Transfer of Training Effectiveness of a Flight Training Device (FTD)

Semi-Annual Interim Report

FAA Cooperative Agreement 2002-G-033

From August 28, 2002 to February 27, 2003

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March 20, 2003

Executive Summary

This report covers the first six months of a three - year effort to investigate the incremental transfer effectiveness of the Frasca 141 with an approved school FAR 141 program. An experimental instrument course has been developed using the Frasca 141 and Piper Archers in the course. To determine incremental transfer (amount of training), four experimental groups received 5, 10, 15 and 20 hours of Frasca training during the instrument curriculum. In this design, the FTD 5 and FTD 10 groups provides a systematic replication for the PCATD 5 and PCATD 10 groups in the study by Taylor et al. (2002b) and these groups will be compared in the current study. The PCATD 5 group provides a direct replication of the PCATD 5 group in the Taylor et al. (2002b), study. The FTD 5 group in the current study provides a reference point for comparing the PCATD 10 and 15 groups in the Taylor et al. 2002b with the FTD 10 and 15 groups in the current study using a meta analysis. A control group will receive all of their training in the airplane. Transfer effectiveness ratios and incremental transfer effectiveness ratios will be computed comparing each experimental group with the control group. During the six-month period covered by the report, we have:

- Developed an experimental syllabus for AVI 130, Basic Instruments, and AVI 140, Advanced Instruments, which include cross-country scenarios using the Frasca 141 flight training device (FTD). The Springfield Flight Standards District Office (FSDO) approved the syllabi.
- Leased two Frasca 141 FTDs for the study.
- Received approval from the University of Illinois Institutional Review Board (IRB) to conduct the study.
- Started forty-one AVI 130 Basic Instrument students the project in the fall semester.
- Developed a survey and collected opinions from the flight instructors concerning the effectiveness of the cross-county scenarios in the Frasca FTD for AVI 130, Basic Instruments for the fall 2002 semester.
- Successfully completed thirty-seven students in the AVI Basic Instruments course during the fall semester, 2002.
- Started thirty AVI 130, Basic Instruments students in the project in the spring semester, 2003.
- Continued thirty-seven students in AVI 140, Advanced Instruments for the spring semester, 2003.
- Received, effective January 27,2003, a 90 day no cost extension following the first five months of the Cooperative Agreement Award.

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INTRODUCTION

To evaluate transfer of training effectiveness of a flight training device (FTD), the performance of subjects trained on instrument tasks in an FTD and later trained to criterion in an airplane must be compared to the performance of subjects trained to criterion only in the airplane. Roscoe (1971) demonstrated that the transfer effectiveness ratio (TER) accounts for the amount of prior training in ground trainers by specifying the trials/time saved in the airplane as a function of the prior trials/time in the ground trainer. Taylor, Lintern, Hulin, Talleur, Emanuel and Phillips (1996, 1999) investigated the extent to which a Personal Computer Aviation Training Device (PCATD) can be used to develop specific instrument skills that are taught in instrument flight training and to evaluate the transfer of training of prior training in the device. A commercially available PCATD was used to teach instrument tasks to students in instrument training at the Institute of Aviation, University of Illinois. The performance, in an aircraft of one group of subjects trained in a PCATD to criterion on a number of instrument tasks PCATD group), was compared with a group of subjects who received no PCATD training but were trained to criterion on the same instrument tasks in the airplane (Control group). In order to evaluate transfer of training effectiveness of the PCATD, time to complete each flight lesson in the airplane, trials to criterion in the airplane, and course completion times for the two groups were made. The findings of the study indicated that the PCATD was effective for teaching instrument tasks. When new tasks were introduced transfer savings were generally positive and statistically significant. No significant transfer was found when tasks already learned in previous lessons were reviewed. The comparison of course completion times indicated a savings of about four hours in the airplane for the PCATD group compared to the Control group; the savings were statistically significant. The overall transfer effectiveness ratio was 0.15 or a savings of 1.5 flight hours for each ten hours of PCATD time. A Federal Aviation Administration (FAA, 1997) advisory circular published in 1997 permits 10 hours of instrument training to be completed in an approved PCATD.

A later study by Taylor, Talleur, Bradshaw, Emanuel, Rantanen, Hulin, and Lendrum (2001) investigated the effectiveness of PCATDs and FTDs to meet FAA recency of experience requirements for instrument flight. An Instrument Proficiency Check (IPC) was given to all subjects in the airplane to establish a performance baseline (IPC #1). After the completion of IPC #1 in the airplane, the subjects were randomly assigned to one of four groups: the PCATD, the FTD, the aircraft or the control group with a balancing constraint so that the subjects successfully completing IPC #1 were equally distributed among the four groups. During the six-month period, each subject received two recency of experience flights of about 1.8 hours each in the PCATD, the FTD or the aircraft; the control group received no recency training. These recency of experience flights included three instrument approaches, holding procedures, and intercepting and tracking navigation radials and courses. After the six-month period, performance on an IPC in the airplane (IPC #2) compared pilots who received recency of experience in the training devices to a control group, which received no recency of experience. The subjects in the PCATD and FTD group were also compared to the aircraft group who received recency of experience in the airplane. The results clearly demonstrated the benefit of recency of experience training in maintaining instrument proficiency for instrument rated pilots. A comparison of the three training groups with the control group performance on the final instrument proficiency check indicated that the training groups performed significantly better than the control group. The study also indicated that PCATDs are effective in maintaining recency of experience for instrument

rated pilots over a period of six months. Pilots receiving recency training in the PCATD performed significantly better on IPC #2 than the control group, which had no practice. Practice in either the PCATD or the FTD resulted in higher pass rates compared to no practice by the control group and practice in the PCATD and the FTD was found to be at least as effective as practice in the airplane. Finally, the performance of the PCATD group was statistically indistinguishable from the FTD group.

