	PVT_StageI_Q47.jpg	3
STG 1	48	When departing to the north, the proper frequency for departure control is	118.1.	133.0.	121.9.	PVT_StageI_Q47.jpg	2
STG 1	49	What information concerning Greater Cincinnati Airport in Covington, Kentucky, is contained in the accompanying NOTAM excerpt?	Runway 3/21 is available at night only.	the airport has a new obstruction 450 feet AGL	the airport has an experimental lighting system.	PVT_StageI_Q49.jpg	3
STG 1	50	FAA Advisory Circulars provide what type of information?	Emergency	Regulatory	Non-regulatory, but necessary for good operating practices		3
STG II	1	What is the major motivating force behind atmospheric circulation?	Rotation of the earth	High and low pressure belts	Uneven heating of the earth's surface		3
STG II	2	What processes result in moisture being added to unsaturated air?	Evaporation and sublimation	Condensation and sublimation	Condensation and latent heat of vaporization		1
STG II	3	A small or converging temperature/ dewpoint spread usually results in	fog and low clouds.	strong surface winds.	low visibility and gusty winds.		1

STG II	4	With the approach and passage of a frontal system in the United States, what pressure and wind direction changes take place?	The pressure falls as the front approaches and rises after its passage, while the wind direction shifts to the right after frontal passage.	The pressure falls as the front approaches and rises after its passage, while the wind direction shifts to the left after frontal passage.	The pressure rises as the front approaches and falls after its passage, while the wind direction shifts to the left after frontal passage.		1
STG II	5	What conditions are necessary for the formation of thunderstorms?	Unstable air, a lifting force, and high moisture levels	High wind velocities aloft and a small temperature/dewpoint spread	The close proximity of a high pressure system to a steep pressure gradient		1
STG II	6	Thunderstorms and squall lines are generally associated with what type of front?	Stationary	Fast moving cold	Slow moving cold		2
STG II	7	The elevation at Denver (KDEN) is 5,400 feet. According to the accompanying aviation routine weather report (METAR), how far below the ceiling will you be if you are flying at 7,500 feet MSL over Denver?	900 feet	2,100 feet	8,400 feet	PVT_StageII_Q7.bmp	1
STG II	8	According to the accompanying terminal aerodrome forecast (TAF) by 0500Z the visibility and ceiling at Philadelphia (KPHL) are expected to be	six miles and 2,000 broken	four miles and 4,000 overcast	greater than six miles and a few clouds at 2,000 feet.	PVT_StageII_Q8.bmp	2
STG II	9	Use the accompanying winds and temperatures aloft forecasts to determine the wind direction, velocity and air temperature expected at 11,000 feet MSL over Glasgow (GGW).	297 Degrees true at 19 knots, 11 degrees C	300 degrees true at 17 m.p.h., 10 degrees F	305 degrees magnetic at 14 m.p.h., 11 degrees C	PVT_StageII_Q9.bmp	1
STG II	10	The scalloped lines on the low level prognostic chart enclose areas	where thunderstorms are expected to develop.	with ceilings below 1,000 feet and/or visibility below three statute miles.	with ceilings from 1,000 to 3,000 feet and/or visibility from three to five statute miles		3
STG II	11	If the departure time for your flight is six or more hours away, what type of weather briefing is appropriate?	Outlook briefing	Standard briefing	Abbreviated briefing		1

STG II	12	What type of information/service is provided by EFAS?	Standard weather briefings	In flight weather briefings and flight plan filing	Pertinent enroute weather briefings and distribution of PIREPs	3
STG II	13	An example of a category classification with respect to pilot certification is	normal	airplane	single engine land	2
STG II	14	If a third class medical certificate was issued to a 35 year old pilot on March 26 of this year, when will it expire?	March 26, 3 years later	March 31, 2 years later	March 31, 3 years later	3
STG II	15	A private pilot had a flight review on September 2 of last year. When is the next flight review required?	September 2, this year	September 2, next year	September 30, next year	3
STG II	16	To carry passengers on a pleasure trip in an airplane with a tricycle landing gear, what recent experience requirements must you meet before departure?	Three takeoffs and landings to a full stop in an aircraft of the same category and class within the preceding 90 days	Five takeoffs and landings to a full stop in an aircraft of the same category, class, and type within the preceding 90 days	A flight review within the preceding 24 months and three takeoffs and landings in an aircraft of the same category and class within the preceding 90 days	3
STG II	17	Who has the final responsibility for the safe operation of an aircraft?	Pilot in command	Pilot with the highest rating	Person who occupies the left seat	1
STG II	18	Under what circumstances is a private pilot permitted to carry a passenger who is clearly under the influence of drugs?	A passenger under the influence of drugs may be carried in an emergency.	Carrying any passenger who is intoxicated or under the influence of drugs is prohibited.	When the passenger is a medical patient under proper care, and the pilot carries a logbook endorsement for the transportation of medical patients	1
STG II	19	Preflight activities for a cross country flight should include a careful study of weather reports and forecasts, fuel and runway requirements, and an alternate course of action if the flight cannot be completed as planned. Such preflight action is	required by regulation and is a good operating practice.	not required by regulation, but is a good operating practice	required by regulation only if passengers are carried for hire	1

STG II	20	With regard to safety belts, the pilot of a small airplane must ensure that all passengers	are briefed on how to fasten and unfasten their safety belts and shoulder harnesses	under the age of two are secured in FAA approved child safety seats during the flight.	wear safety belts at all times, from the time the airplane first moves for the purpose of flight until it stops.		1
STG II	21	While heading north, you find that you are on a converging course with another airplane headed west at the same altitude. What action should you take?	Remain on course, since you have the right of-way.	Alter course to the left, to pass behind the other airplane.	Alter course to the right, to pass behind the other airplane.		3
STG II	22	What action should you take if you receive a clearance that will cause you to deviate from an FAR?	Refuse the clearance, and request an amended clearance.	Accept the clearance, because ATC has assumed responsibility for the deviation.	Accept the clearance, but do not comply with that portion of the clearance that would cause you to violate a regulation.		1
STG II	23	The aircraft papers required by the FAA to be carried aboard an airplane include the	airworthiness certificate, registration certificate, and title of ownership.	airworthiness certificate, certificate of registration, and weight and balance data.	airworthiness certificate, registration certificate, and aircraft and engine logbooks.		2
STG II	24	According to NTSB Part 830, which of the following occurrences would require immediate notification of the NTSB?	A near miss	Damage in excess of $25,000 to property other than the aircraft	Injury to any person or property, regardless of the extent involved		2
STG II	25	According to NTSB Part 830, when is the operator of an aircraft required to notify the NTSB?	When the damage to an airplane exceeds $300	If an aircraft experiences a flight control system malfunction or failure	When an aircraft is involved in any incident, regardless of the damage received		2
STG III	1	What combination of conditions is most detrimental to takeoff and climb performance?	Dry air and low density altitude	Low temperature, low humidity, and low altitude	High temperature, high humidity, and high altitude		3
STG III	2	According to the accompanying chart, a pressure altitude of 5.000 feet with a temperature of +40 degrees C will result in a density altitude of approximately	5,000 feet.	8,900 feet	9,500 feet	PVT_StageIII_Q2.bmp	2

STG III	3	According to the accompanying takeoff distance chart and the following conditions, what is the total distance necessary to clear a 50 foot obstacle?	1,664 feet	1,732 feet	2,165 feet	PVT_StageIII_Q3.bmp	2
STG III	4	Using the listed conditions and the accompanying landing distance chart, determine the distance required to land over a 50 foot barrier	1,470 feet	1,510 feet	1,580 feet	PVT_StageIII_Q4.bmp	1
STG III	5	Use the accompanying maximum rate of climb chart and the listed conditions to determine the rate of climb	742 f.p.m.	765 f.p.m	877 f.p.m.	PVT_StageIII_Q5.bmp	2
STG III	6	What is the difference between the range and the endurance of an aircraft?	Range is the amount of fuel required to fly to a destination, and endurance is the time it will take to get there.	Range is the amount of time that the aircraft can remain in the air, and endurance is the recommended time that the pilot can fly.	With a given amount of fuel, range is the distance that the aircraft can fly, and endurance is the amount of time that the aircraft can remain in the air.		3
STG III	7	Center of gravity is defined as the theoretical point	from which all horizontal measurements are made.	where all of the aircraft's lift is considered to be concentrated.	where all of the aircraft's weight is considered to be concentrated		3
STG III	8	One of the items included in an aircraft's basic empty weight is	baggage	usable fuel	unusable fuel		3
STG III	9	What is the CG location after the airplane is loaded with full fuel?	42.16 inches	42.66 inches	43,03 inches	PVT_StageIII_Q9.bmp	2
STG III	10	How much fuel can be carried in the aircraft with out exceeding a maximum takeoff weight of 2,700 pounds?	11.7 gallons	19.6 gallons	27.5 gallons	PVT_StageIII_Q9.bmp	2
STG III	11	Using the loading specifications from the previous problem, the total moment is	108,231.6 pound inches	113,876.4 pound inches	114,860.0 pound inches	PVT_StageIII_Q9.bmp	2

STG III	12	Assume an aircraft has a total weight of 2,950 pounds and a total moment of 240,700 pound inches. If the CG range is from 82.1 to 86.7 inches, what action, if any, should you take before you fly the aircraft?	Move some load aft in the aircraft	Remove some load from the aft of the aircraft	Take no action, since the aircraft is properly loaded		1
STG III	13	Based on the following conditions, what is the total moment/1000 pound inches?	40.4	47.6	96.8	PVT_StageIII_Q13.jpg	3
STG III	14	According to the center of gravity moment envelope, the aircraft's CG is	out of limits, aft	within both normal and utility category limits	within normal category limits but outside utility category limits	PVT_StageIII_Q14.jpg	3
STG III	15	The time speed distance function of your flight computer can be used to solve for	groundspeed and fuel consumption.	estimated time enroute and indicated airspeed	calibrated airspeed, groundspeed, and wind correction angle		1
STG III	16	If your aircraft's fuel consumption rate is 5.6 g.p.h., how much fuel will it use on a flight of 230 n.m. with an average groundspeed of 93 knots?	11.3 gallons	12.5 gallons	13.8 gallons		3
STG III	17	Determine the density altitude using the listed conditions	1,300 feet	3,075 feet	4,097 feet	PVT_StageIII_Q17.jpg	3
STG III	18	When you are flying an aircraft into a left quartering headwind, what is the effect on groundspeed and wind correction angle if the wind velocity increases?	Both increase.	Both decrease.	Groundspeed decreases, and wind correction increases		3
STG III	19	If you plan to save 30 minutes fuel for reserve, how far can you fly based on the listed conditions?	655 miles	690 miles	720 miles	PVT_StageIII_Q19.jpg	1
STG III	20	Compute the true heading and groundspeed for a cross country flight based on the listed conditions.	185 degrees and 106 knots	205 degrees and 135 knots	186 degrees and 138 knots	PVT_StageIII_Q20.jpg	1
STG III	21	Determine the true airspeed for the trip.	113 knots	118 knots	122 knots	PVT_StageIII_Q21.jpg	1
STG III	22	The compass heading for the trip will be	030 degrees	038 degrees.	056 degrees.	PVT_StageIII_Q21.jpg	1

STG III	23	Assuming a constant fuel consumption rate throughout the flight, how much fuel will remain after the pilot lands at the destination?	11.0 gallons	12.2 gallons	13.1 gallons	PVT_StageIII_Q21.jpg	2
STG III	24	On a flight from Salina, on the upper portion of the chart, to Hutchinson, on the lower portion, your true course will be approximately	103 degrees	193 degrees	283 degrees	PVT_StageI_Q38.jpg	2
STG III	25	The variation in the area is	7 degrees E	7 degrees 30'W	7 degrees 30'E	PVT_StageI_Q38.jpg	1
STG III	26	Using the partially completed navigation log, determine the time required to fly the distance from the bridge to the destination.	1 hour, 5 minutes	1 hour, 10 minutes	1 hour, 17 minutes	PVT_StageIII_Q26.jpg	2
STG III	27	To convert true heading to magnetic heading, you need to	add or subtract the appropriate deviation listed on the compass correction card	compute the wind correction angle and add it to or subtract it from the true heading	subtract easterly or add westerly variation, determined from the isogonic lines on the chart.		3
STG III	28	For a night cross country flight, you are required by the FARs to carry enough fuel, considering wind and forecast weather, to complete the flight to	your primary destination at economy cruise speed	your destination, plus an additional 30 minutes at normal cruise speed	the first point of intended landing and fly after that for at least 45 minutes at normal cruise speed		3
STG III	29	The "R" in block 3 of the flight plan means the airplane	is an R model airplane	has a transponder with no altitude encoding capability.	has RNAV and a transponder with altitude encoding capability.	PVT_StageIII_Q29.jpg	3
STG III	30	How will the flight plan be affected if it is not opened, or activated, until 2030Z?	There will be no effect.	The FSS will begin a phone search of the departure airport to determine why the pilot has not opened the flight plan.	The FSS will cancel the flight plan automatically if it is not opened within one hour of the proposed departure time.	PVT_StageIII_Q29.jpg	3
STG III	31	Assuming the actual departure time was 1930Z, at what time will ATC begin a telephone search if the flight plan has not been closed?	2200Z	2210Z	2240Z	PVT_StageIII_Q29.jpg	3

STG III	32	If you have several cruising altitudes selected for a flight, how are they entered in block 7?	Enter all altitudes.	List only the last altitude.	List only the first altitude.	PVT_StageIII_Q29.jpg	3
STG III	33	The primary disadvantage of VOR navigation is the	limited navigation capabilities.	Line of sight reception characteristic.	difficulty involved in tracking the selected radial		2
STG III	34	If airplane A has 090 degrees set in the course selector, its VOR indications will correspond to those of instrument	1.	3.	4.	PVT_StageIII_Q34.jpg	3
STG III	35	If airplane C displays the VOR indications shown on instrument 2, the course selector will read	120 degrees.	160 degrees.	300 degrees.	PVT_StageIII_Q34.jpg	3
STG III	36	If airplane B has 280 degrees set in the course selector, the VOR indications will correspond to those of instrument.	1.	3.	6.	PVT_StageIII_Q34.jpg	2
STG III	37	Flying outbound from a VOR on the 120 deg. radial and inbound to the next station on the 300 deg. radial. If the course selector is set at 120 deg., what TO/FROM indication will be displayed when you change the frequency to the station ahead?	TO	OFF	FROM		1
STG III	38	While you are tracking a VOR radial, what factor causes the most difference between the selected course and the magnetic heading?	Wind	Deviation	Variation		1
STG III	39	With the heading indicator displaying 130 degrees and the automatic direction finder pointing to 210 degrees, what heading would you use with a fixed card indicator to proceed to the NDB?	080 degrees	210 degrees	340 degrees		3

STG III	40	What part of your eye allows you to perceive color?	Rods	Cones	Lens	2
STG III	41	While allowing your eyes to adapt to darkness for a night flight, you should	use low level blue white light for two hours prior to the flight.	wear dark glasses that block all wavelengths of light except blue for one hour before flight	avoid bright white lights, such as headlights, landing lights, strobe lights, and flash lights for at least thirty minutes before flight	3
STG III	42	The best way to view dim objects at night is to	scan around the object, then stare at it	stare directly at the object for a few moments, then scan around it	use off center viewing and avoid staring at the object for too long	3
STG III	43	When flying a VFR approach at night there is a natural tendency to use a	lower than normal approach	higher than normal approach	lower than normal groundspeed	1
STG III	44	Assume you feel a tumbling or spinning sensation during climb out after a night departure. In this situation, you should	focus on the horizon and keep the wings level	use supplemental oxygen to help restore your equilibrium	rely on the flight instruments and believe what they tell you	3
STG III	45	The best way to overcome the effects of hypoxia is to	climb to a higher altitude	use supplemental oxygen	breathe slowly into a paper bag	2
STG III	46	One of the things that can cause hyperventilation is	stress.	lack of oxygen.	lack of proper nourishment	1
STG III	47	What type of hazardous attitude is represented by the statement, "It won't happen to me," and what is the appropriate antidote?	Macho, and "Taking chances is foolish."	Invulnerability, and "It could happen to me."	Invulnerability, and "Not so fast think first."	2
STG III	48	The "I'm Safe" Checklist provides a	thorough preflight of your aircraft	means for the FAA to evaluate you	self assessment of your safety as a pilot	3
STG III	49	To maximize your communication effectiveness, you should	stay ahead of the conversation by anticipating what is being said.	mentally "fill in the blanks" when you receive incomplete communications	repeat complex communications back to the sender to verify that you have understood them correctly.	3
STG III	50	The key concepts of effective workload management are	planning and preparing for high workload periods during periods of lower workload, and assigning appropriate priority to tasks.	working as fast as possible and postponing important tasks until the landing approach, when your concentration will be at its peak	listening only for your own call sign on the radio. delegating as many tasks as possible to others, and omitting low priority tasks	1

FIN A	1	How long is Runway 17 at Pueblo Memorial Airport?	8,668 feet	8,308 feet	7,668 feet	PVT_11_3.jpg	2
FIN A	2	What is the slope of Runway 17 at Pueblo Memorial Airport?	0.01% down	1.0% down	10% down	PVT_11_3.jpg	2
FIN A	3	What type of fuel is available at La Junta Municipal Airport?	100 Level Limited to Jet A	100 Jet A	100LL and Jet A	PVT_11_3.jpg	3
FIN A	4	What hazard may be present on or in the vicinity of La Junta Municipal Airport?	Antelope	Airport 50' center is Seal Coated Runway	Runway 08 &26 restricted from dusk to dawn	PVT_11_3.jpg	1
FIN A	5	What frequency should you use to activate your flight plan after departure from Centennial Airport?	122.95 MHz	118.90 MHz	122.35 MHz	PVT_FinalA_5.jpg	3
FIN A	6	What is the lowest cruising altitude you could fly eastbound over Colorado Springs Airport to avoid the Class C airspace?	10,500 feet MSL	11,500 feet MSL	13,500 feet MSL	PVT_FinalA_6.jpg	2
FIN A	7	What is the height of the Class D airspace surrounding Butts Army Airfield (8 n.m. south-southwest of Colorado Springs)?	8,400 feet MSL	8,399 feet MSL	10,200 feet MSL	PVT_FinalA_7.jpg	1
FIN A	8	What is the significance of the notation, 11,700 MSL, shown approximately west of Fremont Airport?	The notation indicates the highest obstruction in that quadrangle	The notation indicates that the ceiling of Class E airspace in the area is at 11,700 MSL.	The notation indicates that the floor of Class E airspace in the area is at 11,700 MSL.	PVT_FinalA_8.jpg	3
FIN A	9	If you had to divert to Meadow Lake Airport (3 n.m. east of the Colorado Springs VORTAC), what frequency would you use to obtain an airport advisory? How long is the runway at Meadow Lake?	122.7 MHz, 6874 feet	122.7 MHz; 6,000 feet	122.25 MHz, 6,000 feet	PVT_FinalA_9.jpg	2
FIN A	10	In which reference source can you find information regarding parachute jumping areas?	Sectional	The Airport/Facility Directory	Flight Guide		2

FIN A	11	Given the planned fuel flow of 9.0 g.p.h. and assuming a groundspeed of 120 knots, how far could Ryan fly on the 4.5 gallon fuel reserve?	60 n.m.	58 n.m.	62 n.m.		1
FIN A	12	True/False. An airworthiness certificate is always valid unless it is revoked by the aircraft manufacture.	FALSE	TRUE	Not Appropriate		1
FIN B	1	What is the UNICOM frequency at Centennial Airport?	118.90 MHz	120.3 MHz	122.95 MHz	PVT_FinalB_1.jpg	3
FIN B	2	What NDBs are available for navigation in the vicinity of the Colorado Springs Airport?	Aruba (373kHz) and PUB (119.1 MHz)	Petey (407 kHz) and Ironhorse (335 kHz)	Aruba (373kHz) and BUTTS (108.8 MHz)	PVT_FinalB_2.jpg	2
FIN B	3	What is the elevation of the approach end of Runway 17 at Pueblo Memorial Airport?	4,654 feet	4,726 feet	4,667 feet	PVT_FinalB_3.jpg	2
FIN B	4	What is the nearest emergency alternate airfield to the twin towers located 23 miles east of Pueblo? What is the length of the runway?	Fowler; 3,200 feet	La Junta; 8,300 feet	Melon; 3,800 feet	PVT_FinalB_4.jpg	1
FIN B	5	What type of operations can be conducted on the stopway located at the departure end of Runway 26 ?	The stopway must not be used by an aircraft to decelerate and come to a stop only; it cannot be used for landing, takeoff, or taxiing.	The stopway can be used by an aircraft to decelerate and come to a stop only; it can be used for landing, takeoff, or taxiing.	The stopway can be used by an aircraft to decelerate and come to a stop only; it cannot be used for landing, takeoff, or taxiing.	PVT_FinalB_5.jpg	3
FIN B	6	What is the maximum elevation figure in the vicinity of Limon Municipal Airport?	6,600 feet AGL	6,600 feet MSL	6,700 feet MSL	PVT_FinalB_6.jpg	2
FIN B	7	Is fuel available at Limon Municipal Airport? If so, how can it be obtained?	No	Fuel can be obtained by calling the Limon Police Department.	Yes. can be obtained by calling the Limon Airport Manager	PVT_FinalB_7.jpg	2
FIN B	8	What is the base of the Class B airspace over Everitt Airfield (located 9 miles east of Centennial)?	8,000 feet MSL	6,600 feet MSL	8,000 feet AGL	PVT_FinalB_8.jpg	1

P-SOLO	1	When departing behind a heavy aircraft, the pilot should avoid wake turbulence by maneuvering the aircraft	below and downwind from the heavy aircraft.	above and upwind from the heavy aircraft.	below and upwind from the heavy aircraft.	2
P-SOLO	2	Wingtip vortices created by large aircraft tend to	sink below the aircraft generating turbulence	rise into the traffic pattern	rise into the takeoff or landing path of a crossing runway	1
P-SOLO	3	The greatest vortex strength occurs when the generating aircraft is	light, dirty, and fast.	heavy, dirty, and fast	heavy, clean, and slow.	3
P-SOLO	4	If an altimeter setting is not available before flight, to which altitude should the pilot adjust the altimeter?	The elevation of the nearest airport corrected to mean sea level	The elevation of the departure area.	Pressure altitude corrected for nonstandard temperature	2
P-SOLO	5	Except when necessary for takeoff or landing, what is the minimum safe altitude for a pilot to operate an aircraft anywhere?	An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.	An altitude of 500 feet above the surface and no closer than 500 feet to any person, vessel, vehicle, or structure.	An altitude of 500 feet above the highest obstacle within a horizontal radius of 1,000 feet.	1
P-SOLO	6	When an ATC clearance has been obtained, no pilot in command may deviate from that clearance, unless that pilot obtains an amended clearance. The one exception to this regulation is	when the clearance states 'at pilot's discretion.'	an emergency.	) if the clearance contains a restriction	2
P-SOLO	7	Which would provide the greatest gain in altitude in the shortest distance during climb after takeoff?	Vy.	Va.	Vx.	3
P-SOLO	8	After takeoff, which airspeed would the pilot use to gain the most altitude in a given period of time?	Vy.	Vx.	Va.	1
P-SOLO	9	Which aircraft has the right-of-way over the other aircraft listed?	Glider.	Airship.	Aircraft refueling other aircraft.	1
P-SOLO	10	What action is required when two aircraft of the same category converge, but not head-on?	The faster aircraft shall give way	The aircraft on the left shall give way.	Each aircraft shall give way to the right.	2

P-SOLO	11	What action, if any, is appropriate if the pilot deviates from an ATC instruction during an emergency and is given priority?	Take no special action since you are pilot in command.	File a detailed report within 48 hours to the chief of the appropriate ATC facility, if requested.	File a report to the FAA Administrator, as soon as possible.	2
P-SOLO	12	The definition of nighttime is	sunset to sunrise.	1 hour after sunset to 1 hour before sunrise.	the time between the end of evening civil twilight and the beginning of morning civil twilight.	1
P-SOLO	13	In addition to a valid Airworthiness Certificate, what documents or records must be aboard an aircraft during flight?	Aircraft engine and airframe logbooks, and owner's manual.	Radio operator's permit, and repair and alteration forms	Operating limitations and Registration Certificate.	3
P-SOLO	14	Which V-speed represents maneuvering speed?	Va.	Vlo	Vne.	1
P-SOLO	15	What minimum flight visibility is required for VFR flight operations on an airway below 10,000 feet MSL?	1 mile.	3 miles.	4 miles.	2
P-SOLO	16	Airspace at an airport with a part-time control tower is classified as Class D airspace only	when the weather minimums are below basic VFR.	when the associated control tower is in operation.	when the associated Flight Service Station is in operation	2
P-SOLO	17	A blue segmented circle on a Sectional Chart depicts which class airspace?	Class B	Class C.	Class D	3
P-SOLO	18	Each pilot of an aircraft approaching to land on a runway served by a visual approach slope indicator (VASI) shall	maintain a 3° glide to the runway	maintain an altitude at or above the glide slope	stay high until the runway can be reached in a power-off landing.	2
P-SOLO	19	The minimum distance from clouds required for VFR operations on an airway below 10,000 feet MSL is	remain clear of clouds	500 feet below, 1,000 feet above, and 2,000 feet horizontally	500 feet above, 1,000 feet below, and 2,000 feet horizontally	2
P-SOLO	20	During operations outside controlled airspace at altitudes of more than 1,200 feet AGL, but less than 10,000 feet MSL, the minimum flight visibility for VFR flight at night is	1 mile	3 miles.	5 miles	2