The incremental transfer effectiveness ratio (ITER) can be used to determine the transfer effectiveness of successive amounts of prior training in the ground trainer (Flexman, Roscoe, Williams, & Williges, 1972). Roscoe (1971) and Povenmire and Roscoe (1973) demonstrated that the TER and the ITER are negatively decelerated functions. Successive increments of training in a FTD are predicted to decrease the average TER and the ITER. Incremental transfer functions need to be determined in order to measure the effectiveness of a FTD and to determine the point at which additional training in a FTD is no longer effective. Taylor, Talleur, Emanuel, Rantanen, Bradshaw, and Phillips (2002a, 2002b) investigated the incremental transfer of training effectiveness of Personal Computer Aviation training Devices (PCATDs) for instrument training. Three groups of students at the Institute of Aviation, University of Illinois, received 5, 10, or 15 hours of prior training on selected instrument tasks required for the instrument rating. The instrument tasks investigated were the following basic instrument tasks: steep turns, holds, and approach procedures, and the following advanced instrument procedures: NDB holds and approaches and partial panel procedures. Taylor et al., (1996,1999) found that the PCATD was effective for teaching these instrument tasks. After training on each instrument task, the subjects were evaluated in the airplane using completion standards for each task and these results were compared to a control group trained only in the airplane. The results indicated that the PCATD was effective in teaching basic and advanced instrument tasks to private pilots. As a result of prior training in a PCATD, trials on selected instrument tasks, time to complete the flight lesson and time to a successful evaluation flight were less when compared to an airplane Control group. Overall, the greatest effect was found for the PCATD 5 group, which was predicted by the incremental transfer of training theory of Roscoe (1971). Indeed, very little incremental transfer effectiveness was found for the PCATD 10 and PCATD 15 groups.

Povenmire and Roscoe (1973) conducted an experiment designed to determine the relationship between four increments of training in the Link GAT-1 and incremental savings of flight time in the Piper Cherokee aircraft during private pilot training. The criterion measure was private pilot proficiency as measured by the final flight check. A control group (0 hours of prior GAT-1 training) and three incremental transfer groups (3, 7, and 11 hours of prior GAT-1 training) received the flight hours in the airplane required to pass the final check. Each of the transfer groups required less time to pass the flight check than the control group required. The control group required 45.42 hours while the transfer groups required 40.26, 38.62, and 37.93 hours for the 3, 7, and 11 hour groups respectively. The slopes of both the TER and ITER functions demonstrated that these ratios are negatively decelerated functions. The ITER for the 7 hour group was about 0.3.

The use of the PCATD has been thoroughly investigated and its effectiveness has been shown for instrument training and recency of experience training. Similar studies have shown that FTDs can be used effectively for pilot training. However, flight instruction techniques,

instructional requirements, and FTDs have evolved significantly since the Povenmire and Roscoe (1973) study was completed. Therefore, it is important to determine the effectiveness of FTDs within the current training environment. The purpose of the proposed study is to investigate the incremental transfer effectiveness of the Frasca 141 within an approved school FAR 141 program.

REQUIREMENTS FOR THE EXPERIMENT

In order to conduct the study, four essential elements are required: the experimental team, subjects, equipment, and procedures. We use this framework to describe our progress to date.

Experimental Team

Henry L. Taylor, Tom W. Emanuel, Jr., Esa M. Rantanen and Donald A. Talleur are serving as co-principal investigators on the project. All have significant expertise in aviation research with emphasis on flight training research. Three investigators (Taylor, Emanuel and Talleur) hold commercial pilot certificates (single and multi-engine airplane land with instrument rating) and flight instructor certificates (single and multiengine airplane, land with instrument training). Rantanen holds a private pilot's certificate. Taylor will be the principal point of contact for the study. The experimental team meets once each week by conference call. An agenda is prepared and circulated in advanced and minutes of the meeting are prepared and circulated. Under the agreement of the cooperative agreement the COTR is furnished with the agenda and minutes.

Subjects

A total of 180 University of Illinois, Institute of Aviation private pilot students will be participating in the study (30 subjects in each group). These students will be enrolled in the instrument program of the Institute. The instrument training program at the Institute of Aviation is divided into two courses: AVI 130, Basic Instruments and AVI 140, Advanced Instruments. Basic instrument emphasizes aircraft control and instrument departure, enroute and approach procedures, while Advanced Instruments emphasizes NDB holds and approaches, GPS procedures and partial panel procedures. All students in AVI 130 and 140 will be involved in the study. Additional time will be provided for those who fail to complete the stage check on AVI 130 or the instrument rating certification flight check in AVI 140 within the paid course time.

Equipment

Training in the FTD is being conducted in four Frasca 141 FTDs with a generic single-engine, fixed-gear, and fixed-pitch propeller performance model. The Institute has 6 Frasca 141s at the Institute. Four of these devices are Level 1 certified, which includes two additional level l approved Frasca 141sleased for the project. Three of the four Level 1 Frascas are equipped with GPS navigation radios. The PCATD training is being conducted using FAA approved PCATDs from Aviation Teachware Technologies (ELITE) v 6.0.2, and flight controls by Precision Flight Controls. These PCATDs simulate the flight characteristics of the Piper Archer III. The system contains an instructor map display and a 20-inch monitor and hood. The 20-inch monitor permitted the display of eight flight instruments; avionics are contained in a separate unit positioned just to the side of the monitor. Airplane training will be carried out in the Piper Archer III aircraft which is a single engine, fixed pitch propeller, fixed under carriage aircraft. This is the primary trainer for the Institute of Aviation instrument program.

Procedures

The study is investigating instrument tasks in both AVI 130 Basic Instruments, and AVI 140 Advanced Instruments courses. An experimental instrument course has been developed using the Frasca 141 and Piper Archers in the course. To determine incremental transfer (amount of training), four experimental groups are receiving 5, 10, 15 and 20 hours of prior Frasca training during the instrument curriculum. In this design, the FTD 5 and FTD 10 groups provides a systematic replication for the PCATD 5 and PCATD 10 groups in the study by Taylor et al. (2002b). The PCATD 5 group provides a direct replication for The PCATD 5 group in the Taylor et al. (2002b), study. The FTD 5 group in the current study provides a reference point for comparing the PCATD 10 and 15 groups (Taylor et al. 2002b) with the FTD 10 and 15 groups in a meta analysis. A Control group is receiving all of their training in the airplane. Transfer effectiveness ratios and incremental transfer effectiveness ratios will be computed comparing each experimental group with the Control group. We will compare the training trials, time saved for each flight lesson in which there is prior FTD training, and time to completion between the experimental groups and the control group. The incremental transfer effectiveness functions (ITEF) will be computed using 3 variable levels (i.e., Control vs FTD 5 vs FTD10) for the selected instrument tasks and thus will result in two midpoints for plotting the ITEF. It should be noted, however, that the use of total hours to completion will generate 5 data points for the FTD data resulting in 4 midpoints which will permit the approximation of a quadratic function for the ITEF.

Table 1 shows the hours of prior training in the FTD for each experimental group. The PCATD 5 and the FTD 5 and 10 groups will be used to examine the effectiveness of prior training on specific instrument tasks compared with the Control group. These instrument tasks were chosen since prior studies had demonstrated that the PCATD was effective in teaching instrument tasks (Taylor et al., 1996,1999; Taylor et al., 2002b). A comparison between the PCATD 5 and the FTD 5 will examine the relative effectiveness of the two training devices. Since little incremental transfer effectiveness for instrument tasks was found by Taylor et al. (2002b) for the PCATD 10 and PCATD 15 groups, the current study will investigate the effectiveness of 5 and 10 hours of IFR cross-country training in the FTD for the FTD 15 and 20 groups respectfully. Cross-country training requires that the pilot integrate selected instrument tasks into a meaningful whole. Thus, the FTD 15 and 20 will examine the effectiveness of 10

hours of prior training on specific instrument tasks, but also examine the effectiveness of 5 and 10 hours of IFR cross-country training by these groups respectively.

Table 1.

Time (hours) in FTD by group and by flight lesson in the AVI 130 and AVI 140 courses.

Flight Lesson	PCATD 5 and FTD 5	FTD 10	FTD 15	FTD 20
AVI 130				
34/35: Steep Turns	0.5	1.0	1.0	1.0
36: Holds	0.7	1.3	1.3	1.3
37: Approaches	0.7	1.3	1.3	1.3
38: Approaches	0.7	1.3	1.3	1.3
39: IFR X-country	NA	NA	2.0	2.0
42: IFR X-Country	NA	NA	NA	2.0
AVI 140				
48: Review Approaches	0.7	1.3	1.3	1.3
49: NDB Holds and App.	0.5	1.0	1.0	1.0
50: NDB Holds and App.	0.7	1.3	1.3	1.3
52: Holds/Approaches	0.7	1.3	1.3	1.3
53: IFR X-country	NA	NA	2.0	2.0
54: IFR X-country	NA	NA	1.0	2.0
55: IFR X-country	NA	NA	NA	2.0

After training on each instrument task the subjects will be compared with the Control group trained only in the airplane. The effectiveness of the IFR cross-country training will be evaluated by comparing the time to completion of the FTD 15 and 20 groups with both the Control and the FTD 10 groups.

One half of the prior training time on instrument tasks in the FTD and PCATD are in AVI 130 and one half in AVI 140. All students will be trained to a proficiency standard for each instrument task, for each flight lesson in which there is FTD training, and for the stage check in AVI 130 and the instrument rating check flight in AVI 140. The IFR cross country in the FTD is divided between AVI 130 and AVI 140 as follows: 2 hours and 3 hours for AVI 130 and 140 respectively for the FTD 15 group and 2 and 6 hours for the FTD 20 group. A limited number of standardized assistant chief flight instructors from the Institute of Aviation are performing the check flight.

An incremental transfer of training research design will be used to measure the effectiveness of FTDs (Frasca level l) and to determine the point at which additional training in an FTD will no longer be effective. The dependent measures will be trials to specific completion standards for instrument tasks, time to complete a flight lesson and time to a stage check in AVI 130 and time to the instrument proficiency check in AVI 140. Mean trials to reach criterion on the airplane for selected instrument tasks and mean time to complete the flight lesson will be computed for all groups for both courses.

Percent transfer, transfer effectiveness ratios, and incremental transfer effectiveness ratios will be computed using the following equations:

$$\frac{Y_c - Y_x}{Y_c} = Percent \quad Transfer \tag{1}$$

$$\frac{Y_c - Y_x}{X} = TER \tag{2}$$

$$\frac{(Yx - \Delta x) - Yx}{\Delta X} = ITER \tag{3}$$

Where Y_c = Time/Trials in airplane by Control group, Y_x = Time/Trials in airplane by FTD group, X = Time/Trials in FTD, ΔX = Incremental unit in Time/Trials, for FTD group, and Yx-Δx = Time/Trials, required by FTD group to reach a performance criterion in an aircraft after x - Δx trials in a FTD. Percent transfer measures the difference, expressed as a percent, between the Control and the FTD groups in terms of trials/time to reach criterion in the airplane. A positive percent transfer favors the FTD group and a negative percent transfer favors the Control group. Percent transfer does not consider the amount of prior training in the FTD by the FTD groups. The TER is a ratio that compares the difference between the Control and the FTD groups in terms of trials/time to reach criterion in the airplane as a function of the amount of prior training in the FTD for the FTD groups. The TER is a measure of the average transfer for each group as a function of prior training in the FTD or the PCATD. The ITER measures the amount of transfer of successive increments of training in the FTD (Roscoe, 1971; Flexman, Roscoe, Williams, & Williges, 1972).

Percent transfer, transfer effectiveness ratios (TER) and incremental transfer effectiveness ratios (ITER) will be computed for each instrument task and for the time to complete a flight lesson. Mean trials to reach criterion on the airplane for selected instrument tasks and mean time to complete the flight lesson will be computed for all groups for both courses (AVI 130 and AVI 140). Separate ANOVAS will be performed to analyze the difference between the five groups (four FTD groups and the airplane group) on the three dependent measures for both AVI 130 and 140. ANOVAs will be computed to determine the significance of the trial variable, flight lesson completion time and time to complete the course as a function of experimental treatment for both AVI 130 and AVI 140. Finally, ANOVAs will be used to explore variability in the time to a successful evaluation flight for the AVI 130 and AVI 140 courses as a function of the experimental treatment. To further identify the locus of any significant effects, post-hoc Tukey's tests of significance will be employed to make specific pairwise comparisons. An ANOVA will be computed between the Frasca 5-hour group and the PCATD 5-hour group to determine if there are differences between prior training in the Frasca and the PCATD.

RESULTS TO DATE

A number of activities were performed before the experimentation with the subjects began. Guides for the Certified Flight Instructors were developed for both AVI 130, Basic Instruments and AVI 140, Advanced Instruments. These are included as Appendix 1 and 2 respectively. Guidelines for the CFI for flying IFR cross-country flight in the FTD for both AVI 130 and AVI 140 were developed since this represented the first time that FTDs had been used for cross-country flight. These are included as Appendix 3 and 4 respectively. An experimental syllabus was developed for both AVI 130 and AVI 140. The Aviation 140 Course Outline is included as Appendix 5. Prior to the beginning of each semester a standardization meeting is held for all flight instructors by members of the experimental team. A copy of the agenda of the meeting of January 23,2003 is included as Appendix 6. To train to proficiency, it was necessary to receive an exemption to the flight hour requirement for FAR Part 141. Exemption No. 7921 was issued in Washington DC, on November 18, 2002. The exemption terminates November 30,2004. It will be necessary to receive an extension of the exemption to complete the study. Approval to conduct the study was received from the University of Illinois Institutional review Board.