P-SOLO	21	During operations within controlled airspace at altitudes of less than 1,200 feet AGL, the minimum horizontal distance from clouds requirement for VFR flight is	1,000 feet	1,500 feet.	2,000 feet.	3
P-SOLO	22	What minimum radio equipment is required for operation within Class C airspace?What minimum radio equipment is required for operation within Class C airspace?	Two-way radio communications equipment and a 4096-code transponder.	Two-way radio communications equipment, a 4096-code transponder, and DME.	Two-way radio communications equipment, a 4096-code transponder, and an encoding altimeter.	3
P-SOLO	23	What is the specific fuel requirement for flight under VFR during daylight hours in an airplane?	Enough to complete the flight at normal cruising speed with adverse wind conditions.	Enough to fly to the first point of intended landing and to fly after that for 30 minutes at normal cruising speed.	Enough to fly to the first point of intended landing and to fly after that for 45 minutes at normal cruising speed.	2
P-SOLO	24	Unless otherwise authorized, two-way radio communications with Air Traffic Control are required for landings or takeoffs	at all tower controlled airports regardless of weather conditions.	at all tower controlled airports only when weather conditions are less than VFR.	at all tower controlled airports within Class D airspace only when weather conditions are less than VFR.	1
P-SOLO	25	What minimum pilot certification is required for operation within Class B airspace?	Recreational Pilot Certificate	Private Pilot Certificate or Student Pilot Certificate with appropriate logbook endorsements.	Private Pilot Certificate with an instrument rating	2
P-SOLO	26	Who is responsible for determining if an aircraft is in condition for safe flight?	A certificated aircraft mechanic	The pilot in command	The owner or operator.	2
P-SOLO	27	Two-way radio communication must be established with the Air Traffic Control facility having jurisdiction over the area prior to entering which class airspace?	Class C.	Class E.	Class G.	1
P-SOLO	28	Which is the correct traffic pattern departure procedure to use at a noncontrolled airport?	Depart in any direction consistent with safety, after crossing the airport boundary.	Make all turns to the left.	Comply with any FAA traffic pattern established for the airport.	3

P-SOLO	29	What are the minimum requirements for airplane operations under special VFR in Class D airspace at night?	The airplane must be under radar surveillance at all times while in Class D airspace.	The airplane must be equipped for IFR with an altitude reporting transponder.	The pilot must be instrument rated, and the airplane must be IFR equipped.	3
P-SOLO	30	A steady green light signal directed from the control tower to an aircraft in flight is a signal that the pilot.	is cleared to land.	should give way to other aircraft and continue circling.	should return for landing.	1
P-SOLO	31	A special VFR clearance authorizes the pilot of an aircraft to operate VFR while within Class D airspace when the visibility is	less than 1 mile and the ceiling is less than 1,000 feet.	at least 1 mile and the aircraft can remain clear of clouds.	at least 3 miles and the aircraft can remain clear of clouds.	2
P-SOLO	32	No person may take off or land an aircraft under basic VFR at an airport that lies within Class D airspace unless the	flight visibility at that airport is at least 1 mile.	ground visibility at that airport is at least 1 mile.	ground visibility at that airport is at least 3 miles	1
P-SOLO	33	The responsibility for ensuring that an aircraft is maintained in an airworthy condition is primarily that of the	pilot in command	owner or operator.	mechanic who performs the work.	2
P-SOLO	34	Which preflight action is specifically required of the pilot prior to each flight?	Check the aircraft logbooks for appropriate entries.	Become familiar with all available information concerning the flight.	Review wake turbulence avoidance procedures.	2
P-SOLO	35	Who is responsible for ensuring Airworthiness Directives (AD's) are complied with?	Owner or operator.	Mechanic with inspection authorization (IA).	Repair station.	1
P-SOLO	36	The airworthiness of an aircraft can be determined by a preflight inspection and a	review of the maintenance records.	statement from the owner or operator that the aircraft is airworthy	log book endorsement from a flight instructor.	1
P-SOLO	37	No person may attempt to act as a crewmember of a civil aircraft with	.008 percent by weight or more alcohol in the blood.	.004 percent by weight or more alcohol in the blood.	.04 percent by weight or more alcohol in the blood.	3
P-SOLO	38	Normal VFR operations in Class D airspace with an operating control tower require the ceiling and visibility to be at least	1,000 feet and 1 mile.	1,000 feet and 3 miles.	2,500 feet and 3 miles.	2

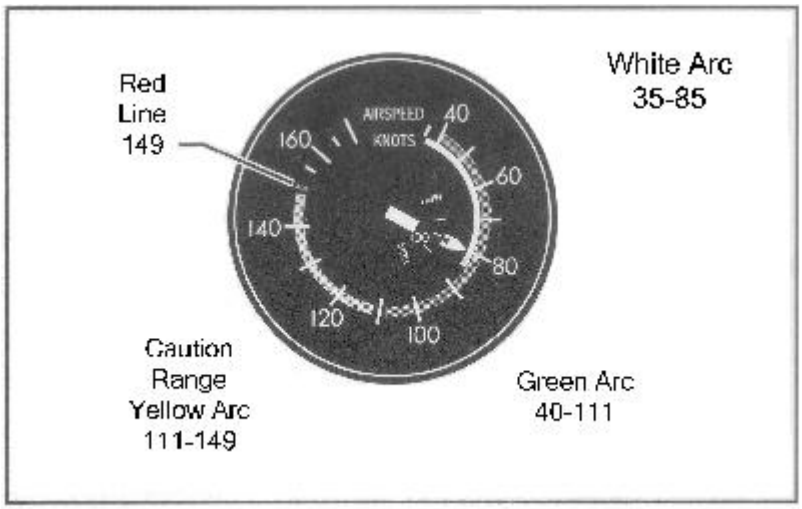
P-SOLO	39	Where may an aircraft's operating limitations be found?	On the Airworthiness Certificate.	In the current, FAA-approved flight manual, approved manual material, markings, and placards, or any combination thereof.	In the aircraft airframe and engine logbooks.	2
P-SOLO	40	The final authority as to the operation of an aircraft is the	Federal Aviation Administration.	pilot in command.	aircraft manufacturer.	2
P-SOLO	41	If an in-flight emergency requires immediate action, the pilot in command may	deviate from the FAR's to the extent required to meet the emergency, but must submit a written report to the Administrator within 24 hours.	deviate from the FAR's to the extent required to meet that emergency.	not deviate from the FAR's unless prior to the deviation approval is granted by the Administrator	2
P-SOLO	42	In addition to other preflight actions for a VFR flight away from the vicinity of the departure airport, regulations specifically require the pilot in command to	review traffic control light signal procedures	check the accuracy of the navigation equipment and the emergency locator transmitter (ELT).	determine runway lengths at airports of intended use and the aircraft's takeoff and landing distance data.	3
P-SOLO	43	Flight crewmembers are required to keep their safety belts and shoulder harnesses fastened during	takeoffs and landings.	all flight conditions.	flight in turbulent air	2
P-SOLO	44	Each person who holds a pilot certificate or a medical certificate shall present it for inspection upon the request of the Administrator, the National Transportation Safety Board, or any	authorized representative of the Department of Transportation.	person in a position of authority.	federal, state, or local law enforcement officer.	3
P-SOLO	45	What document(s) must be in your personal possession or readily accessible in the aircraft while operating as pilot in command of an aircraft?	Certificates showing accomplishment of a checkout in the aircraft and a current biennial flight review.	A pilot certificate with an endorsement showing accomplishment of an annual flight review and a pilot logbook showing recency of experience.	An appropriate pilot certificate and an appropriate current medical certificate if required.	3
P-SOLO	46	Preflight action, as required for all flights away from the vicinity of an airport, shall include	the designation of an alternate airport.	a study of arrival procedures at airports/ heliports of intended use.	an alternate course of action if the flight cannot be completed as planned.	3

P-SOLO	47	What is indicated when a current CONVECTIVE SIGMET forecasts thunderstorms?	Moderate thunderstorms covering 30 percent of the area	Moderate or severe turbulence	Thunderstorms obscured by massive cloud layers.		3
P-SOLO	48	What should pilots state initially when telephoning a weather briefing facility for preflight weather information?	Tell the number of occupants on board.	Identify themselves as pilots.	State their total flight time.		2
P-SOLO	49	What information is contained in a CONVECTIVE SIGMET?	Tornadoes, embedded thunderstorms, and hail 3/4 inch or greater in diameter.	Severe icing, severe turbulence, or widespread dust storms lowering visibility to less than 3 miles.	Surface winds greater than 40 knots or thunderstorms equal to or greater than video integrator processor (VIP) level 4.		1
P-SOLO	50	SIGMET's are issued as a warning of weather conditions hazardous to which aircraft?	Small aircraft only.	Large aircraft only.	All aircraft.		3

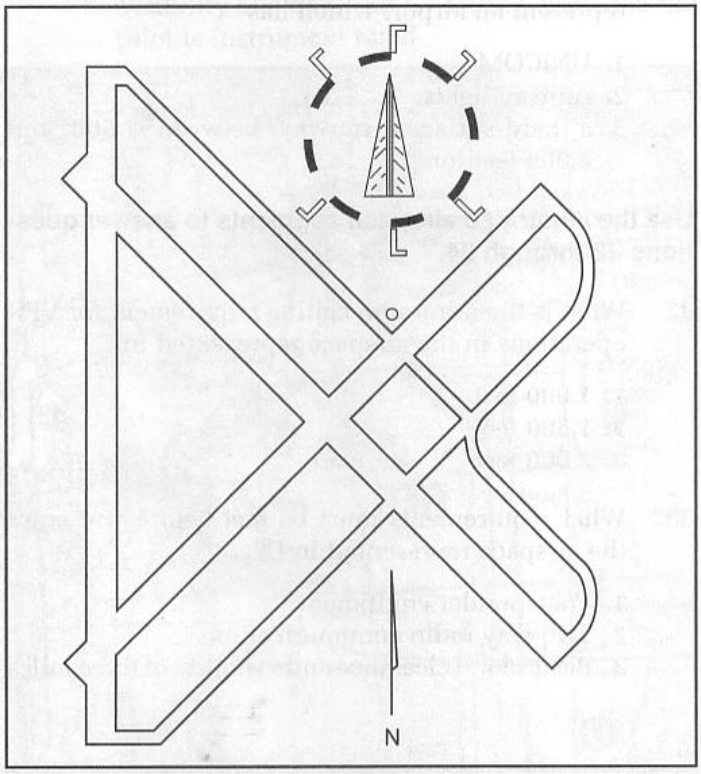
Stage Exam Figures

Listed In Exam Order of Reference

Note: Figure Labels are File Names and are not relative to Question Numbers.

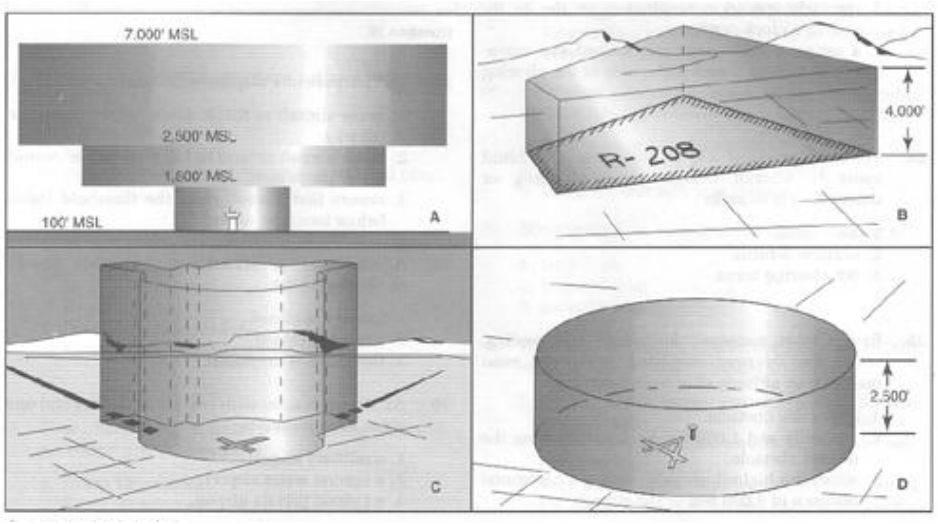


PVT_StageI_Q9

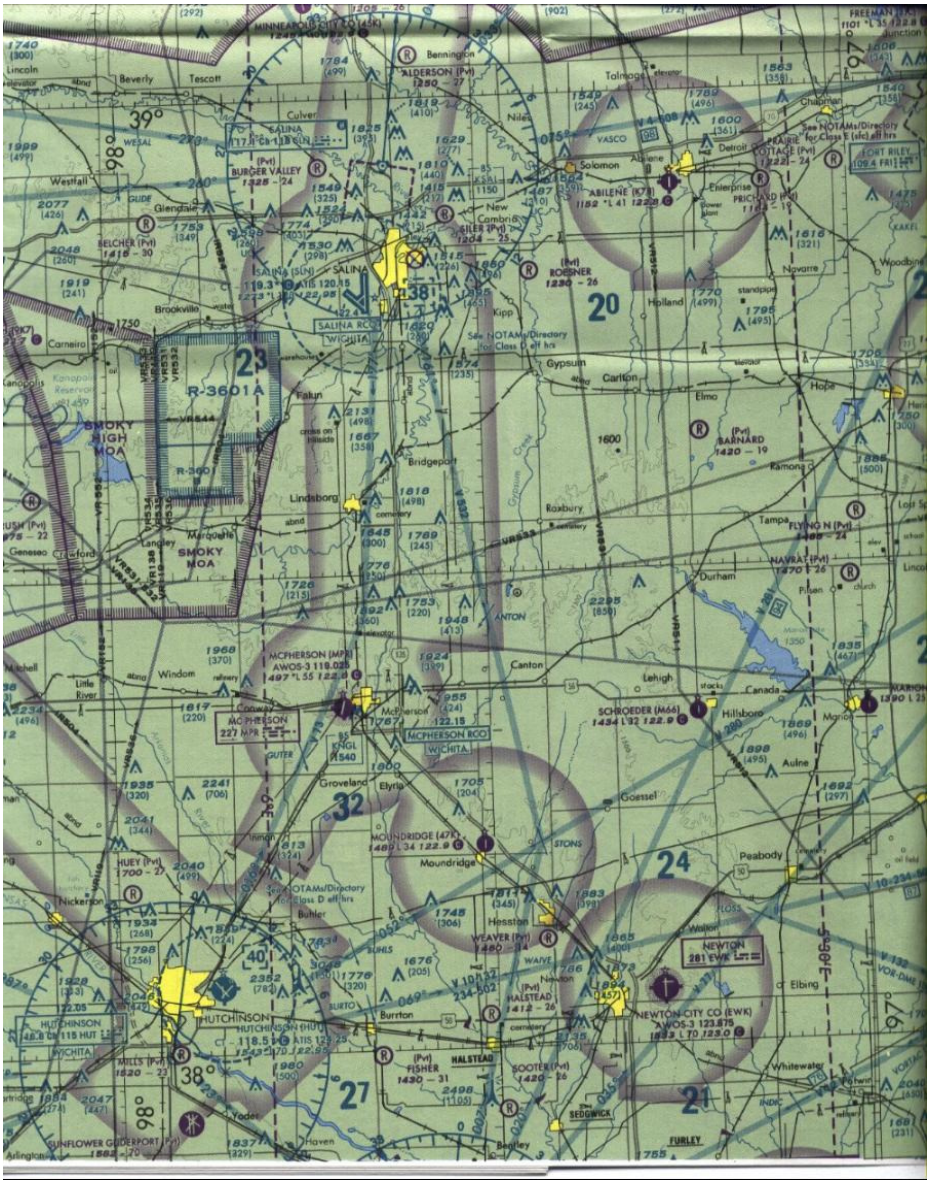


PVT_StageI_Q26

PVT_StageI_Q31



PVT_StageI_Q32



PVT_StageI_Q38

TAOS MUNI (SKX) 6 NW UTC−7(−6DT) N36°27.49′ W105°40.35′ **DENVER**

7091 B S2 **FUEL** 100LL, JET A1 + OX 1, 2, 3, 4 **H–2D, L–6E**

RWY 04–22: H5798X75 (ASPH) S–24 MIRL 0.8% up NE **IAP**

RWY 22: VASI(PSIL)—GA 3.5°TCH 30′. P-line.

AIRPORT REMARKS: Attended 1500–0000Z‡. For fuel after hours call 505–758–9501 or ctc manager on fld. ACTIVATE MIRL Rwy 04–22—CTAF.

WEATHER DATA SOURCES: AWOS–3 132.975 (505) 758–5663.

COMMUNICATIONS: CTAF/UNICOM 122.8

ALBUQUERQUE FSS (ABQ) TF 1–800–WX–BRIEF. NOTAM FILE SKX.

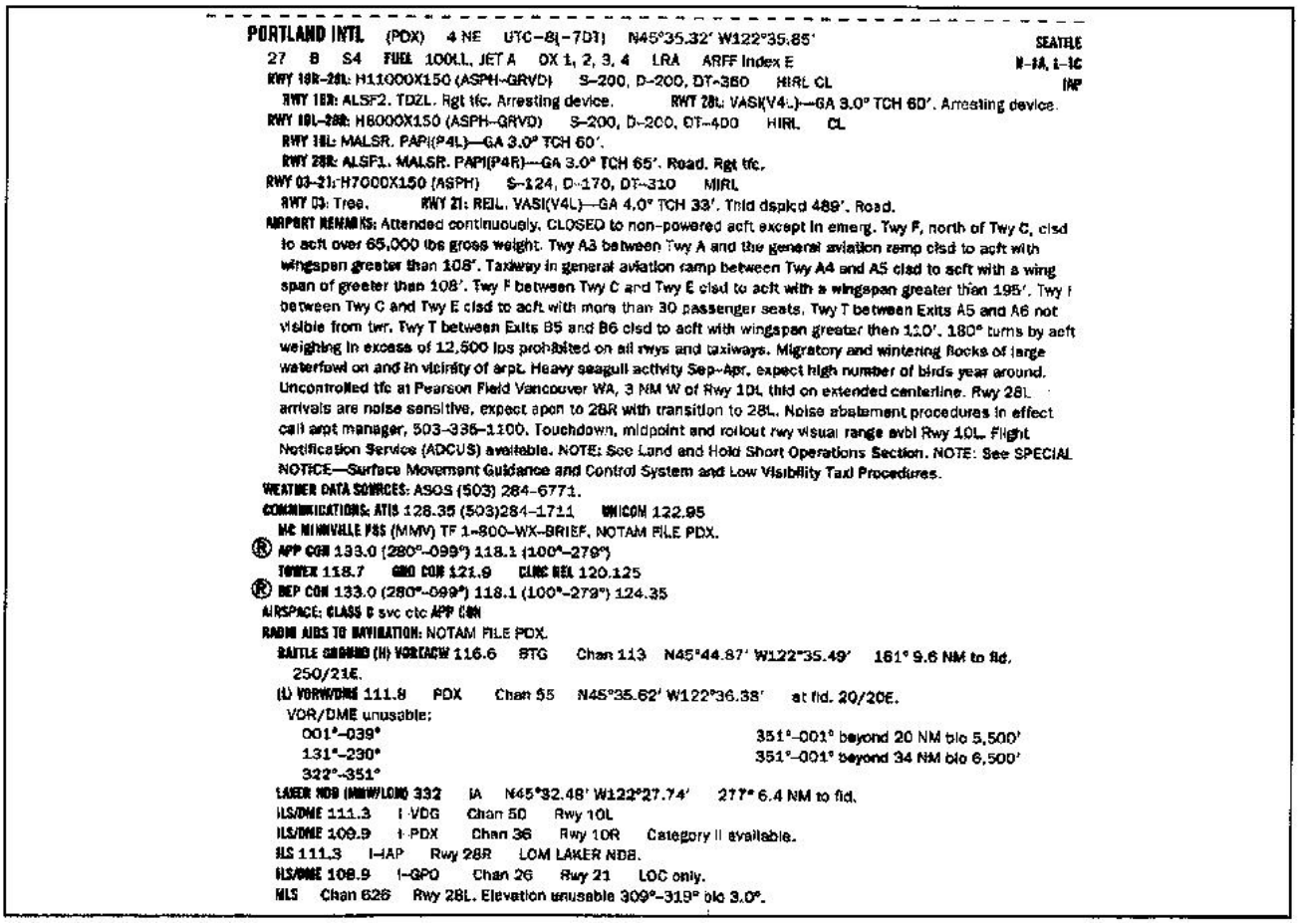
RCO 122.1R 117.6T (ALBUQUERQUE FSS)

RADIO AIDS TO NAVIGATION: NOTAM FILE ABQ.

(L) VORTAC 117.6 TAS Chan 123 N36°36.53′ W105°54.38′ 116° 14.5 NM to fld. 7860/13E.

SKI NDB (MHW) 414 SKX N36°27.47′ W105°40.58′ at fld. NOTAM FILE SKX.

PVT_StageI_Q46



PORTLAND INTL (PDX) 4 NE UTC–8(–7DT) N45°35.32' W122°35.85' SEATTLE
27 B S4 FUEL 100LL, JET A OX 1, 2, 3, 4 LRA ARFF Index E H–1A, L–1C
RWY 10R–28L: H11000X150 (ASPH–GRVD) S–200, D–200, DT–350 HIRL CL INP
RWY 10R: ALSF2. TDZL. Rgt tfc. Arresting device. RWY 28L: VASI(V4L)—GA 3.0° TCH 60'. Arresting device.
RWY 10L–28R: H8000X150 (ASPH–GRVD) S–200, D–200, DT–400 HIRL CL
RWY 10L: MALSR. PAPI(P4L)—GA 3.0° TCH 60'.
RWY 28R: ALSF1. MALSR. PAPI(P4R)—GA 3.0° TCH 65'. Road. Rgt tfc.
RWY 03–21: H7000X150 (ASPH) S–124, D–170, DT–310 MIRL
RWY 03: Tree. RWY 21: REIL. VASI(V4L)—GA 4.0° TCH 33'. Thld dsplcd 489'. Road.
AIRPORT REMARKS: Attended continuously. CLOSED to non–powered acft except in emerg. Twy F, north of Twy C, clsd to acft over 65,000 lbs gross weight. Twy A3 between Twy A and the general aviation ramp clsd to acft with wingspan greater than 108'. Taxiway in general aviation ramp between Twy A4 and A5 clsd to acft with a wing span of greater than 108'. Twy F between Twy C and Twy E clsd to acft with a wingspan greater than 195'. Twy F between Twy C and Twy E clsd to acft with more than 30 passenger seats. Twy T between Exits A5 and A6 not visible from twr. Twy T between Exits B5 and B6 clsd to acft with wingspan greater then 120'. 180° turns by acft weighing in excess of 12,500 lbs prohibited on all rwys and taxiways. Migratory and wintering flocks of large waterfowl on and in vicinity of arpt. Heavy seagull activity Sep–Apr, expect high number of birds year around. Uncontrolled tfc at Pearson Field Vancouver WA, 3 NM W of Rwy 10L thld on extended centerline. Rwy 28L arrivals are noise sensitive, expect apch to 28R with transition to 28L. Noise abatement procedures in effect call arpt manager, 503–335–1100. Touchdown, midpoint and rollout rwy visual range avbl Rwy 10L. Flight Notification Service (ADCUS) available. NOTE: See Land and Hold Short Operations Section. NOTE: See SPECIAL NOTICE—Surface Movement Guidance and Control System and Low Visibility Taxi Procedures.
WEATHER DATA SOURCES: ASOS (503) 284–6771.
COMMUNICATIONS: ATIS 128.35 (503)284–1711 UNICOM 122.95
MC MINNVILLE FSS (MMV) TF 1–800–WX–BRIEF. NOTAM FILE PDX.
Ⓡ APP CON 133.0 (280°–099°) 118.1 (100°–279°)
TOWER 118.7 GND CON 121.9 CLNC DEL 120.125
Ⓡ DEP CON 133.0 (280°–099°) 118.1 (100°–279°) 124.35
AIRSPACE: CLASS C svc ctc APP CON
RADIO AIDS TO NAVIGATION: NOTAM FILE PDX.
BATTLE GROUND (H) VORTACW 116.6 BTG Chan 113 N45°44.87' W122°35.49' 161° 9.6 NM to fld. 250/21E.
(L) VOR/DME 111.8 PDX Chan 55 N45°35.62' W122°36.38' at fld. 20/20E.
VOR/DME unusable:
001°–039° 351°–001° beyond 20 NM blo 5,500'
131°–230° 351°–001° beyond 34 NM blo 6,500'
322°–351°
LAKER NDB (MHW/LOM) 332 IA N45°32.48' W122°27.74' 277° 6.4 NM to fld.
ILS/DME 111.3 I–VDG Chan 50 Rwy 10L
ILS/DME 109.9 I–PDX Chan 36 Rwy 10R Category II available.
ILS 111.3 I–IAP Rwy 28R LOM LAKER NDB.
ILS/DME 108.9 I–GPO Chan 26 Rwy 21 LOC only.
MLS Chan 626 Rwy 28L. Elevation unusable 309°–319° blo 3.0°.

PVT_StageI_Q47

COVINGTON/CINCINNATI

Greater Cincinnati Intl

RNWY ALIGNMENT INDICATOR SYSTEM EXPERIMENTAL (RAISE) LCTD EXTENDED CNTR LINE RNWY 18, 8,630' N OF THRESHOLD. SYSTEM APPEARS AS AN INVERTED T WITH 5 LGT STATIONS FORMING THE CROSS OF THE T, AND 2 ADDITIONAL LGT STATIONS FORMING THE LEG OF THE T. ALL LGTS ARE RED AND SYSTEM OPERS IN STEADY BURNING MODE. MIN CROSSING HEIGHT 1300' MSL FOR VISUAL APPROACHES FROM N. ILS GLIDE PATH ALT IS 1300' MSL OVER (RAISE).

PVT_StageI_Q49

METAR KDEN 081055Z 21010G27KT 4SM
--RA BR SCT015 BKN030 20/16 A2989

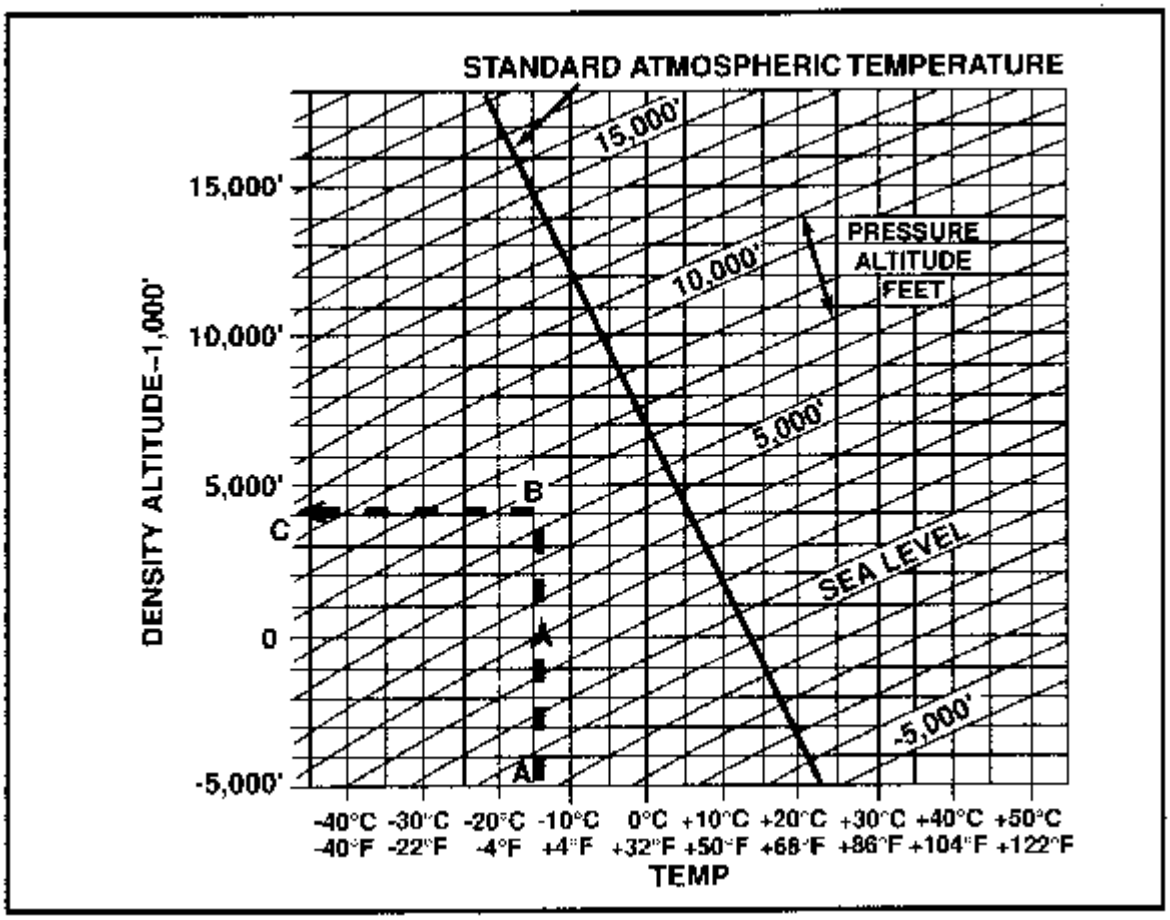
PVT_StageII_Q7

TAF
KPHL 091730Z 091818 15005KT P6SM FEW020
FM0500 27008KT 4SM OVC040 BECMG 1315
P6SM NSW SKC=

PVT_StageII_Q8

	3000	6000	9000	12000	18000	24000	30000	34000	39000
GFK	0105	2809+01	2724-05	2738-10	2758-25	2776-39	279049	278552	276450
GGW		0209-02	3111-08	2923-12	2824-28	2858-39	277150	276452	274751

PVT_StageII_Q9



PVT_StageIII_Q2

TAKEOFF DISTANCE

SHORT FIELD

Specific Condition:

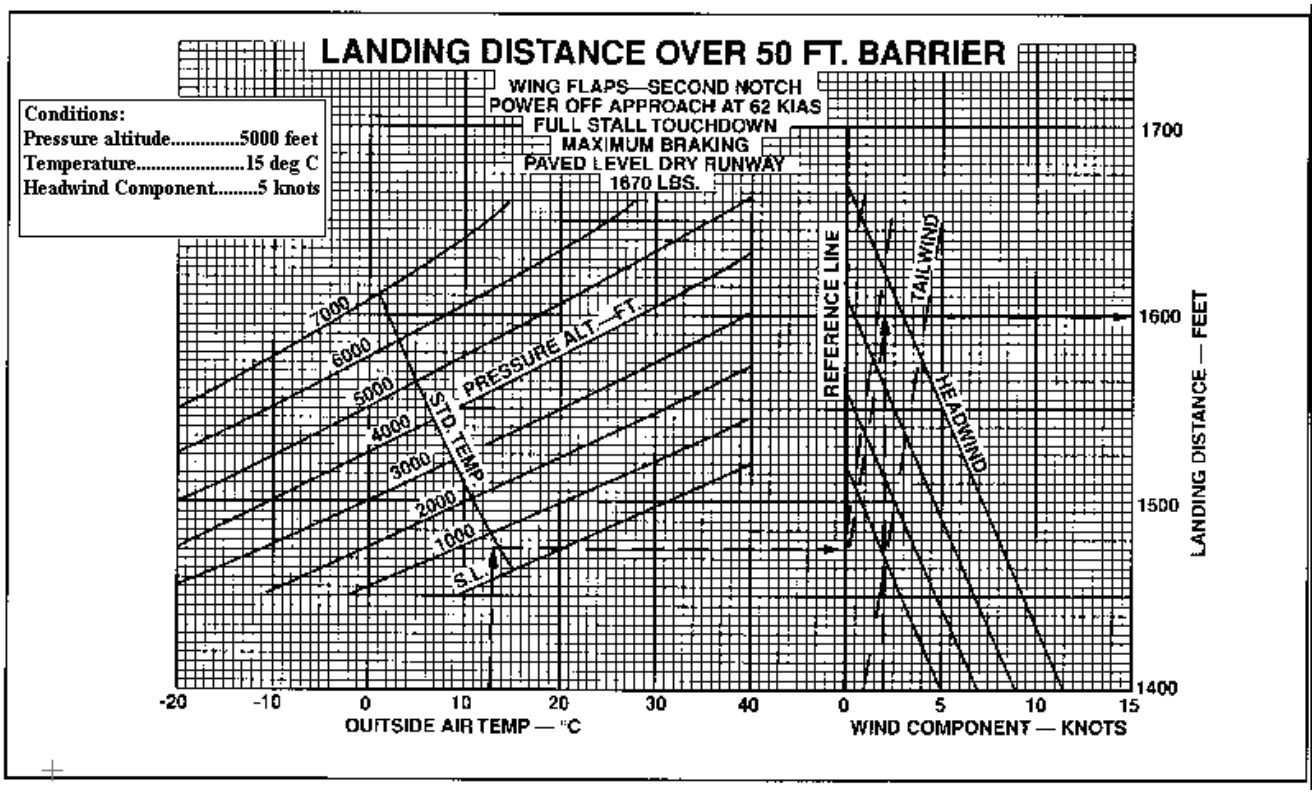
Weight.....1,670 pounds
Pressure Altitude.....4000 feet
Temperature.....25 deg C
Headwind.....18 knots

CONDITIONS:
Flaps 10°
Full Throttle Prior to Brake Release
Paved, Level, Dry Runway
Zero Wind

NOTES:
1. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
2. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.

WEIGHT LBS	TAKEOFF SPEED KIAS		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
1670	50	54	S.L.	640	1190	695	1290	755	1390	810	1495	875	1605
			1000	705	1310	765	1420	825	1530	890	1645	960	1770
			2000	775	1445	840	1565	910	1690	980	1820	1055	1960
			3000	855	1600	925	1730	1000	1870	1080	2020	1165	2185
			4000	940	1775	1020	1920	1100	2080	1190	2250	1285	2440
			5000	1040	1970	1125	2140	1215	2320	1315	2525	1420	2750
			6000	1145	2200	1245	2395	1345	2610	1455	2855	1570	3125
			7000	1270	2470	1375	2705	1490	2960	1615	3255	1745	3590
			8000	1405	2800	1525	3080	1655	3395	1795	3765	1940	4195

PVT_StageIII_Q3



PVT_StageIII_Q4

RATE OF CLIMB

CONDITIONS:
Flaps Up
Full Throttle

MAXIMUM

NOTE:
Mixture leaned above 3000 feet for maximum RPM.

WEIGHT LBS	PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB — FPM			
			-20°C	0°C	20°C	40°C
1670	S.L.	67	835	765	700	630
	2000	66	735	670	600	535

Conditions:
Weight .....1670 pounds
Pressure Altitude .....Sea Level
Temperature .....32 deg F
Indicated Airspeed.....67 knots

PVT_StageIII_Q5

WEIGHT and BALANCE FORM

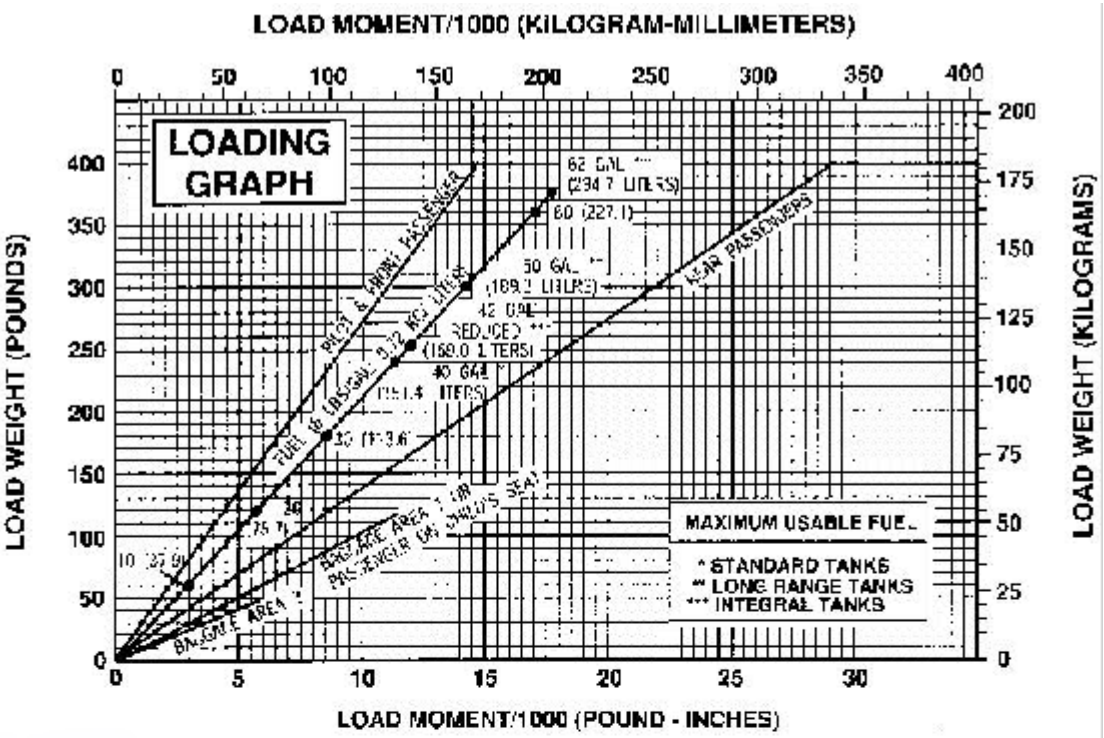
ITEM	WEIGHT (pounds)	ARM (inches)	MOMENT (pound-inches)
Basic Empty Wt.	1772.4	+34	60,261.6
Pilot	180.0	+36	6,480.0
Front Seat Passenger	165.0	+36	5,940.0
Rear Seat Passenger	345.0	+70	24,150.0
Fuel (60 gallons)		+48	
Baggage	120.0	+95	11,400.0
TOTAL			

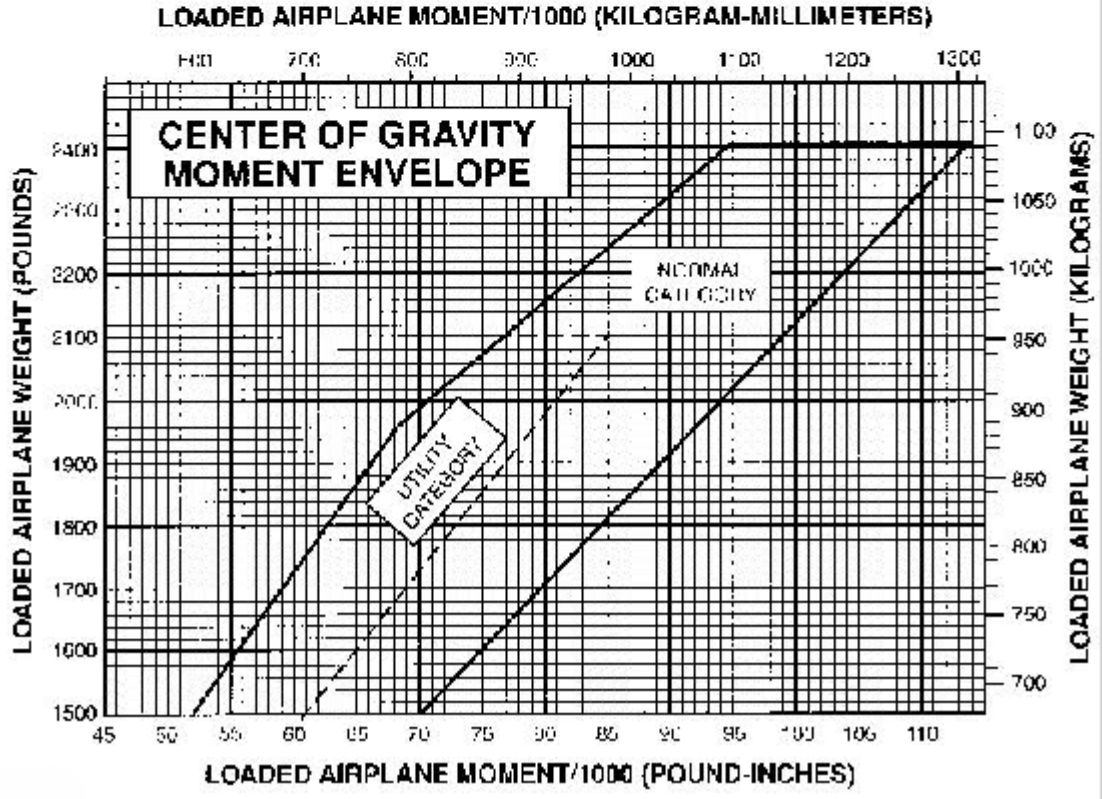
CG = _____ _____INCHES

PVT_StageIII_Q9

	WEIGHT (pounds)	MOMENT/1000 (pound-inches)
Empty airplane	1,467	57.3
Pilot and front Passenger	300	
Rear seat passenger	100	
Baggage area 1	100	
Fuel (40 gallons)		

PVT_StageIII_Q13





PVT_StageIII_Q14

Field elevation	1,400 feet
Pressure altitude	1,500 feet
Temperature	95 degrees F
Altimeter setting	29.82 in. Hg.

PVT_StageIII_Q17

True course	175 Degrees
Wind	030 degrees/20 knots
Pressure altitude	7,500 feet
Temperature	-10 degrees C
Fuel consumption	9.5 g.p.h.
Calibrated airspeed	103 knots
Fuel on board	53 gallons

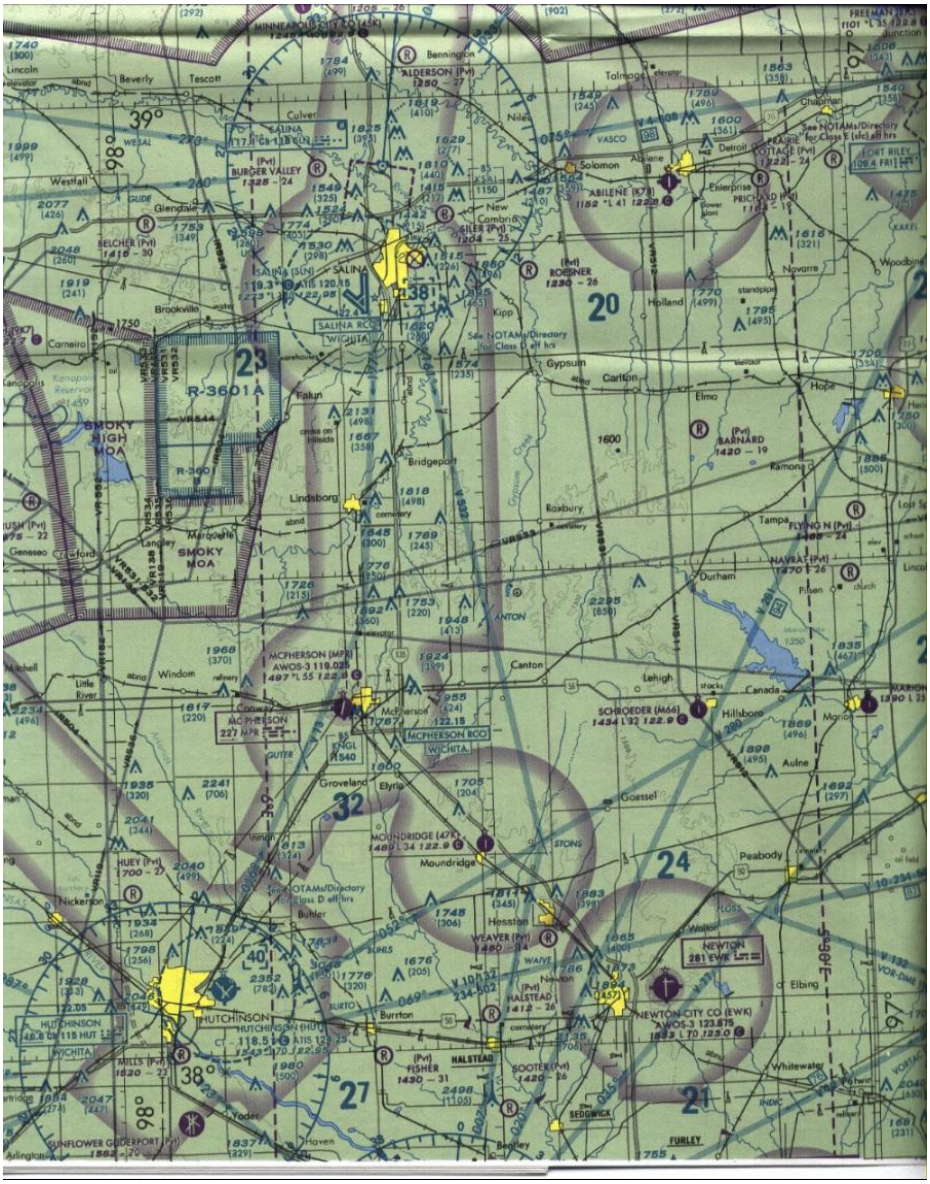
PVT_Stage_Q19

Wind	140 degrees/25 knots
True course	195 degrees
True airspeed	122 knots
Temperature	2 degrees C
Pressure altitude	5,000 feet

PVT_StageIII_Q20

Pressure altitude	7,500 feet
Winds	280 degrees /20 knots
Temperature	5 degrees C
Calibrated airspeed	100 knots
True course	050 degrees
Variation	13 degrees E
Deviation	+1 deg
Fuel consumption	9.5 g.p.h.
Usable fuel capacity	36 gallons
Distance	313 n.m.

PVT_StageIII_Q21



PVT_StageI_Q38 (Figure is Re-Used in Stage III)

Check Points (Fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir. / Vel. / Temp.	CAS / TAS	TC / -L / +R / WCA	TH / -E / +W / Var.	MH / ±Dev.	CH	Dist. Leg / Rem.	GS Est. / Act.	Time Off 1506Z / ETE / ETA / ATE / ATA	GPH / Fuel / Rem.
CITY			6,500	050° / 15 / 5°C	138	355°		-1		30			
BRIDGE							11°W						

PVT_StageIII_Q26

FAA FLIGHT PLAN

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
VFR / IFR / DVFR		PA 28/R	KTS.		PROPOSED (Z)	ACTUAL (Z)	
					1920		

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST. TIME EN ROUTE		11. REMARKS
	HOURS	MINUTES	
	2	40	

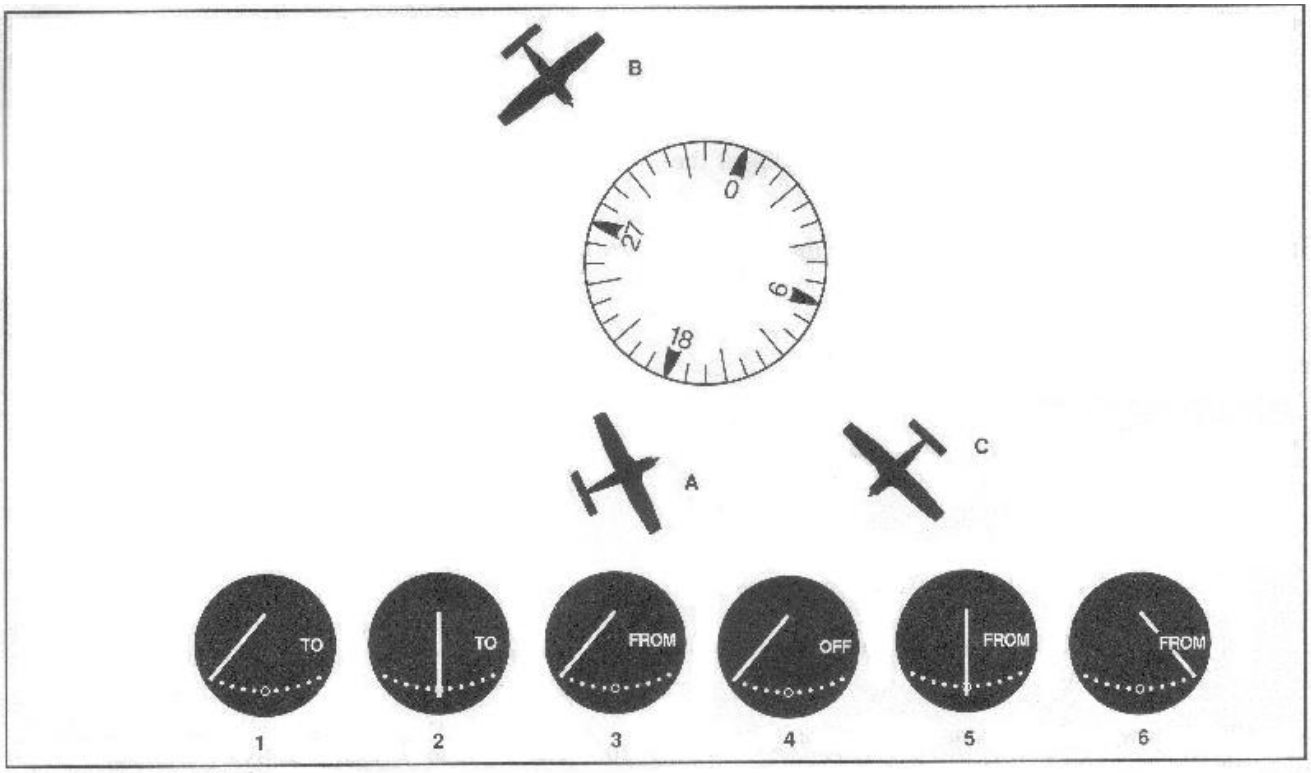
12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS, TEL. NO. & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
4	20		17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	

16. COLOR OF AIRCRAFT

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

Special Equipment Suffix
- X - No Transponder
- T - Transponder With No Altitude Encoding Capability
- U - Transponder With Altitude Encoding Capability
- D - DME, No Transponder
- B - DME, Transponder With No Altitude Encoding Capability
- A - DME, Transponder With Altitude Encoding Capability
- C - RNAV, Transponder With No Altitude Encoding Capability
- R - RNAV, Transponder With Altitude Encoding Capability
- W - RNAV, No Transponder
- G - Flight Management System (FMS) and Electronic Flight Instrument System (EFIS) equipped aircraft with /R capability having a "Special" Aircraft and Aircrew Authorization" issued by the FAA.