A total of 38 students completed the AVI 130 Basic Instrument course and took the final check ride for the course. The following table shows the results of the check ride. A total of 24 students passed the check ride on the first attempt and 13 on the second attempt. One student failed the check ride on the second attempt and was recommended for a remedial course, AVI 102. Three other students failed to complete the course and were recommended for AVI 102.

	Airplane Only	PCATD 5.00	Frasca 5.00	Frasca 10.00	Frasca 15.00	Frasca 20.00
Number of Students	7	6	6	6	7	6
% First Flight Pass Rate	42.86 (N=3)	83.33 (N=5)	66.67 (N=4)	66.67 (N=4)	85.71 (N=6)	33.33 (N=2)
% Second Flight Pass Rate	100.00 (N=4)	100.00 (N=1)	100.00 (N=2)	100.00 (N=2)	0.00 (N=0)	100.00 (N=4)
Students Recommended 102	0	0	1	1	1	1
Total Dual to Completion	20.74 (N=7)	18.70 (N=6)	18.37 (N=6)	18.85 (N=6)	19.88 (N=6)	17.58 (N=6)
Variance Total Dual to Completion	7.90	3.06	6.90	12.80	3.03	11.58

Note: This lesson is the final check ride for AVI 130.

PROJECT MILESTONES

(Start date of August 28, 2002)

Task	
Begin subject testing	August, 2002
Interim Summary Report	February 27, 2003
Interim Summary Report	August 27, 2003
Interim Summary Report	February 27, 2004
Interim Summary Report	August 27, 2004
Interim Summary Report	February 27, 2005
Interim Summary Report	August 27, 2005
Complete experimental testing	August, 27,2005
Prepare data file	September 30, 2005
Complete Analysis	October 31, 2005
Final Report	November 30, 2005

PROBLEMS AND SOLUTIONS

The Cooperative Agreement Award of $105,017 dated August 28,2002 called for a funding period of 5 months (January 27,2003). Since second year funding was not available at that time the FAA has granted a 90 no cost extension. A request for the second year funding has been submitted.

PLANS FOR THE NEXT SIX MONTHS

During the next six months 37 subjects will complete the project and 30 students will complete AVI 130. The students involved in instrument training during the summer semester will enroll in AVI 130 and 140 and will complete the summer session.

SUMMARY

An experimental instrument course has been developed using the Frasca 141 and Piper Archers in the course. To determine incremental transfer (amount of training), four experimental groups received 5, 10, 15 and 20 hours of Frasca training during the instrument curriculum. In this design, the FTD 5 and FTD 10 groups provides a systematic replication for the PCATD 5 and PCATD 10 groups in the study by Taylor et al. (2002b) and these groups will be compared in the current study. The PCATD 5 group in the current study provides a direct replication of the PCATD 5 group in the Taylor et al. (2002b), study. The FTD 5 group in the current study provides a reference point for comparing the PCATD 10 and 15 groups in the Taylor et al. 2002b with the FTD 10 and 15 groups in the current study using a meta analysis. A control group will receive all of their training in the airplane. Transfer effectiveness ratios and incremental transfer effectiveness ratios will be computed comparing each experimental group with the control group. During the six- month period covered by the report, we have:

- Developed an experimental syllabus for AVI 130, Basic Instruments, and AVI 140, Advanced Instruments, which include cross-country scenarios using the Frasca 141 flight training device (FTD). The Springfield Flight Standards District Office (FSDO) approved the syllabi.
- Leased two Frasca 141 FTDs for the study.
- Received approval from the University of Illinois Institutional Review Board (IRB) to conduct the study.
- Started forty-one AVI 130 Basic Instrument students in the project during the fall semester.
- Developed a survey and collected opinions from the flight instructors concerning the effectiveness of the cross-county scenarios in the Frasca FTD for AVI 130, Basic Instruments for the fall 2002 semester.
- Successfully completed thirty-seven students in the AVI Basic Instruments course during the fall semester, 2002.
- Started thirty AVI 130, Basic Instruments students in the project in the spring semester, 2003.
- Continued thirty-seven students in theAVI 140, Advanced Instruments for the spring semester, 2003.
- Received a 90 no cost extension for the project effective January 28,2003.

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APPENDIX 1
AVI 130 CFI Guide

Flight Lesson 31

Before beginning to fly with your student, be sure the "Ground Instruction" page in the logbook has been properly signed.

The purpose of this lesson is to re-familiarize the student with flying the aircraft and to prepare the student for a local solo flight. While all lesson content should be covered, particular attention should be paid to emergency procedures, takeoffs, and landings. Be sure the student is ready to solo even if it takes more dual than is specified in the lesson. Endorse the student's logbook properly.

--"Prior to Solo Flight" logbook page signed.
--Local solo authorization signed and wind limits listed.
--Pilot and medical certificates in personal possession.

For the SI portion of the flight, be sure to score the "A" and "B" patterns immediately. Spend the remaining SI time reviewing Private Pilot instrument tasks. Count the number of landings to solo proficiency and record on the score cards.

Flight Lesson 32

The purpose of this lesson is to check the student's ability to plan and fly a VFR cross country to the Private Pilot PTS.

Flight Lesson 33

This lesson is comprised of two solo cross country flights. The flight instructor is responsible to endorse the student's navlogs and the student's logbook for preflight planning and preparation. A flight instructor must supervise the solo flight and endorse the logbook for weather. Weather minima for these flights are 3000 and 5 reported and forecast for the duration of the flight. In addition, the supervising instructor must check the student's wind limits and determine that the flight can be made within these limits. Be sure the student carries his/her pilot and medical certificates, as well as a photo ID. *The student must obtain a signature at each airport as stated in the TCO.*

Flight Lessons 34 and 35

These lessons introduce the student to attitude instrument flying skills. Chapters 4 and 5 of the Instrument Flying Handbook (FAA) are useful in preparing for this lesson. Steep turns are practiced in the PCATD or Frasca, then in the airplane to proficiency for those in the PCATD or Frasca groups. Score these maneuvers as indicated on the score card.