PVT_StageIII_Q29

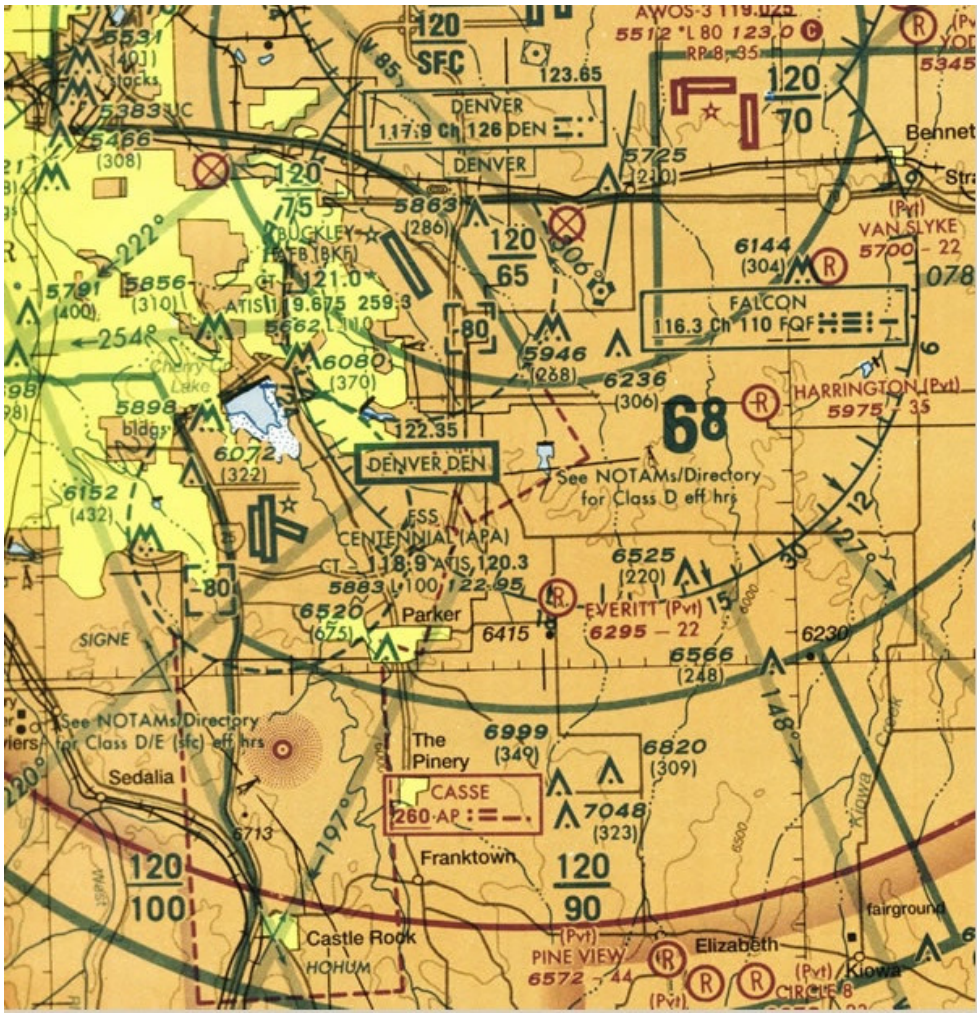


PVT_StageIII_Q34

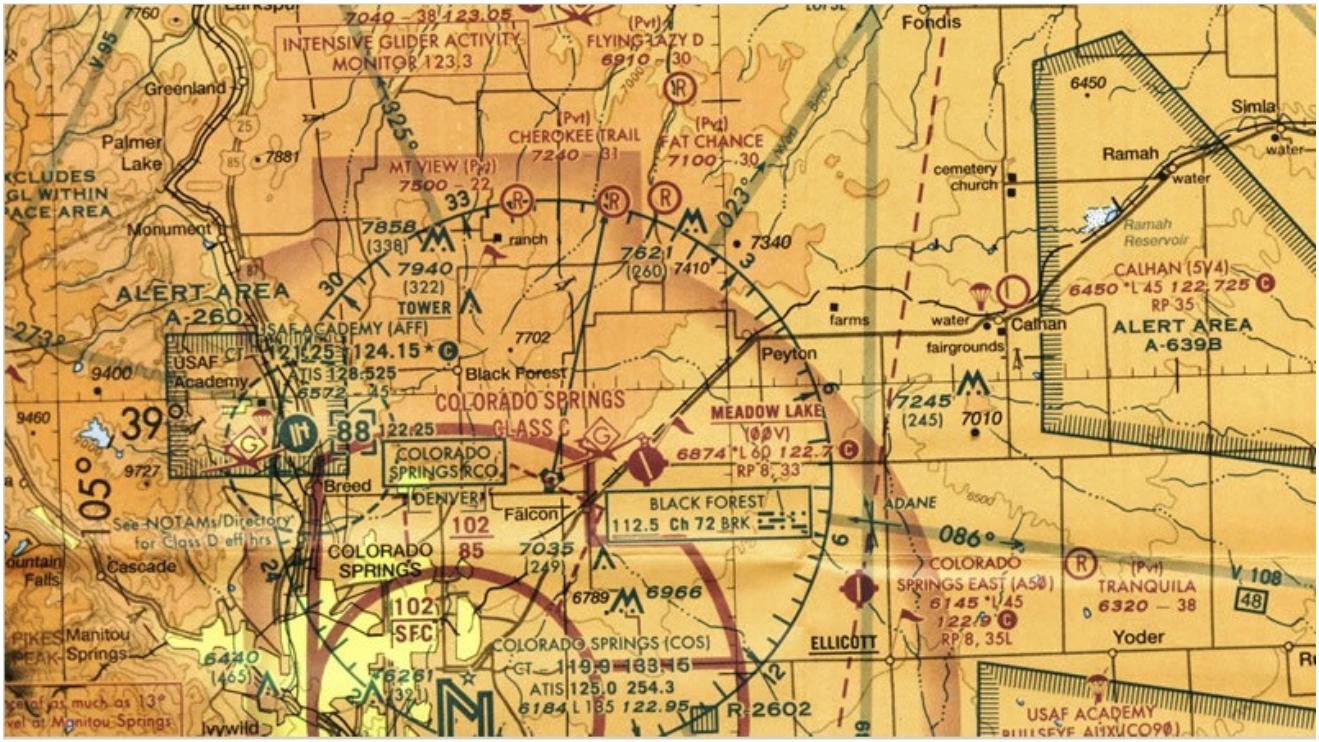
PUEBLO MEM (PUB) 5 E UTC−7(−6DT) N38°17.35' W104°29.79' **DENVER**
4726 B S4 **FUEL** 100LL, JET A ARFF Index B **H-2D, L-6E**
RWY 08L-26R: H10496X150 (ASPH-PFC) S-75, D-170, DT-250 HIRL **IAP**
RWY 08L: SSALR. **RWY 26R:** REIL. VASI(V2L)—GA 3.0° TCH 25'. 0.3% up.
RWY 17-35: H8308X150 (ASPH-PFC) S-93, D-110, DT-170 MIRL
RWY 17: REIL. 1.0% down. **RWY 35:** VASI(V2L)—GA 3.0° TCH 36'. 1.0% up.
RWY 08R-26L: H4073X75 (ASPH) S-20
RWY 08R: Rgt tfc. **RWY 26L:** Gnd.
AIRPORT REMARKS: Attended 1300-0500Z‡. For fuel after hours call 719-948-4560/2447. Rwy 08R-26L avbl to acft under 12,500 pounds during dalgt hours. Sequencing for VFR acft is avbl. When twr closed ACTIVATE HIRL Rwy 08L-26R, MIRL Rwy 17-35, ALS Rwy 08L, VASI Rwy 35, REIL Rwy 26R and Rwy 17-CTAF. NOTE: See Land and Hold Short Operations Section.
WEATHER DATA SOURCES: ASOS (719) 948-4206.
COMMUNICATIONS: CTAF 119.1 **ATIS** 125.25 (1300-0500Z‡) **UNICOM** 122.95
DENVER FSS (DEN) TF 1-800-WX-BRIEF. NOTAM FILE PUB.
RCO 122.2 (DENVER FSS)
Ⓡ **APP/DEP CON** 120.1 (N/S) (1300-0500Z‡)
Ⓡ **DENVER CENTER APP/DEP CON** 128.375 (0500-1300Z‡)
TOWER 119.1 (1300-0500Z‡) **GND CON** 121.9
AIRSPACE: CLASS D svc effective 1300-0500Z‡ other times CLASS E.
RADIO AIDS TO NAVIGATION: NOTAM FILE PUB.
(H) VORTACW 116.7 PUB Chan 114 N38°17.66' W104°25.77' 251° 3.2 NM to fld. 4760/13E.
MERTZ NDB (LOM) 302 PU N38°17.04' W104°38.82' 076° 7.1 NM to fld.
ARUBA NDB (MHW/LOM) 373 TF N38°17.45' W104°21.30' 258° 6.7 NM to fld.
ILS 108.3 I-TFR Rwy 26R. LOM ARUBA NDB.
ILS 109.5 I-PUB Rwy 08L. LOM MERTZ NDB. Unmonitored when twr closed.
ASR (1300-0500Z‡)

LA JUNTA MUNI (LHX) 3 N UTC−7(−6DT) N38°03.08' W103°30.64' **WICHITA**
4238 B **FUEL** 100LL, JET A **H-2D, L-6F**
RWY 12-30: H8277X150 (ASPH) S-50, D-65, DT-100 **IAP**
RWY 30: 0.4% up.
RWY 08-26: H6852X100 (ASPH-RFSC) S-50, D-70, DT-120 MIRL 1.9% up W
RWY 08: REIL. VASI(V4L)—GA 3.0° TCH 45'. Road. **RWY 26:** REIL. VASI(V2L)—GA 3.0° TCH 26'.
AIRPORT REMARKS: Attended continuously. Antelope on and invof arpt. Rwy 12-30 200' on each end of rwy is conc, center 50' is seal coated entire length. Rwy 08-26 MIRL operates dusk to dawn, for changes in ints call arpt manager 719-384-8407. ACTIVATE VASI Rwy 08 and Rwy 26 and REIL Rwy 26—CTAF.
WEATHER DATA SOURCES: ASOS 135.525 (719) 384-5961.
COMMUNICATIONS: CTAF/UNICOM 123.0
DENVER FSS (DEN) TF 1-800-WX-BRIEF. NOTAM FILE LHX.
RCO 122.6 (DENVER FSS)
DENVER CENTER APP/DEP CON 133.4
RADIO AIDS TO NAVIGATION: NOTAM FILE LAA.
LAMAR (H) VORTAC 116.9 LAA Chan 116 N38°11.83' W102°41.26' 246° 39.9 NM to fld. 3950/12E.
NDB (MHW) 239 LHX N38°02.89' W103°37.27' 078° 5.2 NM to fld. NOTAM FILE LHX.

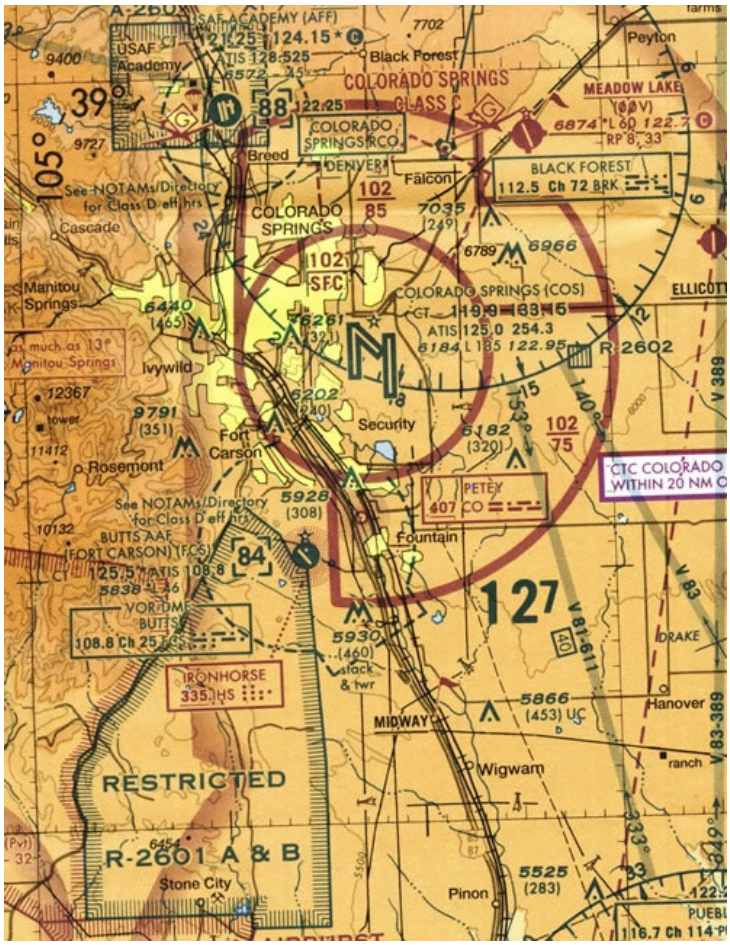
PVT_11_3



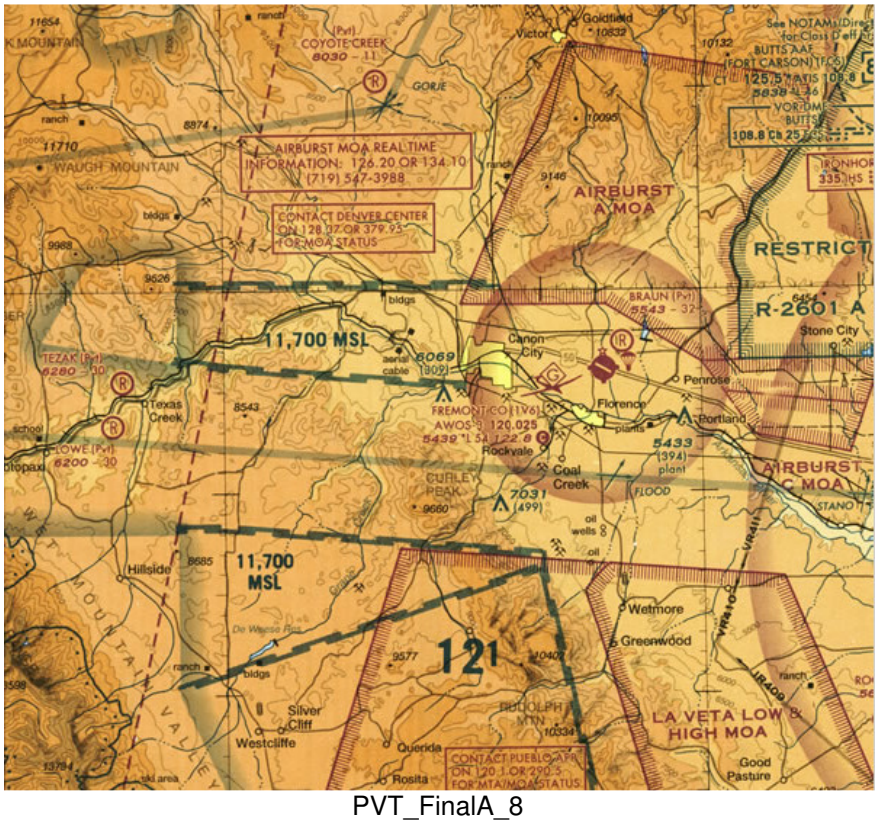
PVT_FinalA_5



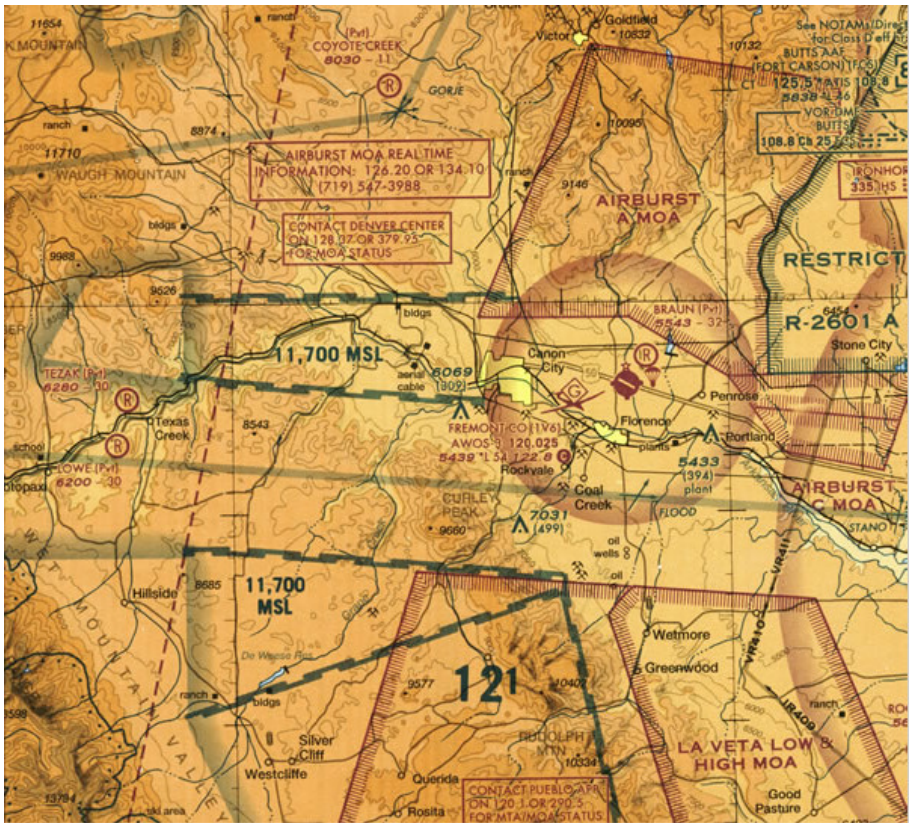
PVT_FinalA_6



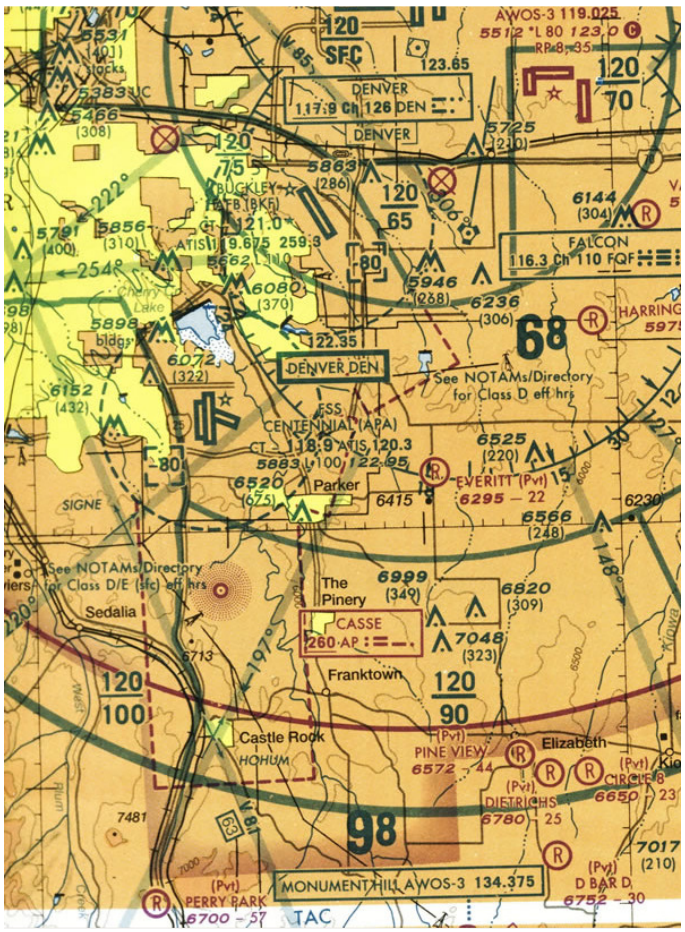
PVT_FinalA_7



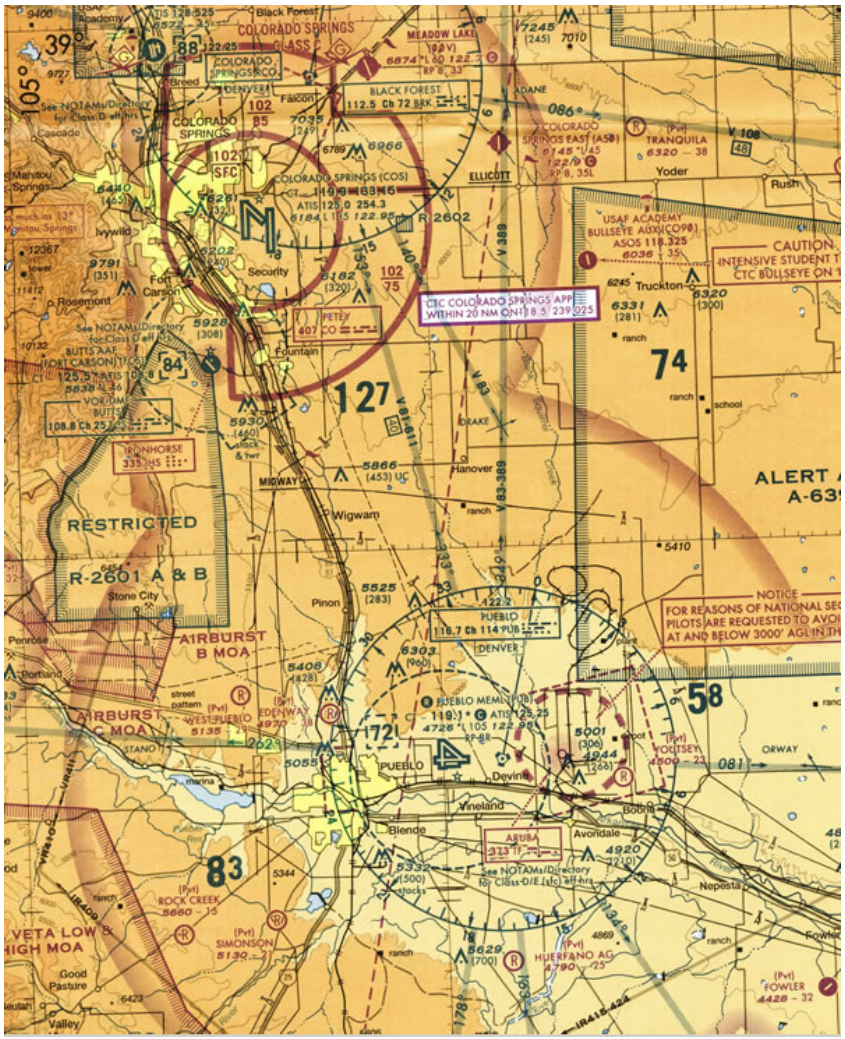
PVT_FinalA_8



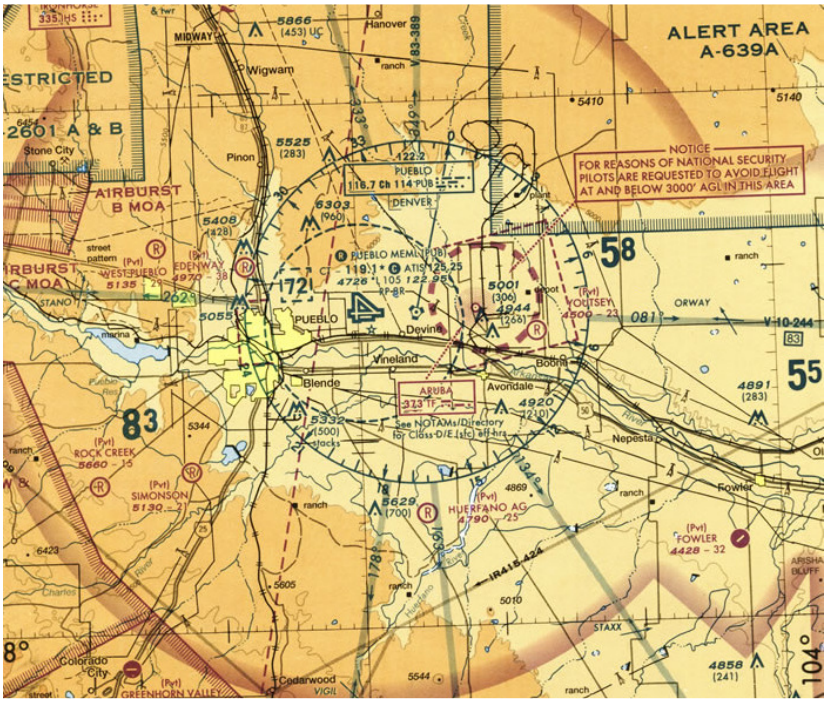
PVT_FinalA_9



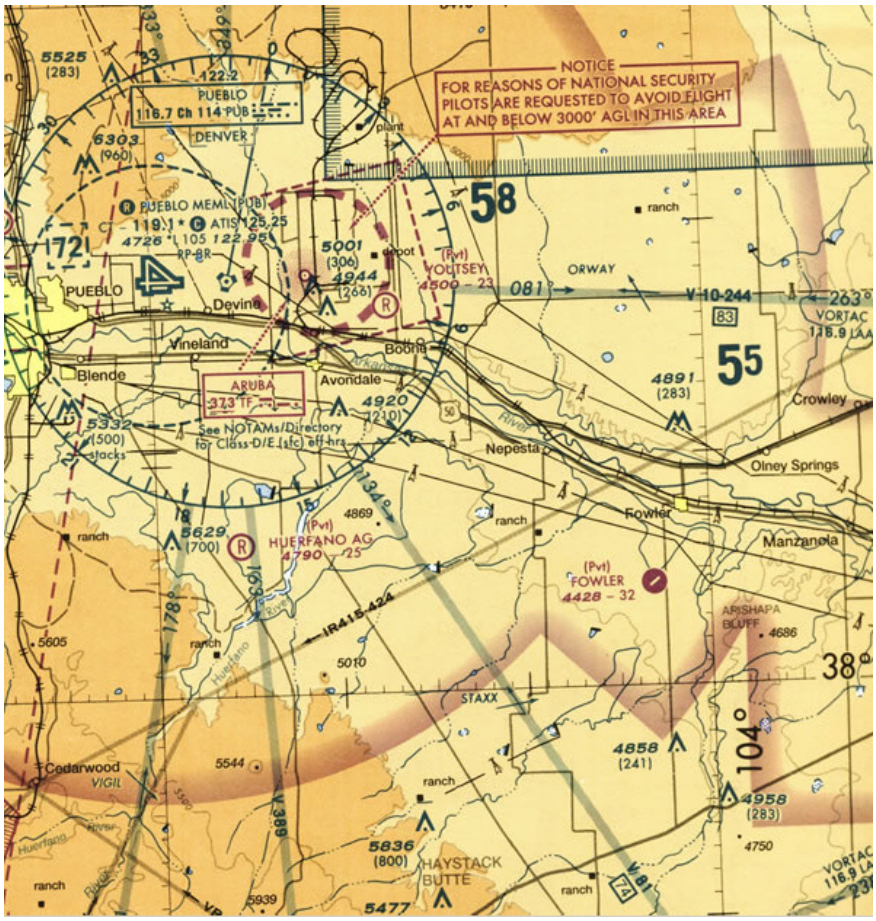
PVY_FinalB_1



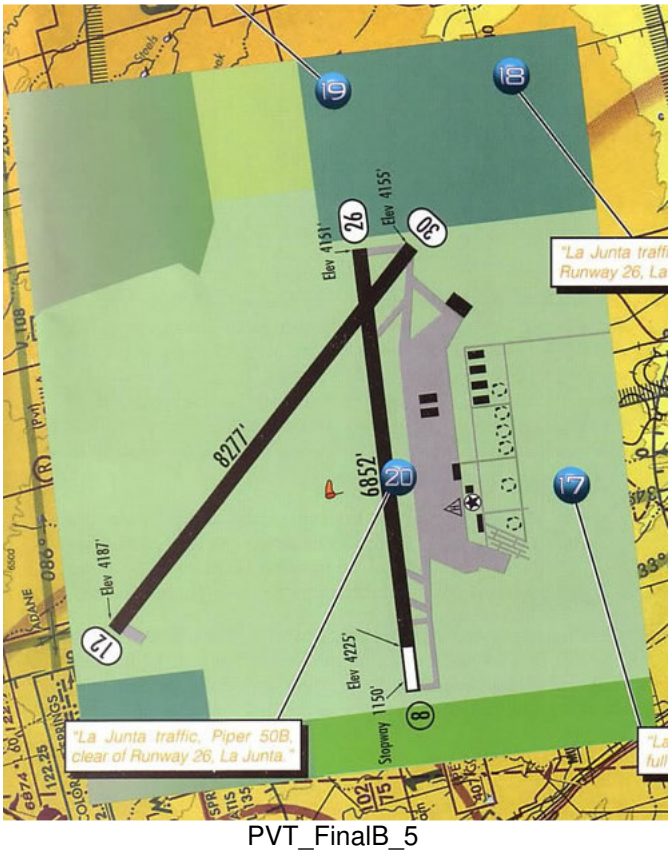
PVT_FinalB_2



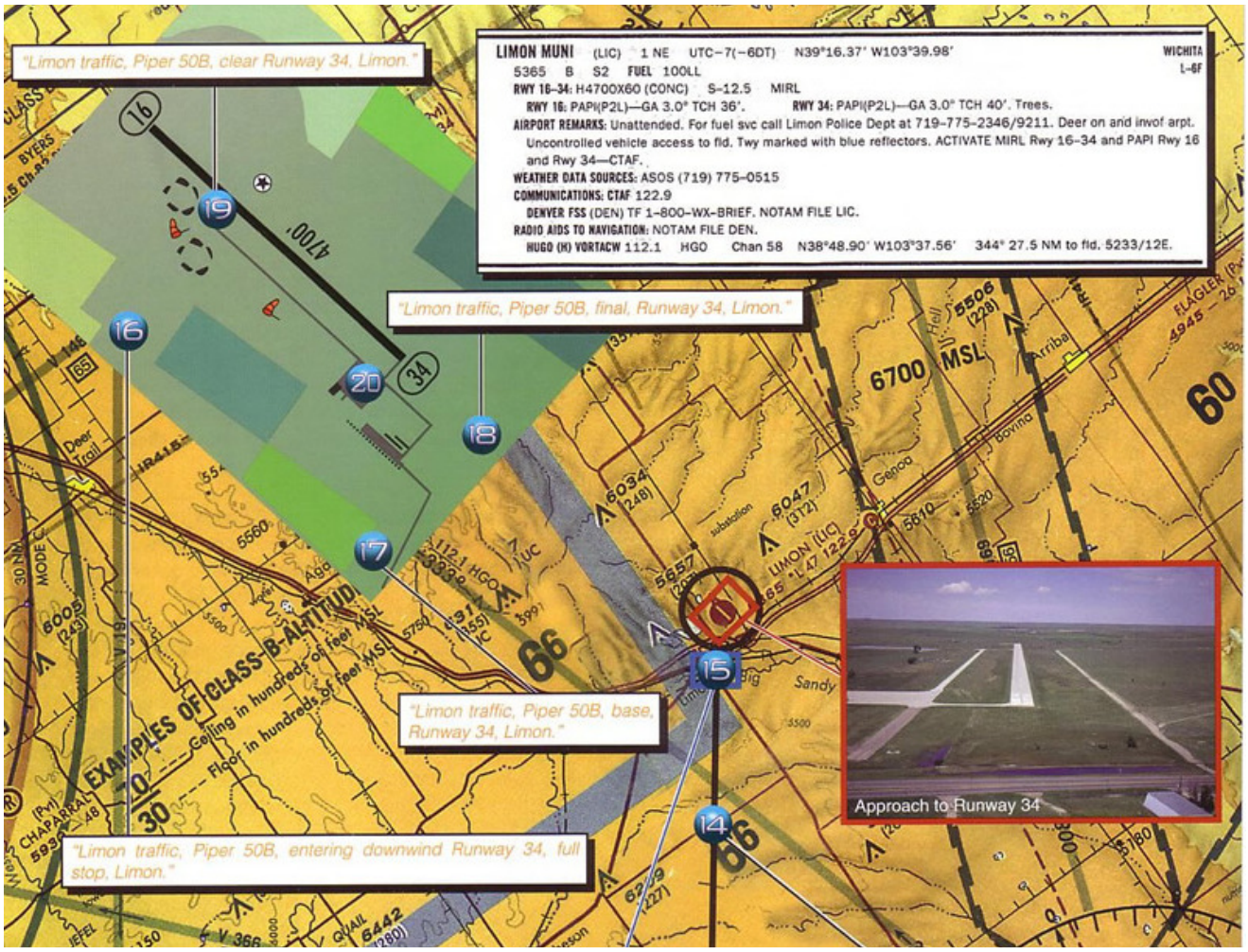
PVT_FinalB_3



PVT_FinalB_4



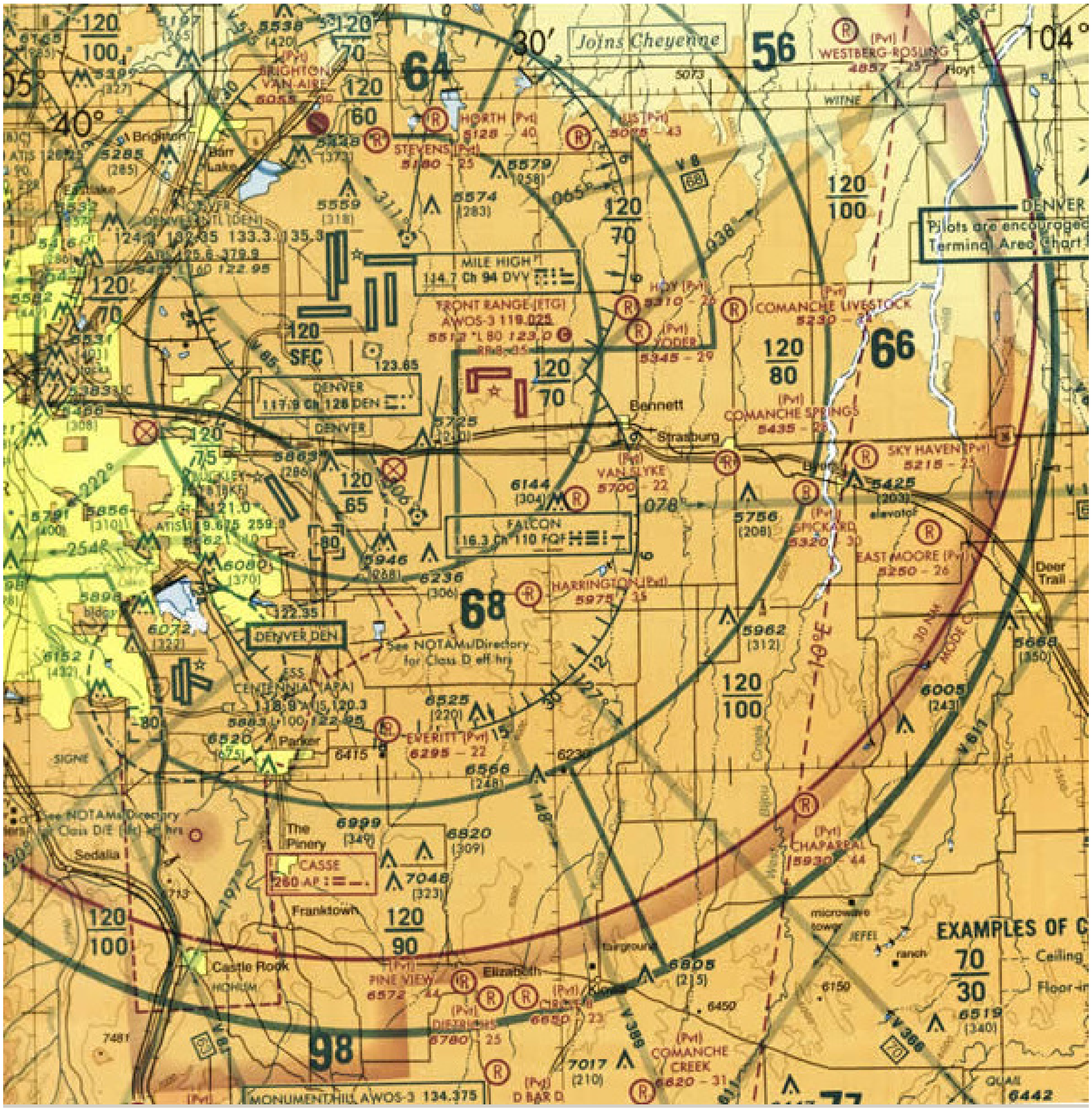
PVT_FinalB_5



PVT_FinalB_6

LIMON MUNI (LIC) 1 NE UTC-7(-6DT) N39°16.37' W103°39.98' **WICHITA**
5365 B S2 **FUEL** 100LL **L-6F**
RWY 16-34: H4700X60 (CONC) S-12.5 MIRL
RWY 16: PAPI(P2L)—GA 3.0° TCH 36'. **RWY 34:** PAPI(P2L)—GA 3.0° TCH 40'. Trees.
AIRPORT REMARKS: Unattended. For fuel svc call Limon Police Dept at 719-775-2346/9211. Deer on and invof arpt. Uncontrolled vehicle access to fld. Twy marked with blue reflectors. ACTIVATE MIRL Rwy 16-34 and PAPI Rwy 16 and Rwy 34—CTAF.
WEATHER DATA SOURCES: ASOS (719) 775-0515
COMMUNICATIONS: CTAF 122.9
DENVER FSS (DEN) TF 1-800-WX-BRIEF. NOTAM FILE LIC.
RADIO AIDS TO NAVIGATION: NOTAM FILE DEN.
HUGO (H) VORTACW 112.1 HGO Chan 58 N38°48.90' W103°37.56' 344° 27.5 NM to fld. 5233/12E.

PVT_FinalB_7


Joins Cheyenne
BRIGHTON VAN-AIRE
HORTH (Pvt)
STEVENS (Pvt)
WESTBERG-ROSLING
Brighton
Barr Lake
DENVER INTL (DEN)
MILE HIGH
114.7 Ch 94 DVV
FRONT RANGE (ETG)
AWOS-3 119.025
DENVER
117.9 Ch 126 DEN
HOY (Pvt)
YODER
COMANCHE LIVESTOCK
COMANCHE SPRINGS
Bennett
Strasburg
SKY HAVEN (Pvt)
VAN SLYKE
BUCKLEY
FALCON
116.3 Ch 110 FQF
SPICKARD
EAST MOORE (Pvt)
HARRINGTON (Pvt)
Deer Trail
DENVER DEN
See NOTAMs/Directory for Class D eff hrs
CENTENNIAL (APA)
EVERITT (Pvt)
Parker
Sedalia
The Pinery
CASSE
Franktown
CHAPARRAL
Castle Rock
Elizabeth
PINE VIEW
DIETRICHS
COMANCHE CREEK
D BAR D
EXAMPLES OF C
Ceiling
MONUMENT HILL AWOS-3 134.375
Pilots are encouraged
Terminal Area Chart

PVT_FinalB_8

Pertinent Advisory Circulars

FAA Advisory Circular 120-78, ACCEPTANCE AND USE OF ELECTRONIC SIGNATURES, ELECTRONIC RECORDKEEPING SYSTEMS, AND ELECTRONIC MANUALS

Date: 10/29/02

Initiated by: AFS-300

AC No: 120-78

Change:

1. What is the purpose of this advisory circular (AC)?

a. This AC is not mandatory and does not constitute a regulation. This AC provides guidance on the acceptance and use of electronic signatures to satisfy certain operational and maintenance requirements. This AC also provides guidance on the acceptability of electronic recordkeeping systems and electronic maintenance manuals, including inspection procedures manuals, quality assurance, operations manuals, and training manuals required by Title 14 of the Code of Federal Regulations (14 CFR). After the Federal Aviation Administration (FAA) accepts an electronic system,

that system may be used to generate aircraft records (such as load manifest, dispatch release, aircraft maintenance records, maintenance task cards, pilot training records, flight release, airworthiness release, flight test reports, etc.) when these records can be properly authenticated.

NOTE: In this AC, the term “electronic signature” refers to either electronic signatures or digital signatures. The specific electronic signature used depends on the end user’s preference and the system application.

b. This AC describes an acceptable means, but not the only means, of complying with the FAA’s operational and maintenance requirements. Specifically, handwritten signatures, records and mechanic’s stamps continue to be acceptable. However, if you use the electronic means described in the AC, you must conform to it in all important respects.

2. Who does this AC apply to?

- Air carriers under 14 CFR parts 121, 129, or 135
- Operators under 14 CFR parts 91, 125, 133, or 137
- Persons performing airmen certification under 14 CFR parts 61, 63, 65, 141, and 142
- Individuals performing maintenance or preventive maintenance under 14 CFR part 43
- Repair stations under 14 CFR part 145
- Aviation maintenance technical schools under 14 CFR part 147

DEFINITIONS

3. For purposes of this AC, what definitions apply?

a. Authentication. The means by which a system validates an authorized user's identity. These may include a password, a personal identification number (PIN), a cryptographic key or badge swipe.

b. Computer Hardware. A computer and the associated physical equipment directly involved in the performance of communications or data processing functions.

c. Computer Software. Written or printed data, such as programs, routines, and symbolic languages, essential to the operation of computers.

d. Digital Signature. Cryptographically generated data that identifies a document's signatory (signer) and certifies that the document has not been altered. Digital signature technology is the foundation of a variety of security, electronic business, and electronic commerce products. This technology is based on public/private key cryptography, digital signature technology used in secure messaging, public key infrastructure (PKI), virtual private network (VPN), web standards for secure transactions, and electronic digital signatures.

e. Electronic Signature. The online equivalent of a handwritten signature. It is an electronic sound, symbol, or process attached to or logically associated with a contract or other record and executed or adopted by an individual. It electronically identifies and authenticates an individual entering, verifying, or auditing computer-based records. An electronic signature combines cryptographic functions of digital signatures with the image of an individual's handwritten signature or some other visible mark considered acceptable in a traditional signing process. It authenticates data with a hash algorithm and provides permanent, secure user-authentication.

f. Electronic Recordkeeping System or Manual. A system of record processing in which records or manuals are entered, stored, and retrieved electronically by a computer system rather than in the traditional hard copy form.

g. Signature. Any form of identification used to acknowledge completion of an act and authenticate a record entry. A signature must be traceable to the individual making the entry, and it must be handwritten or part of an electronic signature system or other form acceptable to the FAA.

4. Why is the FAA providing guidelines for electronic signatures, electronic recordkeeping systems and electronic manuals?

a. The Government Paperwork Elimination Act (GPEA), Public Law 105-277, Title XVII, and the Electronic Signatures in Global and National Commerce Act (E-Sign), Public Law 106-229, encourage use of electronic signatures. When electronic signatures are used and accepted, electronic recordkeeping and document transfer will also be encouraged meeting the goals of the

Small Business Paperwork Relief Act of 2002. This AC represents the FAA's effort to implement these laws to meet certain FAA operational and maintenance requirements.

b. Before the enactment of ESign on June 30, 2000, the regulations on signatures acknowledging satisfaction of maintenance and operational requirements did not reflect current advances in information storage and retrieval technology. These earlier rules were developed when use of electronic media for the storage and retrieval of data was neither available to, nor contemplated by, the aviation industry or the FAA.

c. As the complexity of aircraft design, operations, and maintenance processes increased, the number of records and documents generated and required to be retained by aircraft owners, operators,

manufacturers, and repair facilities expanded dramatically. Electronic information storage and retrieval systems have enhanced significantly the aviation industry's ability not only to meet FAA record-retention requirements, but also to manufacture, operate, and maintain today's highly complex aircraft and aircraft systems in a demanding operational environment.

d. The Office of Management and Budget (OMB), Executive Office of the President, has issued OMB Circular A-130, Management of Federal Information Resources. This document directs the FAA and other government agencies to recognize the limitations on electronic record-keeping systems due to restrictions on the use of electronic signatures. With this AC, the FAA recognizes this limitation and will now permit the use of electronic signatures on certain maintenance and operational records. Owners, operators, and maintenance personnel may now use complete electronic recordkeeping systems because the requirement to authenticate documents with non-electronic signatures has been eliminated. Such systems may now be used to generate aircraft records (e.g., load manifests, dispatch releases, maintenance task cards, aircraft maintenance records, flight releases, airworthiness releases, and flight test reports) that can be properly authenticated with an electronic signature.

e. Acceptance of electronic signatures will encourage the use of electronic maintenance record retention and record entry requirements for maintenance, preventive maintenance, inspection, rebuilding, and alteration records.

f. Using electronic signatures and various computer systems will also enhance communication with local Flight Standards District Offices (FSDO) or Certificate-Holding District Office (CHDO). Their use will provide for the online transmission of manual revisions and other routine written correspondence between operators and the FAA.

g. Using electronic signatures will make it easier to identify a document signer (signatory). Their use will help eliminate the traceability difficulties associated with illegible handwritten

entries and the deterioration of paper documents.

DISCUSSION—ELECTRONIC SIGNATURE

5. What is an acceptable electronic signature?

a. General. Before recent changes to permit the use of electronic signatures, handwritten signatures were used on any required record, record entry, or document. The electronic signature's purpose is identical to that of a handwritten signature or any other form of signature currently accepted by the FAA. The handwritten signature is universally accepted because it has certain qualities and attributes (e.g., subparagraph c(4)(d) below concerning employee termination) that should be preserved in any electronic signature. Therefore, an electronic signature should possess those qualities and attributes that guarantee a handwritten signature's authenticity.

b. Forms of Electronic Signatures.

(1) An electronic signature may be in the following forms.

- A digital signature
- A digitized image of a paper signature
- A typed notation
- An electronic code
- Any other unique form of individual identification that can be used as a means of authenticating a record, record entry, or document

(2) Not all identifying information found in an electronic system may constitute a signature. For example, the entry of an individual's name in an electronic system may not constitute an electronic signature. Other guarantees equal to those of a handwritten signature should be provided.

c. Attributes of an Acceptable Electronic Signature. First and foremost, an electronic signature must be part of a well-designed

program. This program should, at a minimum, consider the following.

(1) Uniqueness. An electronic signature should retain those qualities of a handwritten signature that guarantee its uniqueness. A signature should identify a specific individual and be difficult to duplicate. A unique signature provides evidence that an individual agrees with a statement. An electronic system cannot provide a unique identification with reasonable certainty unless the identification is difficult for an unauthorized individual to duplicate. An acceptable method of proving the uniqueness of a signature is by using an identification and authentication procedure that validates the identity of the signatory. For example, an individual using an electronic signature should be required to identify himself or herself, and the system that produces the electronic signature should then authenticate that identification. Acceptable means of identification and authentication include the use of separate and unrelated identification and authentication codes. These codes could be encoded onto badges, cards, cryptographic keys, or other objects. Systems using PINs or passwords also are an acceptable method of ensuring uniqueness. Additionally, a system could use physical characteristics, such as a fingerprint, handprint, or voice pattern, as a method of identification and authorization.

(2) Significance. An individual using an electronic signature should take deliberate and recognizable action to affix his or her signature. Acceptable, deliberate actions for creating a digital electronic signature include, but are not limited to, the following:

- Badge swipes
- Signing an electronic document with a stylus
- Typing specific keystrokes
- Using a digital signature

(3) Scope. The scope of information being affirmed with an electronic signature should be clear to the signatory and to subsequent readers of the record, record entry, or document. Handwritten documents place the signature close to the information

to identify those items attested to by a signature. However, electronic documents may not position a signature in the same way. It is therefore important to clearly identify the specific sections of a record or document that are affirmed by a signature from those sections that are not. Acceptable methods of marking the affected areas include, but are not limited to, highlighting, contrast inversion, or the use of borders or flashing characters. Additionally, the system should notify the signatory that the signature has been affixed. The user should be asked to ensure that the identified material is, in fact, what is being signed for after affixing the signature. The user also should be able to retrieve a report listing all places where his or her digital electronic signature has been applied. The FAA is not concerned with the computer technology used to accomplish the above tasks. Instead, the FAA concern is with the accuracy of the record and that the signatory is fully aware of what he or she is signing.

(4) Signature Security. The security of an individual's handwritten signature is maintained by ensuring that it is difficult for another individual to duplicate or alter it. An electronic signature should maintain an equivalent level of security. An electronic system that produces signatures should restrict other individuals from affixing another individual's signature to a record, record entry, or document. Such a system enhances safety by preventing an unauthorized individual from certifying required documents, such as an airworthiness release.

(a) A corresponding policy and management structure must support the computer hardware and software that delivers the information.

(b) Signature authenticity/verification: Through control and archives, the computer software should determine if the signature is genuine and if the individual is authorized to participate. This can be accomplished by comparing the signature to a public key archive or some other means. This capability should be an integral part of the computer software.

(c) Archiving electronically signed documents: Since no paper

document with an ink signature exists, a means of safely archiving electronically signed documents should be part of any electronic signature computer software. This will provide for future authentication.

(d) The system should contain restrictions and procedures to prohibit the use of an individual's electronic signature when the individual leaves or terminates employment. This should be done immediately upon notification of the change in employment status.

(e) Procedures should be established allowing the organization to correct documents that were electronically signed in error. The signature should be invalidated anytime a superseding entry is made on the same document. (The entry should be voided but remain in place. Reference to a new entry should be made and electronically signed and dated).