Tip: Teach the basic attitude flying first, then go to the skill patterns (pp. 5-35 and 5-36 Instrument Flying Handbook). Read the skill pattern to the student while he is flying the pattern, then increase the difficulty by requiring the student to fly the pattern without instructor assistance. The flight patterns incorporate many common instrument maneuvers such as holding patterns and entries, procedure turns, airspeed changes, reference to the clock, and precision descents. The student also begins to practice reference to printed material during flight.

Flight Lesson 36

During this lesson, the student is introduced to VOR use and holding.

Introduce the student to holding patterns by practicing holds at OCTOE and LODGE in the PCATD (if applicable) and in the airplane. Emphasize the importance of entry procedures, timing, sizing, required reports, and bracketing. Use of the 6 T's, ALARMS, or whatever memory aid you teach should be emphasized.

Tip (time permitting): To teach tracking and intercepting VOR courses, have the student fly a predetermined course with frequent changes in course, TO/FROM orientation, and changes in VOR stations. A sample flight would be to take off from CMI, track the R-062° to OCTOE, intercept the RBS R-166° to EMTEE

(realizing that this is not normally a flyable route), intercept the CMI R-095° to JAGER, intercept the DNV R-212° (again not normally a flyable route) to NEWMY, then intercept the CMI R-121° back to CMI.

Most students get ample practice at teardrop entries, but not enough practice on parallel or direct entries. If you're unable to do all entries in the ground trainer or airplane, be sure to practice them during discussion with your student.

Be sure to score the holding patterns as indicated on the score card.

Flight Lesson 37

This lesson introduces the student to instrument approaches.

Tips: Use the audio panel as a checklist to determine that all radios are properly set. Emphasize the "Tune, Ident, Set" method of setting navaids. Explain how radar vectoring is like a giant traffic pattern to help the student maintain orientation. Wind awareness and bracketing are important skills to emphasize. Utilize the 6 T's or ALARMS as necessary.

There is a prescribed number of VOR, ILS, and LOC BC approaches for those in the PCATD or Frasca. You may need to position your student close to the final approach course or procedure turn fix to fit the required number of approaches in the designated time. You are permitted to move as needed.

Be sure to count the number of instrument approaches performed as indicated on the score card.

Flight Lesson 38

The lesson reviews instrument approaches and introduces DME arcs.

There is a prescribed number of VOR and ILS approaches with DME arcs for those in the PCATD or Frasca. You may need to position your student close to the DME arc to fit the required number of approaches in the designated time. You are permitted to move as needed.

Tips: Use either a "TO" or "FROM" orientation when teaching DME arcs. Some students understand one way better than the other. After the basic fundamentals of performing an arc have been learned, deepen your student's understanding of arcs by performing an exercise like this: Intercept the CMI R-090° to intercept the 11 DME arc to the VOR 4L approach. Intercept the R-170° to join the 15 DME arc for the ILS 32L approach. This helps the student's orientation if you do not indicate which way to arc using cardinal directions such as north or south.

Be sure to count the number of instrument approaches and DME arcs performed as indicated on the score card.

Flight Lesson 39

This lesson introduces the student to IFR cross country flying (CMI-HUF-CMI).

Be sure to emphasize the importance of a thorough weather briefing, use of the nav log, flight plan preparation and filing (be sure the student places your name on the flight plan), and other content items. Emphasize the importance of thinking ahead to the destination airport, getting weather, and being organized.

This flight lasts 2.0 hours total, with at least 1.7 SI or actual.

This X-C will be flown in the airplane for all groups EXCEPT the 15 hour Frasca and 20 hour Frasca groups. The 15 and 20 hour Frasca groups will fly the X-C in the ground trainer only.

Flight Lesson 40

This lesson is a review of flight planning and approaches to local area airports. The use of GPS for IFR enroute operations is introduced. Be careful to check NOTAMs for local airports; Danville's ASOS has been OTS and that means their approaches are not usable under IFR. This might change by the time you do this lesson.

There is no score card to complete for this lesson. All time is flown in the airplane for all groups.

Flight Lesson 41

This lesson continues to review approaches and hold at local area airports. The use of GPS for approaches is introduced. Include GPS stand-alone approaches as well as overlay approaches. The student should be able to select a GPS approach, activate that approach and fly that approach with only verbal assistance from the flight instructor.

There is no score card to complete for this lesson. All time is flown in the airplane for all groups.

Flight Lesson 42

This lesson is a dual IFR X-C flight to MTO. All aspects of instrument flight learned thus far will be reviewed. All groups EXCEPT the 20 hour Frasca group will fly this flight in the airplane. The 20 hour Frasca group will fly the flight in the Frasca only. This is the last lesson with a score card.

The stage check flight, conducted by Bill Jones or David Boyd (Sybil Phillips and Rick Weinberg backups) should be conducted any time after Lesson 42 as soon as the student is proficient, in your opinion, to check ride standards. PLEASE SCHEDULE THIS STAGE CHECK AS SOON AS YOUR STUDENT IS PROFICIENT.

YOUR STUDENT'S LOGBOOK MUST BE CHECKED BY SYBIL PHILLIPS PRIOR TO THE STAGE CHECK.

Flight Lessons 43 and 44

These lessons are used to review course content in preparation for the stage check. See note in Flight Lesson 42 regarding the stage check.

Flight Lesson 45

This lesson is the final stage check for the course. See note in Flight Lesson 42 regarding the stage check.

If you need additional time above and beyond what is in the student's account to complete the course, let Sybil know ASAP. Up to **five** hours of additional aircraft time will be given. Any time not needed by the student to complete the course will be refunded.

IT IS CRITICAL THAT YOUR STUDENT'S LOGBOOK AND DISPATCH ACCOUNT ARE IN AGREEMENT BEFORE ANY REFUNDS ARE ISSUED OR ADDITIONAL FUNDS AWARDED. Please correct any discrepancies as they occur.

AFTER THE CHECK RIDE

Please complete the CFR and return the student's logbook to Sybil.

APPENDIX 2
AVI 140 CFI GUIDE

Flight Lesson 46

Before beginning to fly with your student, be sure the "Ground Instruction" page in the logbook has been properly signed.

The purpose of this lesson is to re-familiarize the student with flying the aircraft and to prepare the student for a long solo X-C flight. While all lesson content should be covered, particular attention should be paid to emergency procedures, takeoffs, and landings. Be sure the student is ready to solo even if it takes more dual than is specified in the lesson. Endorse the student's logbook properly.

--"Prior to Solo Flight" logbook page signed.
--Local solo authorization signed and wind limits listed.
--Pilot and medical certificates in personal possession.