(5) Non-repudiation. An electronic signature should prevent a signatory from denying that he or she affixed a signature to a specific record, record entry, or document. The more difficult it is to duplicate a signature, the likelier the signature was created by the signatory. The system's security features that make it difficult for others to duplicate signatures or alter signed documents usually ensure that a signature was indeed made by the signatory. Many off-the-shelf computer software packages, such as Adobe Acrobat, contain a self-sign utility. Although such computer software can provide an electronic signature for individuals or a group of individuals participating in an electronic signature program, a self-sign utility by itself cannot be used. However, it can become the basis of a digital signature program if the public and private keys are issued and controlled by a trusted third party.

(6) Traceability. An electronic signature should provide positive traceability to the individual who signed a record, record entry, or any other document.

d. Other Acceptable Forms of Signature/Identification. Although this

AC specifically addresses electronic signatures, other types of signatures, such as a mechanic's stamp, may also be acceptable to the FAA. If identification other than a handwritten signature is used, access to that identification should be limited to the named individual only. For example, the individual should secure a mechanic's stamp when it is not in use. Similarly, a computer entry used as a signature should have restricted access that is limited by an authentication code that is changed periodically. Access to issued stamps or authentication codes should be limited to the user. Although a signature may take many forms, the FAA emphasizes that not all electronic entries may satisfy the criteria to qualify the entry as an acceptable signature.

e. Compliance with Other Regulatory Requirements. Although the FAA now permits the use of electronic signatures to meet certain FAA operational and maintenance requirements, any computer hardware used to generate the required documents and records must continue to meet current regulatory requirements. A proper signature affixed to an improperly created document still results in a document that does not meet regulatory requirements. Methods and procedures used to generate an electronic signature must therefore meet all regulatory requirements for a recordkeeping system to be used by owners, operators, or maintenance personnel. In addition, electronic signatures should only be used to satisfy the maintenance and operational requirements relating to this AC. Electronic signatures may not be considered acceptable in other areas covered by 14 CFR having more specific applicability (i.e., legal depositions and various other applications). Although the acceptance of electronic signatures will foster the use of electronic recordkeeping systems, the FAA continues to accept paper documents to satisfy current regulatory requirements.

6. How does an operator or individual receive FAA approval to use an electronic signature?

a. Announcing Intent to Use Electronic Signatures. Certificate holders and operators intending to use electronic signatures should consult

with their local FSDO or CHDOs before implementing an electronic system. To obtain FAA approval, the certificate holder or operator must submit a letter to the appropriate FSDO or CHDO (see Appendix 1 for sample letter) describing the proposed system and include the proposed section or revision to the operator's manual.

b. Description of Electronic System and Proposed Manual Changes. The electronic system description should explain how electronic signatures will be used in the operator's maintenance and operational activities. The proposed manual section or revision should clearly state who in the organization has authority and the overall responsibility for implementing, modifying, revising, and monitoring the electronic signature computer software. In addition, the operator's manual must explain how electronically signed documents required aboard an aircraft will be transferred (in accordance with the appropriate regulations) prior to the aircraft's operation. Required documents include aircraft maintenance releases, dispatch releases, etc.

c. FAA Approval Process. The appropriate FAA Principal Inspector will review the electronic signature proposal. If the proposed electronic hardware and computer software system meets the elements of this AC, the inspector will make the appropriate entry on the operator's operation specifications. For a part 91 operator, the FSDO will review the operator's proposed procedures. If the procedures are acceptable, the FSDO will provide the operator with a letter of acceptance (see Appendix 2 for sample letter).

DISCUSSION—ELECTRONIC RECORDKEEPING SYSTEMS

7. What is an acceptable electronic recordkeeping system?

When constructing an electronic recordkeeping system to meet the operational and maintenance requirements addressed in this AC, the following elements must be considered and addressed in the operator's manual or in the directions for the system. This information must be made available to each individual responsible for using the

system.

a. Security.

(1) The electronic system should protect confidential information.

(2) The system should ensure that the information is not altered in an unauthorized way.

(3) A corresponding policy and management structure should support the computer hardware and computer software that delivers the information.

b. Procedures. Before introducing an electronic recordkeeping system, computer procedures must be incorporated into the operator's manual or in the directions for the system to include the following:

(1) Procedures for making required records available to both the National Transportation Safety Board (NTSB) and FAA personnel. If the computer hardware and software system is not compatible with the FAA and the NTSB system, the organization will provide an employee or representative to assist. This individual must be familiar with the computer system and assist in accessing the necessary computerized information. This procedure and computer system must be capable of producing paper copies of the viewed information at the request of the FAA or NTSB authorized representative.

NOTE: The FAA and NTSB must be able to review the records and information at their respective offices when necessary and on request.

Persons or entities can fulfill this request in many ways, i.e., floppy disk, paper copy, etc.

(2) Procedures for reviewing the computerized personal identification codes system to ensure that the system will not permit password

duplication.

(3) Procedures for auditing the computer system every 60 days to ensure the integrity of the system. A record of the audit should be completed and retained on file as part of the operator's record retention requirements. This audit may be a computer program that automatically audits itself.

(4) Audit procedures to ensure the integrity of each computerized workstation. If the workstations are server-based and contain no inherent attributes that enable or disable access, there is no need for each workstation to be audited.

(5) Procedures describing how the operator will ensure that the computerized records are transmitted in accordance with the appropriate regulatory requirements to customers or to another operator. The records may be either electronic or paper copies.

(6) Procedures to ensure that records required to be transferred with an aircraft are in a format (either electronic or on paper) that is acceptable to the new owner/operator.

(7) Guidelines for authorized representatives of the owner/operator to use electronic signatures and to have access to the appropriate records.

(8) A description of the training procedure and requirements necessary to authorize access to the computer hardware and software system. (Recognizing that the details will vary with the different individuals who need access, the training description may simply be part of the position description. Its location should be referenced in the manual.)

8. How does an operator or individual receive FAA approval to use an electronic recordkeeping system?

a. Announcing Intent to Use Electronic Recordkeeping. Certificate

holders and operators intending to use electronic recordkeeping should consult with their local FSDO or CHDO before implementing an electronic system. To obtain FAA approval, the certificate holder or operator must submit a letter to the appropriate FSDO or CHDO (see Appendix 1 for sample letter) describing the proposed system and include the proposed section or revision to the operator's manual.

b. Description of Electronic System and Proposed Manual Changes. The electronic system description should explain how the electronic recordkeeping will be used in the operator's maintenance and operational activities. The proposed manual section or revision should clearly state who in the organization has authority and the overall responsibility for implementing, modifying, revising, and monitoring the electronic recordkeeping computer software.

c. FAA Approval Process. The appropriate FAA Principal Inspector will review the electronic recordkeeping proposal. If the proposed electronic hardware and computer software system meets the elements of this AC, the inspector will make the appropriate entry on the operator's operation specifications. For a part 91 operator, the regulations do not require FAA approval; however, if the part 91 operator wants to submit its electronic system to the local FSDO, the FSDO will review the operator's proposed procedures. If the procedures are acceptable, the FSDO will provide the operator with a letter of acceptance (see Appendix 2 for sample letter).

DISCUSSION—ELECTRONIC MANUALS

9. What is an acceptable electronic manual?

a. General. Assuming its contents have been FAA approved, manuals on CD-ROM, Internet-based systems, or other electronic media are acceptable.

(1) These electronic formats offer improved data accessibility, quality control, and speed distribution over paper or microfilm-based

information storage systems that result in enhanced safety. In addition, the industry and government should experience a reduced economic burden because users will have rapid access to information at reduced cost as well as improving the presentation of technical data contained in a certificate holder's or operator's manual(s). Presentation is improved by using media formats incompatible with the use of paper or microfilm-based manuals such as visual displays, video, graphic files, audio, animation, and computer data files.

(2) Electronic manual computer hardware and software systems must deliver the same, or better, accuracy and integrity maintained by paper/microfilm-based systems. In addition, electronic manuals must still comply with requirements about the currency, completeness, use, or availability of the technical data.

b. Electronic Manual Construction. When constructing an electronic manual to meet the operational and maintenance requirements addressed in this AC, the following elements must be considered and addressed.

(1) Storage and Retrieval. Computer hardware and software system must store and retrieve the manual's technical data under conditions of normal operation and use. The system must not permit unauthorized modification of the data it contains.

(2) Maintenance and Support. Maintenance and support for the system, including provisions for outages and necessary alternative retrieval services, may be provided by sources independent of the certificate holder or operator. However, the certificate holder or operator is still responsible for compliance with all regulatory requirements and cannot be delegated.

(3) Access to Manual. Appropriate certificate holder or operator personnel must be able to access the manuals. Procedures for distributing the manuals/technical data may be similar to procedures

distributing information contained in paper or microfilm manuals. Certificate holders or operators may use their current manual distribution system to distribute electronic manuals.

(4) Revisions to Manual. Procedures will be established to verify that revisions (i.e., incremental, temporary or scheduled revisions) to the technical data contained in the maintenance portion of its manual are current and complete. In addition, revisions must be approved by the appropriate authority before distribution. FAA approval may be accomplished in accordance with subparagraph d below, Revision Control Procedures.

(5) FAA/NTSB Access. Any FAA or NTSB authorized representative must be able to retrieve, print, or view the information in any electronic manual. If a certificate holder or operator is required to provide information to the FAA or NTSB, they should provide the record in a format usable by the requesting agency.

(6) User Instructions. Users will be provided information describing the electronic system's use and operation. Such information will include instructions for using publications, reference information, and system administration information. These instructions need not be in paper form. They will consist of the following:

- Electronic, context-sensitive help
- Online or system responses to specific operator queries
- Telephonic or electronic access to a designated assistance line
- Other information included in the electronic system

(7) Training. A training program will be provided to employees or contractors who use the electronic manual. The subject matter and objectives of the training will vary depending on the employee or contractor job responsibilities and function level within the organization. Customer training will include security awareness and policy and procedures for the system. Acceptable methods of providing this training may include, but are not limited to, classroom instruction, online or system tutorials, user guides, and simulated

problem-solving exercises. Any training program will define minimum competency criteria and the method for users to demonstrate competence.

(8) Enhancements. Additional features (such as text searching, hypertext links, or other enhancements) that facilitate access to the information are generally not required for a system to be approved.

c. Functional Considerations.

(1) The electronic system should allow users to retrieve the technical data from any electronic manual stored in the system. The electronic manual should be able to access, navigate, and retrieve applicable information at a computer workstation. Information stored in the electronic manual may occur in either a stand-alone or a shared environment.

(2) The content of an electronic manual must be clearly identifiable and vieweable by the user. This material must easily correlate to corresponding information in a printed version of the manual. Requested information must be displayed on a computer screen or comparable device. If connected to a paper printer, the system must be able to print any information contained in an electronic manual.

d. Revision Control Procedures. These procedures apply to organizations operating under an FAA-issued certificate with a continuous aircraft maintenance program. Electronic or paper manual revision can be submitted to the appropriate FAA FSDO/CHDO and the appropriate FAA Principal Inspector for approval via electronic data transfer, e-mail, or paper. This submission will normally contain a cover letter that requests approval and gives a brief description of the revision. After reviewing the revision, the FAA Principal Inspector will send back to the certificate holder an e-mail or paper memorandum approving or rejecting. In most cases, the approval of manual revisions only require the principal inspector to initial and date the list of affected pages. However, if the computer system uses a continuous flow of information process, a table of revisions should

be used. The table of revisions must contain each chapter, section, task or sub-task number to be revised. With a table of revisions, the same process of initialing and dating the list of affected sections will apply. In either case, the copy of signed revisions will become archive copies of the manual revisions for the operator and the FAA.

(1) Validation of Revision Control Procedures. Procedures must be established to audit the revision process to ensure contents of the electronic system are current and complete. The revision control procedures for electronic manual data may be similar to the revision control procedures used for other storage media.

(2) Revision Transmittal Letter/Release Notes. Many certificate holders and operators frequently use internal distribution documents that specify the current revision number and date for each revision. If this document is provided separately, it conveys the revision number and date with applicable instructions to the users. A user can inspect and review this documentation to determine data currency.

(3) Data Currency Audit. Procedures must be established to ensure the currency of the technical data (regardless of the storage media). They must ensure that all electronic storage media contain the current revision and associated revision dates. With electronic media, page level insertion audits of manuals may no longer be necessary for users to ensure information currency.

(4) User Responsibility. Users of information or printed data from electronic manuals systems must ensure the information or printed data is from the most current manual.

e. Special Considerations in Displaying Information.

(1) Data Content and Information Form.

(a) Information retrieved from an electronic manual might be

displayed in a different format than it appears on paper or microfilm pages. These formatting differences may be caused by advancements of electronic retrieval systems. The information should be identical in content regardless of its format.

(b) Any computer-displayed information should be readily traceable to its original source. This information must be readily accessible to the user and should be able to obtain the following:

- The manual title
- Applicable aircraft, airframe, engine, propeller, appliance, component, or part make and model
- Effective date of the data
- Revision simultaneously displayed with the technical data (e.g., on the computer screen)

(2) Page Numbers and Revision Data.

(a) Complete display of traditional letter size (8.5” x 11”) documents may not be possible on certain computer displays. Frequently, the video monitor will display only one-third to one-half of a paper page, and the user must scroll through the on-screen display to see the complete page. In addition, some systems may print an entire page although the video monitor displays only a partial page. This situation may result in electronic systems assigning, displaying, or printing page numbers not matching the approved copy of the manual. Therefore, certificate holders and operators must ensure information displayed or printed can be traced to the correct revision level of the manual.

(b) The contents of a chapter, section, or subject in a maintenance manual may be displayed as a continuous flow of information without displaying the actual page numbers of the approved manual. The user may elect to display only a portion of a manual page. If this occurs, the organizational format of the manual should be retained, and a means of referencing the section or page of the manual from which the data was obtained should be provided. Some electronic

manuals systems may provide a page number as with paper manuals. Some systems will only provide the chapter, section, and a page block or task number. In these cases, the user must output such blocks of information after selecting them.

(3) References to specific chapters, sections, or paragraphs of the manual may be used to ensure information traceability to corresponding sections of a printed version. This permits the technical data to be easily referenced by the user and ensures traceability of the information to its source.

(4) The most common method of updating a manual is to issue a revision with a list identifying the pages to which the revision applies. Each subsequently revised page contains the revision status. This same process may be applied when the manuals are in electronic format. The FAA recommends that certificate holders and operators prepare a table of revisions. That table should be included in the electronic manual to show when each page of the manual was revised. Some electronic manuals using a continuous flow of information process may not be capable of producing a list of effected pages. Therefore, a table of revisions needs to contain the revised manual, chapter, section, subject, task or sub-task numbers.

f. Data Archive. A maintenance recordkeeping requirement often requires retention or access to previously used technical data to support or verify a method of repair or maintenance. To comply with those traceability requirements, a certificate holder or operator must archive earlier versions of manuals to provide for future needs to duplicate, regenerate, or reconstruct maintenance instructions. The archived materials should be obtained from the original source of the data. Regardless of the source, the certificate holder or operator is responsible for ensuring the availability of any required record.

(1) Preservation of Stored Data. Procedures will be established to ensure the integrity of the stored technical data, regardless of the storage medium. These procedures should include:

- Ensuring that no unauthorized changes can be made
- Selecting storage mediums that minimize regeneration of errors or deterioration
- Exercising, refreshing, or duplicating archived technical data at a frequency compatible with the storage life of the medium (i.e., before the storage medium deteriorates)
- Storing duplicate copies in physically separate archives to minimize the risk of data loss in the event of a fire or natural disaster

(2) Technological Advances. Certificate holders and operators should ensure all electronic systems components are maintained to enable retrievable archived manuals. Future changes in data storage media may result in a need to replace current computer hardware or a need to use another storage medium. Future systems must be able to retrieve archived technical data. Otherwise, the certificate holder or operator will have to maintain the old system to ensure data availability.

10. How does a certificate holder or operator receive FAA approval to use an electronic manual?

a. Announcing Intent to Use Electronic Manual. Certificate holders and operators intending to use an electronic manual should consult with their local FSDO or CHDO before implementing an electronic system. To obtain FAA approval, the certificate holder or operator must submit a letter to the appropriate FSDO or CHDO (see Appendix 1 for sample letter) describing the proposed system and include the proposed section or revision to the operator's manual.

b. Description of Electronic System. The electronic system description should explain how the electronic manual will be used in the operator's maintenance and operational activities. The proposed manual section or revision should clearly state who in the organization has authority and the overall responsibility for implementing, modifying, revising, and monitoring the electronic manual computer software.

c. FAA Approval Process. The appropriate FAA Principal Inspector will review the electronic manual proposal. If the proposed electronic hardware and computer software system meets the elements of this AC, the inspector will make the appropriate entry on the operator's operation specifications. For a part 91 operator, the FSDO will review the operator's proposed procedures. If the procedures are acceptable, the FSDO will provide the operator with a letter of acceptance (see Appendix 2 for sample letter).

11. Are there any related documents?

a. Title 14 CFR: parts 43, 61, 65, 91, 119, 121, 125, 129, 133, 135, 137, 141, 145, and 147.

b. FAA Orders. Copies of the following documents may be purchased from: New Orders,
Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.
(1) Order 8300.10, Airworthiness Inspector's Handbook.

(2) Order 8400.10, Air Transportation Operations Inspector's Handbook.

(3) Order 8700.1, General Aviation Operations Inspector's Handbook.

12. Does this AC cancel any prior ACs?

This AC cancels AC 120-69, Use of CD-ROM System, dated August 14, 1997.

FAA Advisory Circular 90-48C, Pilots Role in Collision Avoidance

Subject: Pilots' Role in Collision Avoidance

Sate: 3/18/83

AC No. 90-48C

Initiated by: AFO-820

1. PURPOSE.

This advisory circular is issued for the purpose of alerting all pilots to the potential hazards of midair collision and near midair collision, a to emphasize those basic problem areas related to the human causal factors where improvements in pilot education, operating practices, procedures, and improved scanning techniques are needed to reduce midair conflicts.

2. CANCELLATION.

AC 90-48B, Pilots' Role in Collision Avoidance, dated 9/5/80 is canceled.

3. BACKGROUND.

a. From 1978 through October 1982 a total of 152 midair collisions (MAC) occurred in the United States resulting in 377 fatalities. Throughout this approximate 5 year time period the yearly statistics remained fairly constant, with a recorded high of 38 accidents in 1978 and a low of 25 in both 1980 and 1981. During this same time period there were 2,241 reported near midair collisions (NMAC). Statistics indicate that the majority of these midair collisions and near midair collisions, occurred in good weather and during the hours of daylight.

b. The FAA has introduced several significant programs designed to reduce the potential for midair and near midair collisions. This advisory circular is but one of those programs and is directed towards all pilots operating in the National Airspace System, with emphasis on the need for recognition of the human factors associated with midair conflicts.

4. ACTION.

The following areas warrant special attention and continuing action on the part of all pilots to avoid the possibility of becoming involved in a midair conflict.

a. "See and Avoid" Concept.

(1) The flight rules prescribed in Part 91 of the Federal Aviation Regulations (FAR) set forth the concept of "See and Avoid." This concept requires that vigilance shall be maintained at all times, by each person operating an aircraft, regardless of whether the operation is conducted under Instrument Flight Rules (IFR) or Visual Flight Rules (VFR).

(2) Pilots should also keep in mind their responsibility for continuously maintaining a vigilant lookout regardless of the type of aircraft being flown. Remember that most MAC accidents and reported NMAC incidents occurred during good VFR weather conditions and during the hours of daylight.

b. Visual Scanning.

(1) Pilots should remain constantly alert to all traffic movement within their field of vision as well as periodically scanning the entire visual field outside of their aircraft to ensure detection of conflicting traffic. Remember that the performance capabilities of many aircraft, in both speed and rates of climb / descent, result in high closure rates limiting the time available for detection, decision, and evasive action. (See the "Distance/Speed/Time" chart in Appendix 1.)

(2) The probability of spotting a potential collision threat increases with the time spent looking outside, but certain techniques may be used to increase the effectiveness of the scan time. The human eyes tend to focus somewhere, even in a featureless sky. In order to be most effective, the pilot should shift glances and refocus at intervals. Most pilots do this in the process of scanning the instrument panel, but it is also important to focus outside to set up the visual system for effective target acquisition.

(3) Pilots should also realize that their eyes may require several seconds to refocus when switching views between items in the cockpit and distant objects. Proper scanning requires the constant sharing of attention with other piloting tasks, thus it is easily degraded by such psychophysiological conditions such as fatigue, boredom, illness, anxiety, or preoccupation.

(4) Effective scanning is accomplished with a series of short, regularly spaced eye movements that bring successive areas of the sky into the central visual field. Each movement should not exceed 10 degrees, and each area should be observed for at least 1 second to enable detection. Although horizontal back and forth eye movements seem preferred by most pilots, each pilot should develop a scanning pattern that is most comfortable and then adhere to it to assure optimum scanning.

(5) Peripheral vision can be most useful in spotting collision threats from other aircraft. Each time a scan is stopped and the eyes are refocused, the peripheral vision takes on more importance because it is through this element that movement is detected. Apparent movement is almost always the first perception of a collision threat and probably the most important, because it is the discovery of a threat that triggers the events leading to proper evasive action. It is essential to remember, however, that if another aircraft appears to have no relative motion, it is likely to be on a collision course with you. If the other aircraft shows no lateral or vertical motion, but is increasing in size, take immediate evasive action.

(6) Visual search at night depends almost entirely an peripheral vision. In order to perceive a very dim lighted object in a certain direction, the pilot should not look directly at the object, but scan the area adjacent to it. Short stops, of a few seconds, in each scan will help to detect the light and its movement.

(7) Lack of brightness and color contrast in daytime and conflicting ground lights at night increase the difficulty of detecting other aircraft.

(8) Pilots are reminded of the requirement to move one's head in order to search around the physical obstructions, such as door and window posts. The doorpost can cover a considerable amount of sky, but a small head movement may uncover an area which might be concealing a threat.

c. Clearing Procedures.

(1) Pilots should:

(i) Prior to taxiing onto a runway or landing area for takeoff, scan the approach areas for possible landing traffic by maneuvering the aircraft to provide a clear view of such areas. It is important that this be accomplished even though a taxi or takeoff clearance has been received.

(ii) During climbs and descents in flight conditions which permit visual detection of other traffic, execute gentle banks left and right at a frequency which permits continuous visual scanning of the airspace about them.

(iii) Execute appropriate clearing procedures before all turns, abnormal maneuvers, or acrobatics.

d. Airspace, Flight Rules, and Operational Environment.

(1) Pilots should be aware of the type of airspace in which they intend to operate in order to comply with the flight rules applicable to that

airspace. Aeronautical information concerning the National Airspace System is disseminated by three methods: aeronautical charts (primary); the Airman's Information Manual (AIM); and the Notices to Airmen (NOTAM) system. The general operating and flight rules governing the operation of aircraft within the United States are contained in Part 91 of the FAR.

(2) Pilots should:

(i) Use currently effective aeronautical charts for the route or area in which they intend to operate.

(ii) Note and understand the aeronautical legend and chart symbols related to airspace information depicted on aeronautical charts.

(iii) Develop a working knowledge of the various airspace segments, including the vertical and horizontal boundaries.

(iv) Develop a working knowledge of the specific flight rules (FAR 91) governing operation of aircraft within the various airspace segments.

(v) Use the AIM. The Basic Flight Information and ATC Procedures describe the airspace segments and the basic pilot responsibilities for operating in such airspace.

(vi) Contact the nearest FAA Flight Service Station for any pertinent NOTAMs pertaining to their area of operation.

(3) Pilots should also be familiar with, and exercise caution, in those operational environments where they may expect to find a high volume of traffic or special types of aircraft operation. These areas include Terminal Radar Service Areas (TRSAs), airport traffic patterns, particularly at airports without a control tower; airport traffic areas (below 3,000 feet above the surface within five statute miles of an airport with an operating control tower); terminal control areas; control zones, including any extensions; Federal airways; vicinity of VORs; restricted areas; warning areas; alert areas; Military Operating

Areas (MOA); intensive student jet training areas; military low level high speed training routes; instrument approach areas; and areas of high density jet arrival / departure routings, especially in the vicinity of major terminals and military bases.

e. Use of Communications Equipment and Air Traffic Advisory Services.

(1) One of the major factors contributing to the likelihood of NMAC incidents in terminal areas that have an operating air traffic control (ATC) system has been the mix of known arriving and departing aircraft with unknown traffic. The known aircraft are generally in radio contact with the controlling facility (local, approach, or departure control) and the other aircraft are neither in two-way radio contact nor identified by ATC at the time of the NMAC. This precludes ATC from issuing traffic advisory information to either aircraft.

(2) Although pilots should adhere to the necessary communications requirements when operating VFR, they are also urged to take advantage of the air traffic advisory services available to VFR aircraft.

(3) Pilots should:

(i) Use the AIM.

(A) The basic AIM contains a section dealing with services available to pilots, including information on VFR advisory services, radar traffic information services for VFR pilots, and recommended traffic advisory practices at nontower airports.