The flight instructor is responsible to endorse the student's navlogs and the student's logbook for preflight planning and preparation. A flight instructor must supervise the solo flight and endorse the logbook for weather. Weather minima for these flights are 2500 and 5 reported and forecast for the duration of the flight. In addition, the supervising instructor must check the student's wind limits and determine that the flight can be made within these limits. Be sure the student carries his/her pilot and medical certificates, as well as a photo ID.

Flight Lesson 47

The purpose of this lesson is to review basic attitude instrument flying skills. The instrument training patterns on pp. 5-35 and 5-36 of the Instrument Flying Handbook might be useful for this lesson.

Flight Lesson 48

This lesson includes review of basic hold and approach procedures. In the PCATD or Frasca (where applicable), a certain number of intersection holds, VOR approaches, and ILS approaches will be performed. There are two score cards for PCATD and Frasca students in this lesson; one to complete in the PCATD or Frasca and one to complete in the airplane.

Emphasize the importance of using proper instrument procedures. Use of the 6 T's, ALARMS, or whatever checklist the student has learned should be emphasized. Use the audio panel as a checklist to determine that all radios are properly set. Emphasize the "Tune, Ident, Set" method of setting navaids. Build good habits!

Flight Lesson 49

This lesson introduces the student to NDB operations. In the PCATD or Frasca (where applicable), a certain number of NDB holds and NDB approaches will be performed (see your TCO). Please use VEALS, ELWIN, or ZEBRE for your holds.

Some students have difficulty learning NDBs, so ask for help if your method isn't working for your student. There are many methods and techniques for teaching and learning NDB operations and your student might benefit from a different point of view.

Here are one person's thoughts on teaching NDB tracking—there are three fundamental skills that need to be solid before you can track an NDB bearing. 1) You must be able to hold a precise heading; that means do not bank the wings unless you intend to turn. Aircraft attitude control must be solid. 2) You must be disciplined in assuring that the DG and compass are aligned correctly. 3) You must be able to hold a heading; that means keep your wings level.

Flight Lesson 50

This lesson includes a review of NDB operations, as well as localizer holding procedures. In the PCATD or Frasca (where applicable), a certain number of NDB holds and NDB approaches will be performed, as well as ILS holds (see your TCO).

Flight Lesson 51

This lesson introduces the student to partial panel procedures, timed turns, compass turns, aircraft system malfunctions; and reviews unusual attitude recovery procedures.

The student should be familiar with the use of ASR and no-gyro ASR approach procedures; specifically where they are available, how to obtain the approach, how to fly the approach. In addition, radio failure procedures should be introduced along with troubleshooting procedures and alternative modes of communication. Unusual attitudes should be reviewed, preferably with the student flying himself into the UA, both full and partial panel. The student should review how to detect a gyro failure and how to distinguish between an instrument failure and a system failure. Pitot-static system malfunctions should also be reviewed.

Flight Lesson 52

This lesson continues to review system malfunction and partial panel operations during approaches and holds. In the PCATD or Frasca (where applicable), a certain number of holds and approaches will be performed (see your TCO).

Flight Lesson 53

This lesson is the first IFR X-C flight. The route is CMI-C16-2K0-CMI; this flight is a cross-country in that it goes to other airports, but these airports are less than 50 miles away so do not log the flights as cross-country. You may reverse the route of flight if needed. For those in the 15- and 20-hour Frasca groups, this flight will be done in the Frasca only and should last 2.0 hours. For those in all other groups, this flight will be done in the airplane and there is no minimum flight time required.

Be sure to emphasize the importance of a thorough weather briefing, use of the nav log, flight plan preparation and filing (be sure the student places your name on the flight plan), and other content items. Emphasize the importance of thinking ahead to the destination airport, getting weather, and being organized.

Be careful in your planning of whether to fly an ADF airplane or a GPS airplane on the X-C flights. You should vary the type of equipment on each flight; be sure to provide ample opportunity for the student to practice in both ADF and GPS. The lesson calls for both GPS and NDB approaches; both approaches cannot be done in the airplane.

Please do not land at Frasca and be cautious about landing at Monticello. Check the runway condition carefully. All the approaches at C16 and 2K0 are VOR or GPS approaches.

Flight Lesson 54

This flight is the second IFR X-C. The route is CMI-TIP-BMI-CMI; this flight is a cross-country in that it goes to other airports, but these airports are less than 50 miles away so do not log the flights as cross-country. You may reverse the route of flight if needed. For those in the 20-hour Frasca group, this flight will be done in the Frasca only and should last 2.0 hours. For those in the 15-hour Frasca group, the CMI-BMI portion will be done in the Frasca (1.0 hour) and the CMI-TIP portion will be done in the airplane. For those in all other groups, this flight will be done in the airplane and there is no minimum flight time required.

Be sure to emphasize the importance of a thorough weather briefing, use of the nav log, flight plan preparation and filing (be sure the student places your name on the flight plan), and other content items. Emphasize the importance of thinking ahead to the destination airport, getting weather, and being organized.

Obtain a clearance void time at Rantoul by calling FSS.

Flight Lesson 55

This is the third X-C flight (CMI-IKK-CMI). **THIS IS NOT A NIGHT CROSS-COUNTRY (your TCO may indicate that it is to be flown at night).** Flight lesson 57 contains the night cross-country. IKK is 50 miles from CMI so this flight can be logged as cross-country. For those in the 20-hour Frasca group, this flight will be done in the Frasca only and should last 2.0 hours.

This lesson provides opportunity to use pilot-controlled lighting at IKK.

Flight Lesson 56

This is the long IFR X-C flight (250 nm). Three suggested routes are listed in the TCO.

The TCO specifies VOR, ILS, and NDB approaches. FAR Part 141 requirements have changed since the TCO was written. Now this is what you need to do: AN INSTRUMENT APPROACH AT EACH AIRPORT, INVOLVING THREE DIFFERENT KINDS OF APPROACHES WITH THE USE OF NAVIGATION SYSTEMS. If you are unable to perform an instrument approach at MDW, STL, or IND, be sure to do a third approach at some other airport. A visual or radar approach is not considered to be using navigation systems. A GPS approach is acceptable.

Try to use DP's if at all possible. Instrument charts for Missouri will have to be obtained in advance from Rick if you plan to fly to STL.

Flight Lesson 57

This lesson is the final IFR X-C flight for the course. The route is CMI-LAF-CFJ-CMI. You may reverse the route of flight if needed.