(B) The airport / facility directory contains a list of all major airports showing the services available to pilots and the applicable communication frequencies.

(ii) Develop a working knowledge of those facilities providing traffic advisory services and the area in which they give these services.

(iii) Initiate radio contact with the appropriate terminal radar or nonradar facility when operating within the perimeters of the advertised service areas or within 15 miles of the facility when no service area is specified.

(iv) When it is not practical to initiate radio contact for traffic information, at least monitor the appropriate facility communication frequency, particularly when operating in or through arrival / departure routes and instrument approach areas.

(v) Remember that controller observation of aircraft in the terminal area is often limited by distance, depth perception, aircraft conspicuity, and other normal visual acuity problems. Limitations of radar (when available), traffic volume, controller workload, unknown traffic, etc., may prevent the controller from providing timely traffic advisory information. Traffic advisories are secondary to the controllers' primary duties (which are separating aircraft under their control and issuing safety advisories when aware of safety conflicts). Therefore, the pilot is responsible for seeing and avoiding other traffic. Traffic advisories should be requested and used when available to assist the pilot to see and avoid other traffic by assisting, but not substituting in any way, the pilot's own visual scanning. It is important to remember that advisories which air traffic control may provide are not intended to lessen in any manner the pilot's obligation to properly scan to see and avoid traffic.

f. Airport Traffic Patterns.

(1) A significant number of midair collisions, as well as near midair collisions, have occurred within the traffic pattern environment.

(2) Pilots should:

(i) When operating at tower controlled airports, maintain two-way radio contact with the tower while within the airport traffic area. Make every effort to see and properly avoid any aircraft pointed out by the tower, or any other aircraft which may be in the area and unknown to

the tower.

(ii) When entering a known traffic pattern at a nontower airport, keep a sharp lookout for other aircraft in the pattern. Enter the pattern in level flight and allow plenty of spacing to avoid overtaking or cutting any aircraft out of the pattern.

(iii) When approaching an unfamiliar airport fly over or circle the airport at least 500 feet above traffic pattern altitude (usually at 2,000 feet or more above the surface) to observe the airport layout, any local traffic in the area, and the wind and traffic direction indicators. Never descend into the traffic pattern from directly above the airport.

(iv) Be particularly alert before turning to the base leg, final approach course, and during the final approach to landing. At nontower airports, avoid entering the traffic pattern on the base leg or from a straight-in approach to the landing runway.

(v) Compensate for blind spots due to aircraft design and flight attitude by moving your head or maneuvering the aircraft.

g. Flying In Formation.

(1) Several midair collisions have occurred which involved aircraft on the same mission, with each pilot aware of the other's presence.

(2) Pilots who are required, by the nature of their operations, to fly in pairs or in formation are cautioned to:

(i) Recognize the high statistical probability of their involvement in midair collisions.

(ii) Make sure that adequate preflight preparations are made and the procedures to be followed are understood by all pilots intending to participate in the mission.

(iii) Always keep the other aircraft in sight despite possible distraction

and preoccupation with other mission requirements.

(iv) Avoid attempting formation flight without having obtained instruction and attained the skill necessary for conducting such operations.

h. Flight Instructors, Pilot Examiners, and Persons Acting As Safety Pilots.

(1) The importance of flight instructors training pilot applicants to devote maximum attention to collision avoidance while conducting flight operations in today's increasing air traffic environment cannot be overemphasized.

(2) Flight instructors should set an example by carefully observing all regulations and recognized safety practices, since students consciously and unconsciously imitate the flying habits of their instructors.

(3) Flight instructors and persons acting as safety pilots should:

(i) Guard against preoccupation during flight instruction to the exclusion of maintaining a constant vigilance for other traffic.

(ii) Be particularly alert during the conduct of simulated instrument flight where there is a tendency to "look inside."

(iii) Place special training emphasis on those basic problem areas of concern mentioned in this advisory circular where improvements in pilot education, operating practices, procedures, and techniques are needed to reduce midair conflicts.

(iv) Notify the control tower operator, at airports where a tower is manned, regarding student first solo flights.

(v) Explain the availability of and encourage the use of expanded radar services for arriving and departing aircraft at terminal airports

where this service is available, as well as, the use of radar traffic advisory services for transiting terminal areas or flying between enroute points.

(vi) Understand and explain the limitations of radar that may frequently limit or prevent the issuance of radar advisories by air traffic controllers (refer to AIM).

(4) Pilot examiners should:

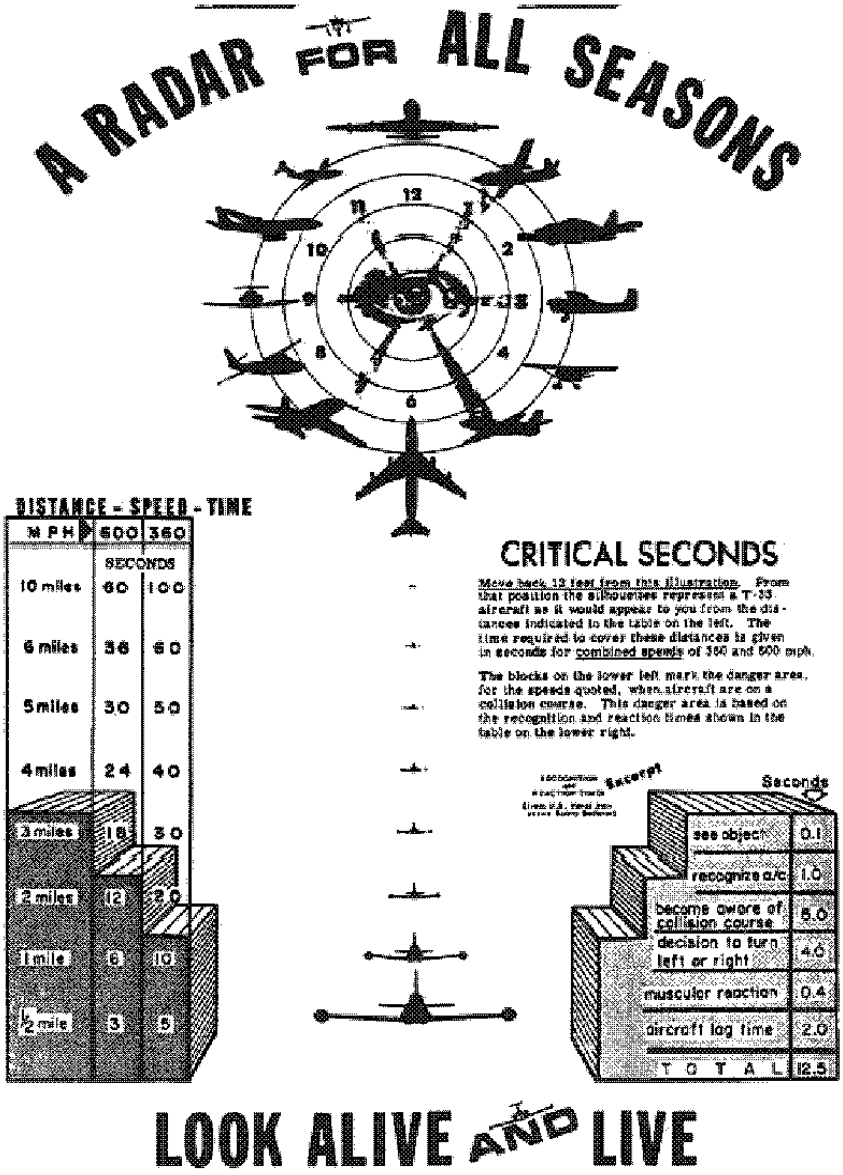
(i) During any flight test, direct attention to the applicant's vigilance of other air traffic and an adequate clearance of the area before performing any flight maneuver.

(ii) Direct attention to the applicant's knowledge of the airspace, available FAA air traffic services and facilities, essential rules, good operating practices, procedures, and techniques that are necessary to achieve high standards of air safety.

i. Scan Training. The Aircraft Owners and Pilots Association (AOPA) Air Safety Foundation has developed an excellent educational program designed to inform pilots on effective visual scan techniques. All pilots are encouraged to attend FAA / industry sponsored safety meetings which feature this program. The program, called "Take Two and See," is available on loan through the AOPA Air Safety Foundation, 7315 Wisconsin Avenue, Bethesda, Maryland 20814. For further information on the availability of this or any other Accident Prevention Program dealing with collision avoidance, interested persons may contact the Accident Prevention Specialist at any FAA General Aviation District Office or Flight Standards District Office.

/s/

KENNETH S. HUNT
Director of Flight Operations


A RADAR FOR ALL SEASONS
DISTANCE - SPEED - TIME
MPH 600 360
SECONDS
10 miles 60 100
6 miles 36 60
5 miles 30 50
4 miles 24 40
3 miles 18 30
2 miles 12 20
1 mile 6 10
½ mile 3 5
CRITICAL SECONDS
Move back 12 feet from this illustration. From that position the silhouettes represent a T-33 aircraft as it would appear to you from the distances indicated in the table on the left. The time required to cover these distances is given in seconds for combined speeds of 360 and 600 mph.
The blocks on the lower left mark the danger area, for the speeds quoted, when aircraft are on a collision course. This danger area is based on the recognition and reaction times shown in the table on the lower right.
Excerpt
Seconds
see object 0.1
recognize a/c 1.0
become aware of collision course 5.0
decision to turn left or right 4.6
muscular reaction 0.4
aircraft lag time 2.0
TOTAL 12.5
LOOK ALIVE AND LIVE

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

Advisory Circular

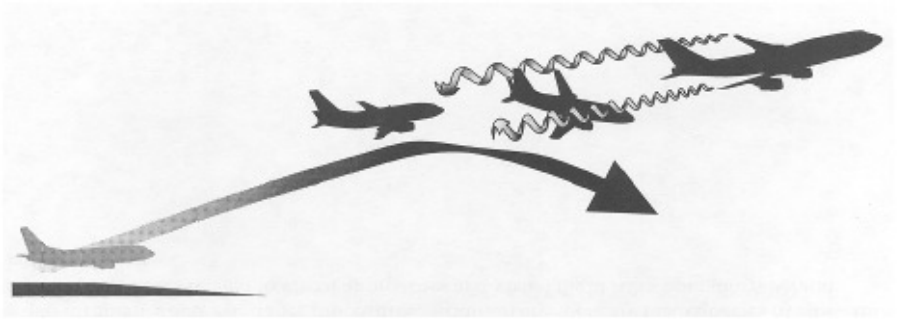
Subject: AIRCRAFT WAKE Date: 02/20/02 AC No.: 90-23F TURBULENCE
Initiated by: AFS-430 Change:

FAA Advisory Circular 90-23F, Aircraft Wake Turbulence

U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject:	Date:	AC No.:
AIRCRAFT WAKE TURBULENCE	02/20/02	90-23F
	Initiated by: AFS-430	Change:



1. PURPOSE. This advisory circular (AC) is intended to alert pilots to the hazards of aircraft wake turbulence and recommends related operational procedures.

2. CANCELLATION. AC 90-23E, Aircraft Wake Turbulence, dated October 1, 1991, is canceled.

3. INTRODUCTION. Every aircraft in flight generates a wake. Historically, when pilots encountered this wake the disturbance was attributed to "prop wash." It is known, however, that this disturbance is caused by a pair of counter-rotating vortices trailing from the wing-tips. The vortices from large aircraft pose problems to encountering aircraft. For instance, the wake of these aircraft can impose rolling moments exceeding the control authority of the encountering aircraft. Further, turbulence generated within the vortices encountered at close range can damage aircraft components and equipment and cause personal injuries. The pilot must learn to envision the location of the vortex wake generated by larger (transport category) aircraft and adjust his/her flight path accordingly.

4. VORTEX GENERATION. Lift is generated by the creation of a pressure differential over the wing surfaces. The lowest pressure occurs over the upper wing surface and the highest pressure under the wing. This pressure differential triggers the rollup of the airflow aft of the wing resulting in

swirling air masses trailing downstream of the wing-tips. After the rollup is completed, the wake consists of two counterrotating cylindrical vortices (see figure 1). Most of the energy is within a few feet of the center of each vortex, but pilots should avoid a region within about 100 feet of the vortex core.

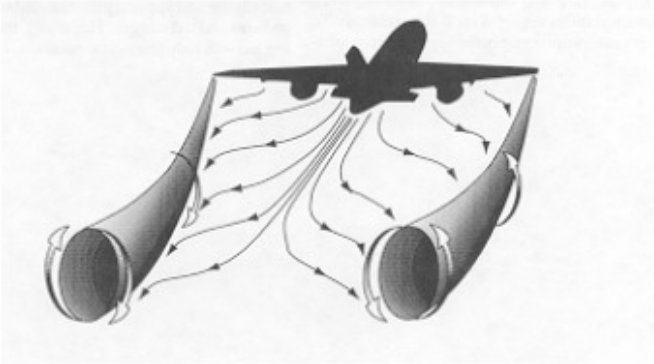


FIGURE 1. THE ROLLING UP PROCESS

5. VORTEX STRENGTH. The strength of the vortex is governed by the weight, speed, and shape of the wing of the generating aircraft. The vortex characteristics of any given aircraft can also be changed by extension of flaps or other wing configuring devices. However, as the basic factor is weight, the vortex strength increases proportionately with increase in aircraft operating weight. Peak vortex tangential speeds up to almost 300 feet per second have been recorded. The greatest vortex strength occurs when the generating aircraft is heavy-clean-slow.

6. INDUCED ROLL.

a. In rare instances, a wake encounter could cause in-flight structural damage of catastrophic proportions. However, the usual hazard is associated with induced rolling moments which can exceed the roll control capability of the encountering aircraft. In flight experiments, aircraft have been intentionally flown directly up trailing vortex cores of larger aircraft. It was shown that the capability of an aircraft to counteract the roll imposed by the wake vortex primarily depends on the wingspan and counter-control responsiveness of the encountering aircraft.

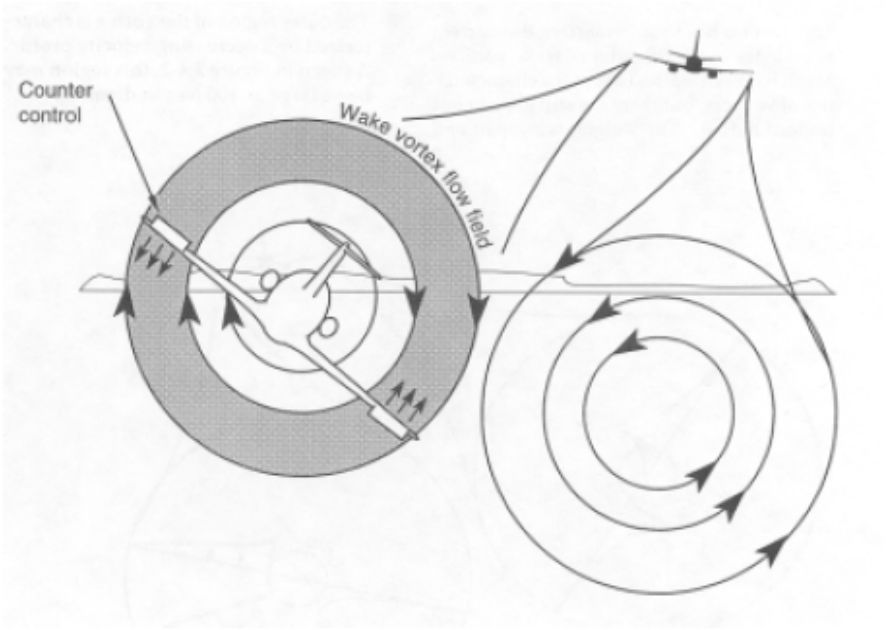


FIGURE 2. INDUCED ROLL

b. Counter-control is usually effective and induced roll minimal in cases where the wingspan and ailerons of the encountering aircraft extend beyond the rotational flow field of the vortex. It is more difficult for aircraft with short wingspans (relative to the vortex generating aircraft) to counter the imposed roll induced by vortex flow. Pilots of short-span aircraft, even of the high performance type, must be especially alert to vortex encounters. The wake of larger aircraft requires the respect of all pilots (see figures 2 and 3).

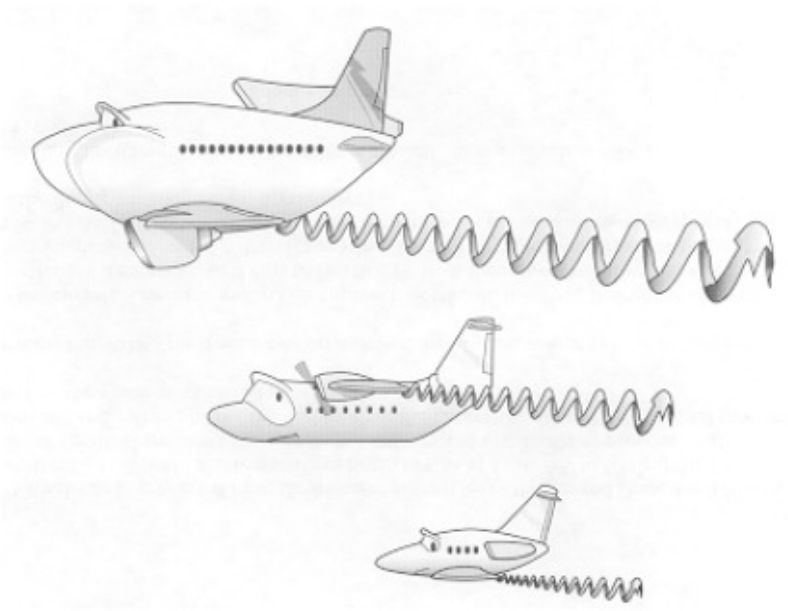


FIGURE 3. WAKE VS. AIRCRAFT WEIGHT

7. VORTEX BEHAVIOR. Trailing vortices have certain behavioral characteristics which can help pilots visualize the wake location and thereby take avoidance precautions.

a. Vortices are generated from the moment aircraft leave the ground, since trailing vortices are a by-product of wing lift. Prior to takeoff or landing, pilots should note the rotation or touchdown point of the preceding aircraft (see figure 4).

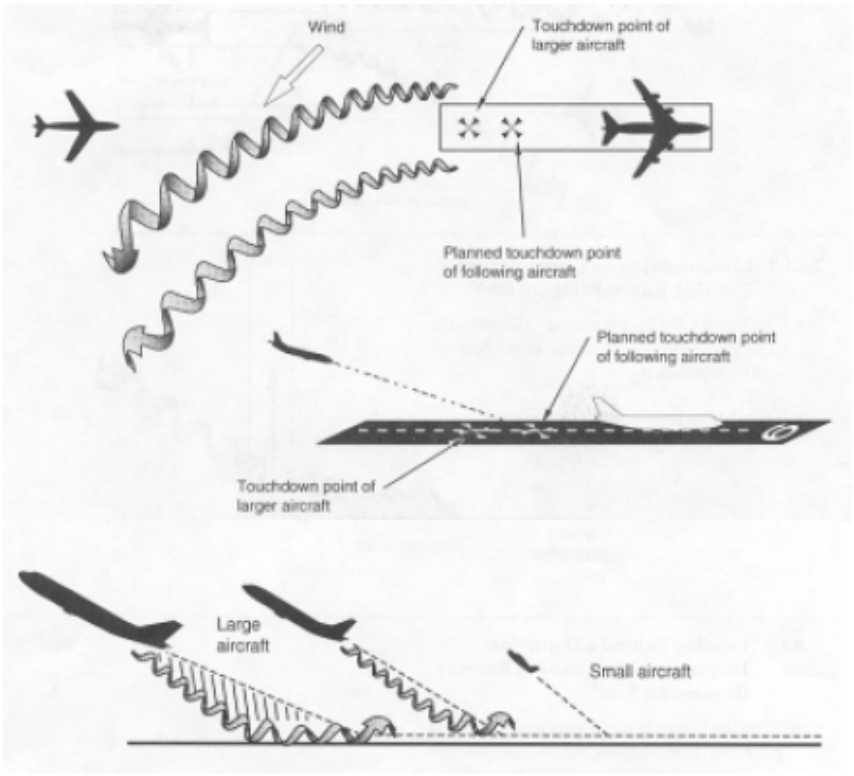


FIGURE 4. ROTATION AND TOUCHDOWN POINTS OF PRECEDING AIRCRAFT

b. The vortex circulation is outward, upward, and around the wing-tips when viewed from either ahead or behind the aircraft. Tests with large aircraft have shown that the vortices remain spaced a bit less than a wingspan apart, drifting with the wind at altitudes greater than a wingspan from the ground. In view of this, if persistent vortex turbulence is encountered, a slight change of altitude and lateral position (preferably upwind) will provide a flight path clear of the turbulence.

c. Flight tests have shown that the vortices from larger (transport category) aircraft sink at a rate of several hundred feet per minute, slowing their descent and diminishing in strength with time and distance behind the generating aircraft. Atmospheric turbulence hastens breakup. Pilots should fly at or above the preceding aircraft's flight path, altering course as necessary to avoid the area behind and below the generating aircraft. However, vertical separation of 1,000 feet may be considered safe (see figure 5).

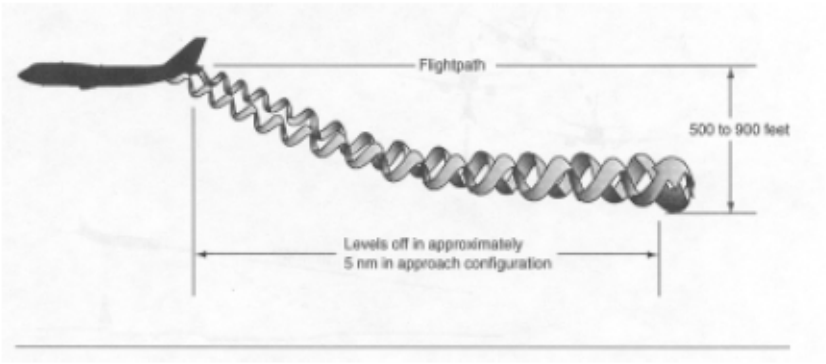


FIGURE 5. DESCENT OF VORTICES FROM LARGER AIRCRAFT

d. When the vortices of larger aircraft sink close to the ground (within 100 to 200 feet), they tend to move laterally over the ground at a speed of 2 or 3 knots (see figure 6).

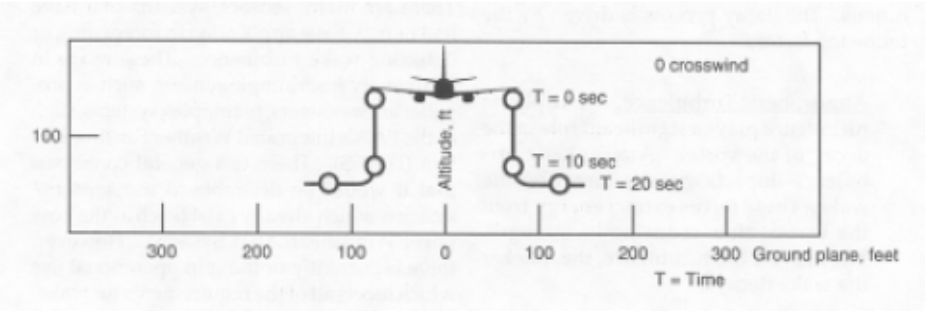


FIGURE 6. MOVEMENT OF VORTICES FROM LOW FLYING LARGE AIRCRAFT

e. A crosswind will decrease the lateral movement of the upwind vortex and increase the movement of the downwind vortex (figure 7). Thus, a light wind with a cross-runway component of 1 to 5 knots (depending on conditions) could result in the upwind vortex remaining in the touchdown zone for a period of time and hasten the drift of the downwind vortex toward another runway. Similarly, a tailwind condition can move the vortices of the preceding aircraft forward into the touchdown zone. The light quartering tailwind requires maximum caution. Pilots should be alert to larger aircraft upwind from their approach and takeoff flight paths.