The CFJ portion of the flight provides an opportunity to obtain a clearance void time. Three approaches at LAF are recommended; the ILS 10, the NDB 10, or the GPS 10. The other approaches require you to fly a longer distance. If you plan to perform a missed approach at LAF and wish to get a clearance to CFJ in the air, be sure to advise Chicago Center prior to arriving at LAF. The center needs time to work out a clearance.

This lesson is an opportunity to review non-tower IFR procedures, partial panel, and emergency procedures.

NOTE: The course check ride, conducted by either Bill Jones or David Boyd (Sybil Phillips or Rick Weinberg backups) should be conducted any time after Lesson 56 as soon as the student is proficient, in your opinion, to check ride standards. PLEASE SCHEDULE THE CHECK RIDE AS SOON AS YOUR STUDENT IS PROFICIENT. If Lessons 58 and 59 are not flown in sequence, please make sure that the content of both lessons has been completed and so indicated by lesson number in the student's logbook before the check ride.

Flight Lesson 58

This lesson is a practice check ride with the student's flight instructor or a different instructor checked out to teach AVI 140.

Flight Lesson 59

This lesson is a review flight in preparation for the Instrument Rating Practical Test

Flight Lesson 60

Check ride lesson. This flight needs to be conducted by either Bill Jones or David Boyd (Sybil Phillips or Rick Weinberg backups). The oral can be given by any check pilot.

If you need additional time above and beyond what is in the student's account to complete the course, let Sybil know ASAP. Any time not needed by the student to complete the course can be flown off or will be refunded. Again, please keep Sybil informed. IT IS CRITICAL THAT YOUR STUDENT'S LOGBOOK AND DISPATCH ACCOUNT ARE IN AGREEMENT BEFORE ANY REFUNDS ARE ISSUED OR ADDITIONAL FUNDS AWARDED. Please correct any discrepancies as they occur. It is important to note that the student should be able to fly somewhere between 22.6-28.4 hours dual (depending on experimental group) before additional funds are needed (assuming that solo time has been completed).

APPENDIX 3

Guidelines for flying an IFR cross country flight in an FTD
AVI 130

Flight Lesson 39

Both the 15- and 20-hour Frasca groups will fly the CMI-HUF-CMI cross country in the Frasca 141 flight training device.

Teach your student X-C flight planning procedures as though you would be flying in the airplane. ***A sample weather briefing is included at the end of this document. This weather should be used to provide the student with a weather briefing in order to make decisions about the best approach to fly and the weather to expect during that approach***. Also be sure to cover all the content items in the lesson.

The student should "file" a flight plan for each leg with the instructor who will act as ATC and any other necessary entity during the flight.

The student should follow the checklist for starting, run up, instrument taxi check, etc. Have the student obtain ATIS (you'll have to be the voice of ATIS). A sample follows:

"*Champaign Willard Airport information Charlie, time _53 zulu, wind 220 at 16 gusting 24; visibility 5, light rain, mist; sky condition broken 800, broken 1700, overcast 2400; temperature 21, dew point 20; altimeter 2970; LOC BC 14L approach in use landing and departing runways 14L and 22, advise on initial contact you have information Charlie"*

The student should obtain the clearance from clearance delivery or ground (your choice, it's a better learning experience to have him use clearance delivery). Here's a sample clearance ATC would give:
"*Archer 4144K, you're cleared to Terre Haute as filed, climb and maintain 3000, expect 5000 ten minutes after departure, departure frequency will be 121.35, squawk 2153."*

The student should call ground when ready to taxi. A sample ATC transmission:
"*Archer 4144K, taxi to runway 22"*

The student should call tower when ready to take off. Sample:
"*Archer 4144K, turn left heading 190, runway 22 cleared for takeoff"*

When the student is about 500 feet AGL, send them to departure. Sample:
"*Archer 4144K, contact departure."*

When the student calls departure, he/she should report the altitude leaving and altitude cleared to, as well as assigned heading or course. Sample reply:
"*Archer 4144K, radar contact, climb and maintain 5000, turn left heading 090, join V192 on course."*

At some point enroute, the student should obtain ATIS at Terre Haute. You may wish to change the wind depending on what approach you want your student to fly. Sample:
"*Hulman International Airport information Hotel, time _53 zulu, wind 170 at 9; visibility 10, light rain; few clouds 800, broken 1400; temperature 22, dew point 22; altimeter 2975; LOC BC and VOR runway 23 approaches in use, landing and departing runway 23, advise on initial contact you have information Hotel."*

When the student is about 30 miles from CMI, you should transfer him/her to Hulman Approach. Sample:
"*Archer 4144K, contact Hulman Approach now on 125.45"*

Your student should report the altitude and ATIS information on initial contact to Hulman Approach.

You will need to choose what approach and how the student will navigate to the final approach course, via procedure turn or radar vectors. At some point, you will need to descend your student to a lower altitude for the approach and clear him for the approach. Samples:

"Archer 4144K, descend and maintain _____."

"Archer 4144K, fly heading _____."

"Archer 4144K, maintain 3000 until established, cleared for the _____ approach."

"Archer 4144K, maintain 3000 until the HUF VOR, cleared for the _____ approach via procedure turn."

The LOC BC Rwy 23 approach is unique because it requires simultaneous reception of the IHUF LOC and TTH VOR. The distance from the FAF to the MAP is only 2.3 nm.

There are also a number of GPS approaches, as well as ILS and VOR. Some have a published missed approach procedure that ends in a hold at the VOR.

At some point prior to the FAF, you'll need to tell your student to contact tower. Sample:

"Archer 4144K, contact Hulman tower now on 118.3"

After your student contacts tower, you can either issue a clearance to land or issue missed approach instructions. Samples:

"Archer 4144K cleared to land runway _____."

"Archer 4144K, missed approach instructions are to fly the published missed approach procedure."

"Archer 4144K, missed approach instructions are fly heading _____, climb and maintain 3000."

You will need to choose how to end the approach at HUF, either in a miss or a landing. Even if you do a missed approach, you may wish to re-position the student on the ground at HUF to go through the process of obtaining a clearance back to CMI. Or you can have the student obtain a clearance in the air, either before the approach or after. Sample clearance to CMI:

"Archer 4144K, you are cleared to Champaign as filed, climb and maintain 3000, expect 6000 ten minutes after departure, departure frequency will be 125.45, squawk 5254."

Upon departure from HUF, student will be directed to contact Hulman approach again.