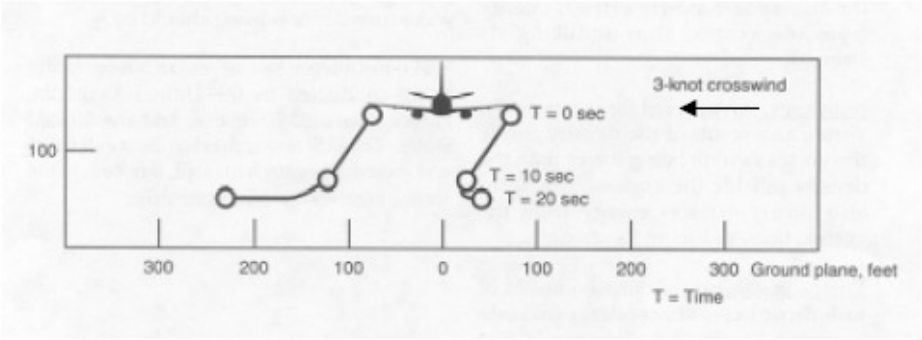


FIGURE 7. EFFECT OF 3-KNOT CROSSWIND ON VORTICES FROM LOW FLYING AIRCRAFT

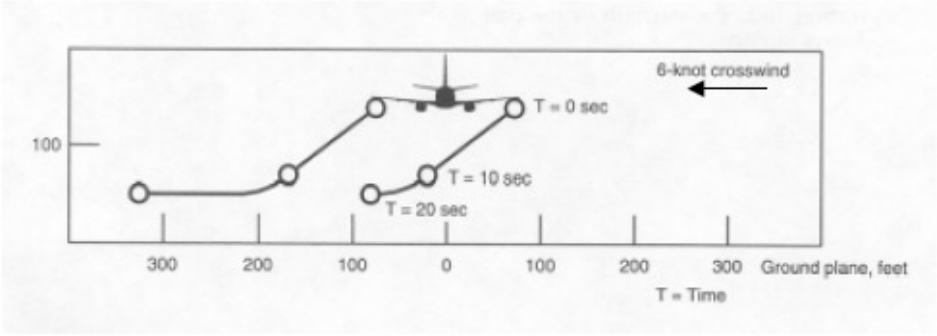


FIGURE 8. EFFECT OF 6-KNOT CROSSWIND ON VORTICES FROM LOW FLYING AIRCRAFT

8. OPERATIONAL PROBLEM AREAS.

a. A wake encounter is not necessarily hazardous. It can be one or more jolts with varying severity depending upon the direction of the encounter, weight of the generating aircraft, size of the encountering aircraft, distance from the generating aircraft, and point of vortex encounter. The probability of induced roll increases when the encountering aircraft's heading is generally aligned or parallel with the flight path of the generating aircraft. Avoid the area below and behind the generating aircraft, especially at low altitude where even a momentary wake encounter could be hazardous. Pilots should be particularly alert in calm wind conditions and maneuvering situations in the vicinity of the airport where the vortices could:

(1) remain in the touchdown area,

(2) drift from aircraft operating on a nearby runway,

(3) sink into takeoff or landing path from crossing runway,

(4) sink into the traffic patterns from other airport operations, or

(5) sink into the flight path of aircraft operating under Visual Flight Rules (VFR) and at hemispheric altitudes 500 feet below.

b. Pilots of all aircraft should visualize the location of the vortex trail behind larger aircraft and use proper vortex avoidance procedures to achieve safe operation. It is equally important that pilots of larger aircraft plan or adjust their flight paths, whenever possible, to minimize vortex exposure to other aircraft.

9. VORTEX AVOIDANCE PROCEDURES. Under certain conditions, airport traffic controllers apply procedures for separating IFR aircraft. If a pilot accepts a clearance to visually follow a preceding aircraft, the pilot accepts responsibility for separation and wake turbulence avoidance. The controllers will also provide to VFR aircraft, with whom they are in communication and which in the tower's opinion may be adversely affected by wake turbulence from a larger aircraft, the position, altitude and direction of flight of larger aircraft followed by the phrase "CAUTION – WAKE TURBULENCE." After issuing the caution for wake turbulence, the airport traffic controllers generally do not provide additional information to the following aircraft unless the airport traffic controllers know the following aircraft is overtaking the preceding aircraft. WHETHER OR NOT A WARNING OR INFORMATION HAS BEEN GIVEN, HOWEVER, THE PILOT IS EXPECTED TO ADJUST AIRCRAFT OPERATIONS AND FLIGHT PATH AS NECESSARY TO PRECLUDE SERIOUS WAKE ENCOUNTERS. When any doubt exists about maintaining safe separation distances between aircraft to avoid wake turbulence, pilots should ask the control tower for updates on separation distance and aircraft groundspeed.

a. When landing behind a larger aircraft - same runway (figure 9) - stay at or above the larger aircraft's final approach flight path. Note touchdown point - land beyond it.

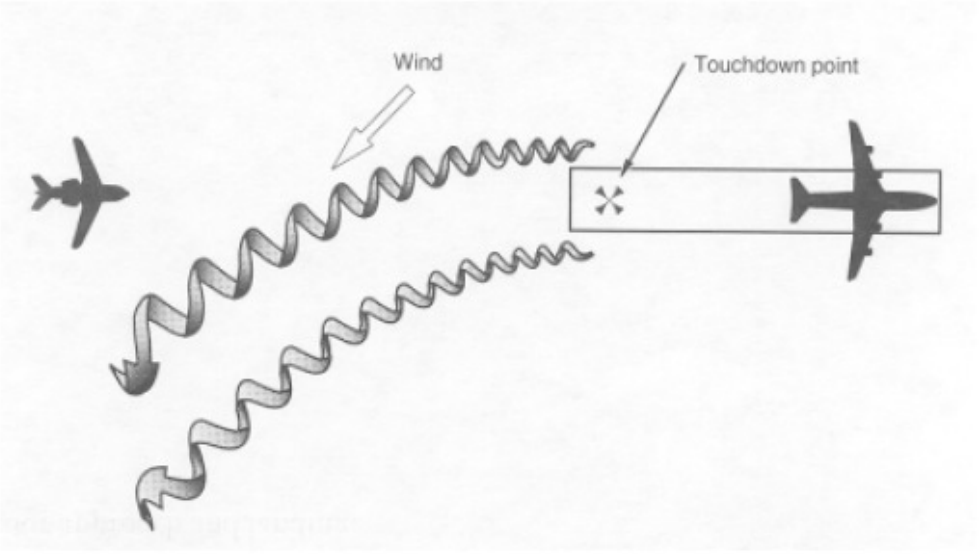


FIGURE 9. AVOIDANCE PROCEDURES LANDING BEHIND LARGER AIRCRAFT ON THE SAME RUNWAY

b. When landing behind a larger aircraft - when parallel runway is closer than 2,500 feet (figure 10) - consider possible vortex drift onto your runway. If you have visual contact with the larger aircraft landing on the parallel runway, whenever possible, stay at or above the larger aircraft's final approach flight path. Note its touchdown point.

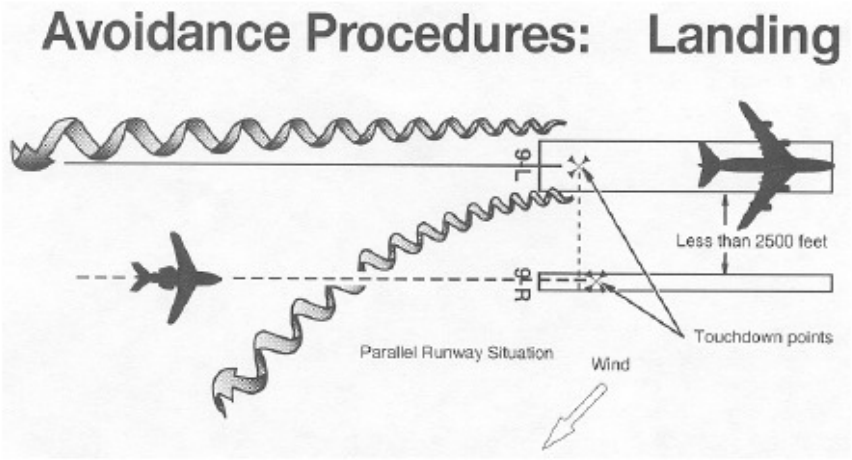


FIGURE 10. AVOIDANCE PROCEDURE LANDING ON PARALLEL RUNWAYS CLOSER THAN 2,500 FEET

c. When landing behind a larger aircraft - crossing runway (figure 11) - cross above the larger aircraft's flight path.

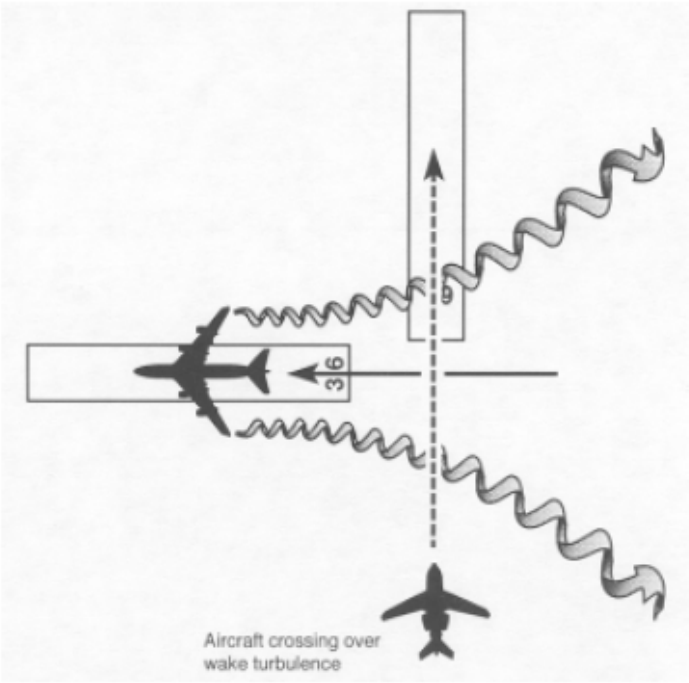


FIGURE 11. AVOIDANCE PROCEDURE FOR LANDING BEHIND LARGER AIRCRAFT THAT IS USING A CROSSING RUNWAY

d. When landing behind a departing larger aircraft - same runway (figure 12) - note larger aircraft's rotation point, and land well before the rotation point.

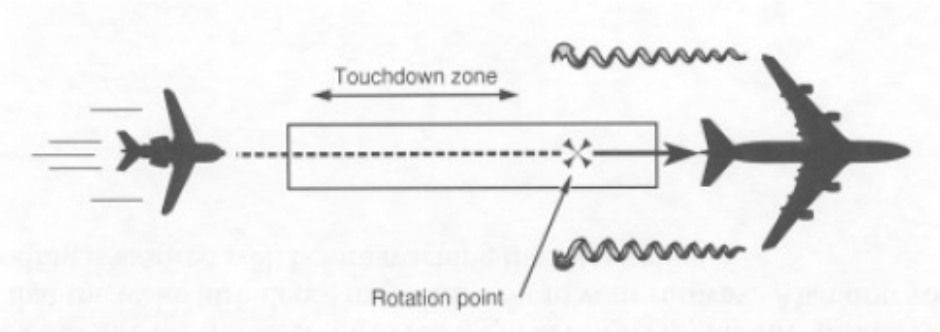


FIGURE 12. AVOIDANCE WHEN LANDING BEHIND A DEPARTING AIRCRAFT ON THE SAME RUNWAY

e. When landing behind a departing larger aircraft - crossing runway - note larger aircraft's rotation point. If rotation is past the intersection, continue the approach and land before the intersection (figure 13). If larger aircraft rotates prior to the intersection, avoid flight below the larger aircraft's flight path. Abandon the approach unless a landing is ensured well before reaching the intersection (figure 14).

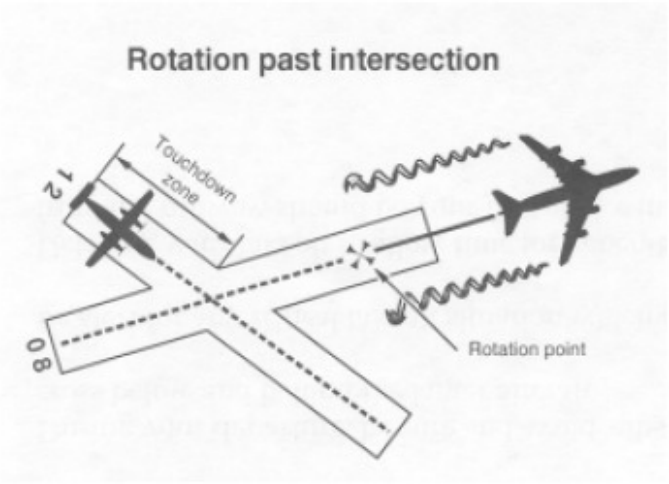


FIGURE 13. AVOIDANCE FOR LANDING BEHIND DEPARTING LARGER AIRCRAFT ON A CROSSING RUNWAY ROTATION POINT PAST THE INTERSECTION

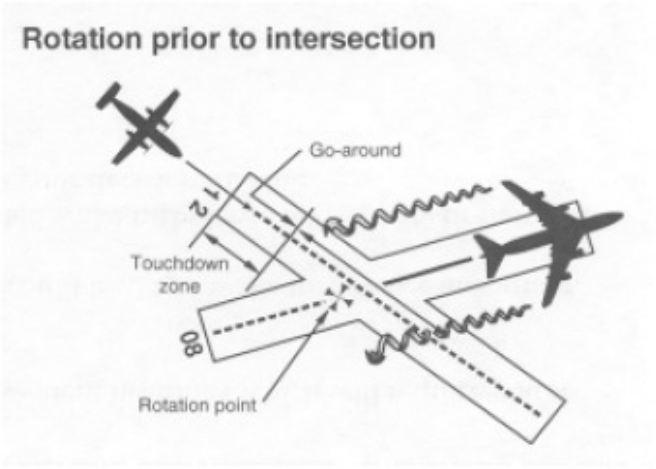


FIGURE 14. AVOIDANCE FOR LANDING WHEN LARGER DEPARTING AIRCRAFT ROTATES PRIOR TO THE INTERSECTION

f. When departing behind a larger aircraft - same runway - note larger aircraft's rotation point, and rotate prior to larger aircraft's rotation point. Continue climb above the larger aircraft's climb path until turning clear of this wake (figure 15). Avoid subsequent headings which will cross below and behind aircraft (see figure 16). Be alert for any critical takeoff situation which could lead to a vortex encounter.

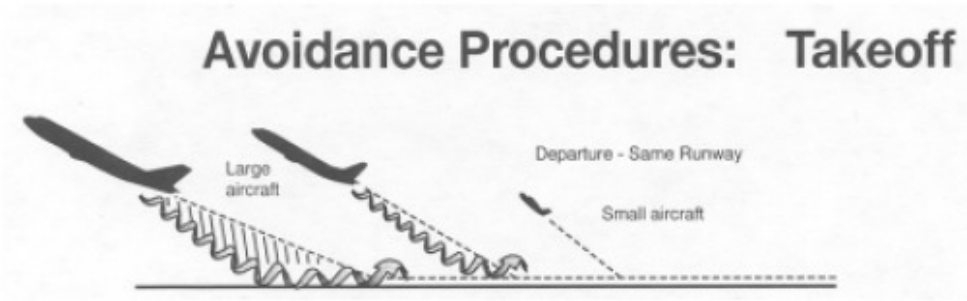


FIGURE 15. DEPARTING SAME RUNWAY BEHIND A LARGER AIRCRAFT

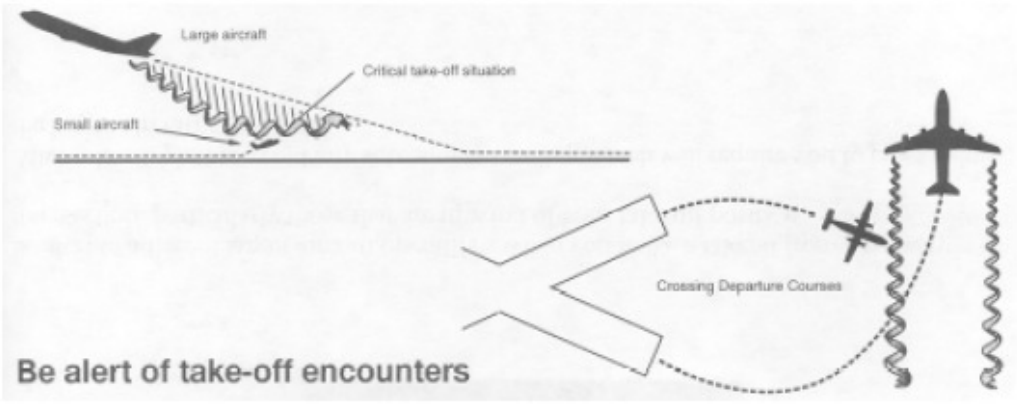


FIGURE 16. CRITICAL TAKEOFF SITUATION AND CROSSING DEPARTURE COURSES

g. Intersection takeoffs - same runway - be alert to adjacent large aircraft operations, particularly upwind of your runway. If intersection takeoff clearance is received, avoid subsequent heading which will cross below a larger aircraft's path.

h. Departing or landing after a larger aircraft executing a low missed approach or touch-and-go landing. Because vortices settle and move laterally near the ground, the vortex hazard may exist along the runway and in your flight path after a larger aircraft has executed a low missed approach or a touch-and-go landing, particularly in light quartering wind conditions. You should ensure that an interval of at least 2 minutes has elapsed before your takeoff or landing.

i. En route VFR (1,000-foot altitude plus 500 feet). Avoid flight below and behind a larger aircraft's path. If a larger aircraft is observed above on the same track (meeting or overtaking), adjust your position laterally, preferably upwind.

10. HELICOPTERS. A hovering helicopter generates a downwash from its main rotor(s) similar to the "prop wash" of a conventional aircraft. However, in forward flight this energy is transformed into a pair of strong, high-speed trailing vortices similar to wing-tip vortices of larger fixed-wing aircraft. Pilots should avoid helicopter vortices since helicopter forward flight airspeeds are often very low which generate exceptionally strong wake turbulence (see figure 17).

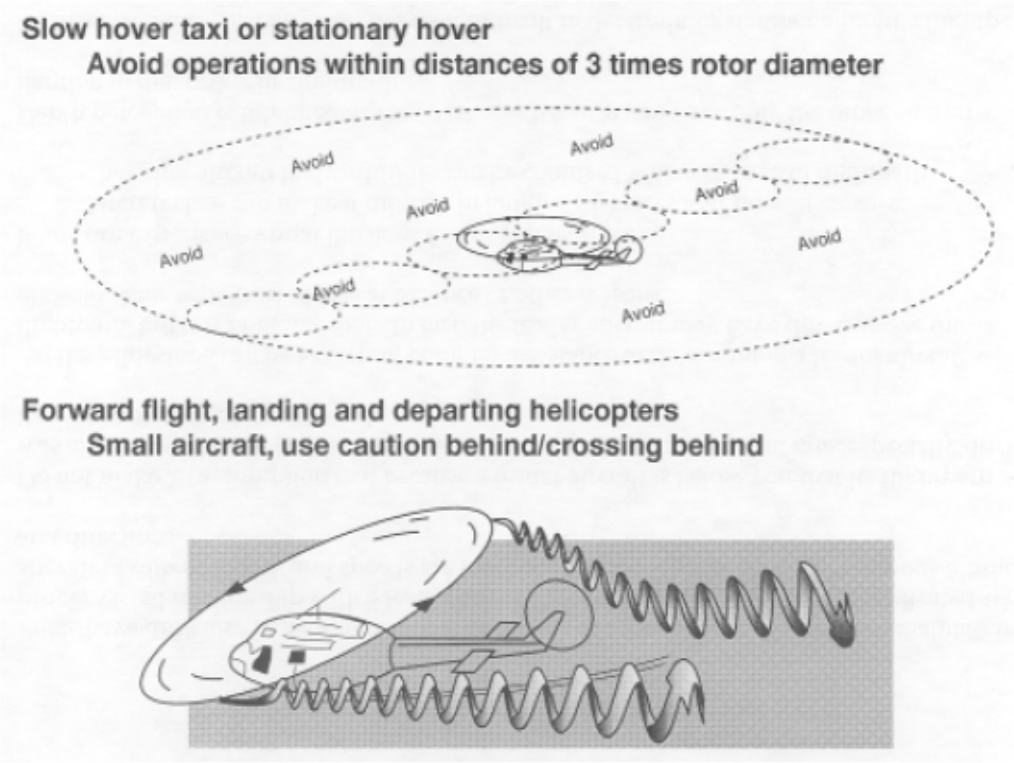


FIGURE 17. HELICOPTER VORTICES

11. JET ENGINE EXHAUST.

a. During ground operations, jet engine blast (thrust stream turbulence) can cause damage and upsets if encountered at close range. Exhaust velocity versus distance studies at various thrust levels have shown a need for light aircraft to maintain an adequate separation during ground operations.

b. Engine exhaust velocities, generated by larger jet aircraft during ground operations and initial takeoff roll, dictate the desirability of lighter aircraft awaiting takeoff to hold well back of the runway edge at the taxiway hold line. Also, it is desirable to align the aircraft to face any possible jet engine blast effects. Additionally, in the course of running up engines and taxiing on the ground, pilots of larger aircraft should consider the effects of their jet blasts on other aircraft, vehicles, and maintenance and servicing equipment.

12. PILOT RESPONSIBILITY.

a. Government and industry groups are making concerted efforts to minimize or eliminate the hazards of trailing vortices. However, the flight disciplines necessary to ensure vortex avoidance during VFR operations must be exercised by the pilot. Vortex visualization and avoidance procedures should be exercised by the pilot using the same degree of concern as in collision avoidance.

b. Pilots are reminded that in operations conducted behind all aircraft, acceptance of instructions from air traffic control (ATC) in the following situations is an acknowledgment that the pilot will ensure safe takeoff and landing intervals, and accepts the responsibility for providing wake turbulence separation.

(1) Traffic information,

(2) Instructions to follow an aircraft, and

(3) The acceptance of a visual approach clearance.

c. For operations conducted behind **heavy** aircraft, **ATC** will specify the word **"heavy"** when this information is known. Pilots of **heavy** aircraft should always use the word **"heavy"** in radio communications.

d. Heavy and large jet aircraft operators should use the following procedures during an approach to landing. These procedures establish a dependable baseline from which pilots of in-trail, lighter aircraft may reasonably expect to make effective flight path adjustments to avoid serious wake vortex turbulence.

(1) Pilots of aircraft that produce strong wake vortices should make every attempt to fly on the established glidepath, not above it; or, if glidepath guidance is not available, to fly as closely as possible to a "3 to 1" glidepath, not above it.

EXAMPLE:
Fly 3,000 feet at 10 miles from touchdown, 1,500 feet at 5 miles, 1,200 feet at 4 miles, and so on to touchdown.

(2) Pilots of aircraft that produce strong wake vortices should fly as closely as possible to approach course centerline or to the extended centerline of the runway of intended landing as appropriate to conditions.

e. Pilots operating lighter aircraft on visual approaches in-trail to aircraft producing strong wake vortices should use the following procedures to assist in avoiding wake turbulence. These procedures apply only to those aircraft that are on visual approaches.

(1) Pilots of lighter aircraft should fly on or above the glidepath. Glidepath reference may be furnished by an ILS, by a visual approach slope system, by other ground-based approach slope guidance systems, or by other means. In the absence of visible glidepath guidance, pilots may very nearly duplicate a 3-degree glideslope by adhering to the "3 to 1" glidepath principles.

EXAMPLE:
Fly 3,000 feet at 10 miles from touchdown, 1,500 feet at 5 miles, 1,200 feet at 4 miles, and so on to touchdown.

(2) If the pilot of the lighter following aircraft has visual contact with the preceding heavier aircraft and also with the runway, the pilot may further adjust for possible wake vortex turbulence by the following practices:

(a) Pick a point of landing no less than 1,000 feet from the arrival end of the runway.

(b) Establish a line-of-sight to that landing point that is above and in front of the heavier preceding aircraft.

(c) When possible, note the point of landing of the heavier preceding aircraft and adjust point of intended landing as necessary.

EXAMPLE:
***A puff** of smoke may appear at the 1,000-foot markings of the runway, showing that touchdown was that point; therefore, adjust point of intended landing to the 1,500-foot markings.*

(d) Maintain the line-of-sight to the point of intended landing above and ahead of the heavier preceding aircraft; maintain it to touchdown.

(e) Land beyond the point of landing of the preceding heavier aircraft.

(3) During visual approaches pilots may ask ATC for updates on separation and groundspeed with respect to heavier preceding aircraft, especially when there is any question of safe separation from wake turbulence.

(4) Aircraft Classes. For the purposes of Wake Turbulence Separation Minima, ATC classifies aircraft as Heavy, Large, and Small as follows:

(a) Heavy-Aircraft capable of takeoff weights of more than 255,000 pounds whether or not they are operating at this weight during a particular phase of flight.

(b) Large-Aircraft of more than 41,000 pounds, maximum certificated takeoff weight, up to 255,000 pounds.

(c) Small-Aircraft of 41,000 pounds or less maximum certificated takeoff weight.

13. PILOT AWARENESS INTERVENTION. There is a small segment of the aviation community that have become convinced that wake vortices may "bounce" up to twice their nominal steady state height (with a 200-foot span aircraft the "bounce" height could reach approximately 200 feet above ground level (AGL)). This conviction is based on a single unsubstantiated report of an apparent coherent vortical flow that was seen in the volume scan of a research sensor. No one can say what conditions cause vortex bouncing, how high they bounce, at what angle they bounce, nor how many times a vortex may bounce. On the other hand, no one can say for certain that vortices never "bounce." Test data have shown that vortices can rise with the air mass in which they are embedded. Wind shear, particularly, can cause vortex flow field "tilting." Also, ambient thermal lifting and orographic effects (rising terrain or tree lines) can cause a vortex flow field to rise. In view of the foregoing, pilots are reminded that they should be alert at all times for possible wake vortex encounters when conducting approach and landing operations. The pilot has the ultimate responsibility for ensuring appropriate separations and positioning of the aircraft in the terminal area to avoid the wake turbulence created by a preceding aircraft.

James J. Ballough
Director, Flight Standards Service

SECTION II

Course Syllabi

List of Effective Pages Followed by Individual Content.