At some point enroute, the student should obtain ATIS at Champaign. You may wish to change the wind depending on what approach you want your student to fly (see sample above).

When the student is about 30 miles from HUF, you should transfer them to Champaign Approach (see sample above). Your student should report the altitude and ATIS information on initial contact to Champaign Approach.

You will need to choose what approach and how the student will navigate to the final approach course, via procedure turn or radar vectors. At some point, you will need to descend your student to a lower altitude for the approach and clear the student for the approach (see sample above).

At some point prior to the FAF, you'll need to tell your student to contact tower. After your student contacts tower, you can either issue a clearance to land or issue missed approach instructions (see sample above). There may be time to perform more than one approach at HUF or CMI.

```
=== Standard Route Briefing  Depart:KCMI Arrive:KHUF
===  Route:DIRECT

===>ADVERSE CONDITIONS<===

   SYNOPSIS AND VFR CLOUDS/WEATHER FORECASTS
CHIC FA 200945
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 210400
CLDS/WX VALID UNTIL 202200...OTLK VALID 202200-210400
ND SD NE KS MN IA MO WI LM LS MI LH IL IN KY
.
SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HGTS DENOTED BY AGL OR CIG.
.
SYNOPSIS...CDFNT 10Z CNTRL WI-ERN IA-ERN MO FCST MOV EWD INTO LM-
NERN IL-XTRM SERN MO BY 04Z. CDFNT 10Z NWRN ND FCST MOV SEWD INTO
WRN LS-NWRN WI-SERN MN-WRN IA-SRN NE BY 04Z. ..SMITH..
.
IL
CIG BKN010 OVC025. SCT -SHRA/WDLY SCT TSRA. CB TOPS FL350.
OTLK...MVFR CIG PCPN/BR.
.
IN
AGL SCT-BKN025 SCT-BKN100. VIS 3-5SM BR. TOPS FL200. WDLY SCT
-SHRA/TSRA. CB TOPS FL400. OTLK...MVFR CIG PCPN/BR.
.

   AIRMETS
CHIS WA 201345
AIRMET SIERRA UPDT 3 FOR IFR VALID UNTIL 202000
.
AIRMET IFR...MN IA WI IL MI IN LS LM LH
FROM YQT TO SSM TO ASP TO FWA TO LOU TO PXV TO STL TO UIN TO MCW
TO DLH TO YQT
OCNL CIGS/VIS BLW OVC010/3SM IN CLDS..PCPN AND BR. CONDS CONTG
BYD 20Z THRU 02Z IN UPR GRTLKS RGN...ENDG ELSW 17Z-20Z.
.
....
CHIT WA 201345
AIRMET TANGO UPDT 3 FOR TURB VALID UNTIL 202000
.
...SEE SIGMET OSCAR SERIES FOR SEV UPR LVL TURB...
.
AIRMET TURB...WI IL MI IN LM LH
FROM MQT TO SSM TO YVV TO DXO TO FWA TO PXV TO FAM TO RHI TO MQT
OCNL MOD TURB BLW 150. CONDS CONTG BYD 20Z THRU 02Z OVR NERN PTNS
AREA...CONTG BYD 20Z BUT ENDG BY 02Z OVR SWRN PTNS.
.
ELSW...NO SGFNT TURB EXPCD OUTSIDE OF CNVTV ACT.
.
....
CHIZ WA 201345
AIRMET ZULU UPDT 2 FOR ICE AND FRZLVL VALID UNTIL 202000
.
FRZLVL...050-080...NW OF 80SW DIK-BIS-YWG LN
      ...080-120...NW OF RAP-GFK-70SE YWG LN
```

```
      ...120-140...SE OF RAP-GFK-70SE YWG LN

===>CURRENT CONDITIONS<===

   SURFACE WEATHER OBSERVATIONS
METAR KCMI 201353Z 22016G24KT 5SM -RA BR BKN008 BKN017 OVC024 21/20
     A2970 RMK AO2 SLP054 P0031 T02060200
METAR KTIP 201345Z AUTO 19015G24KT 7SM RA SCT006 BKN012 OVC016 21/20 A2968
RMK
     AO2 P0017
2I5 METAR NO CURRENT DATA
METAR KPRG 201345Z AUTO 19011G18KT 10SM -DZ SCT015 SCT043 BKN100 21/21 A2971
     RMK AO2 P0001
METAR KHUF 201353Z 17009KT 10SM -RA FEW008 BKN014 22/22 A2975 RMK
     AO2 SLP070 P0001 T02170217
METAR KLAF 201354Z 19008KT 8SM -RA FEW021 SCT080 BKN100 22/21 A2974
     RMK AO2 SLP066 P0009 T02170206

   PILOT REPORTS
CMI UA /OV CMI240020/TM 1239/FL060/TP BE36/TB LGT OCNL MDT/RM LGT
     OCNL HVY RAIN


===>FORECAST CONDITIONS<===

   TERMINAL FORECASTS
TAF KCMI 201138Z 201212 17012KT P6SM -RA OVC015 TEMPO 1216 2SM
     TSRA BR BKN008CB
     FM1600 19010KT P6SM OVC015 TEMPO 1620 4SM -SHRA BR
     BKN008
     FM2300 24010KT P6SM BKN020
     FM0400 26007KT P6SM SCT060
TAF KHUF 201131Z 201212 17012KT P6SM SCT007 BKN020 TEMPO 1215 3SM
     -TSRA BR BKN012CB
     FM1500 18012G20KT P6SM SCT006 OVC016 TEMPO 1522 3SM TSRA
     BR BKN006CB
     FM2200 21012KT P6SM SCT018 BKN040 TEMPO 2201 5SM -SHRA
     BKN018
     FM0100 23008KT P6SM SCT030 BKN070 TEMPO 0105 BKN030
     FM0500 26006KT P6SM SCT100
TAF KLAF 201140Z 201212 19012KT P6SM SCT018 BKN035 TEMPO 1215 4SM
     -TSRA BR BKN018CB
     FM1500 19012G19KT P6SM SCT015 BKN030 TEMPO 1524 3SM TSRA
     BKN015CB
     FM0000 24007KT P6SM SCT025 BKN050 PROB30 0003 5SM -SHRA
     BKN025
     FM0300 25007KT P6SM SCT035 BKN080 TEMPO 0307 BKN035
     FM0700 26006KT P6SM SCT100 AMD LTD TO CLD WIND AND VIS
     TIL 14Z

   WINDS ALOFT FORECASTS

DATA BASED ON 200000Z
VALID 201200Z   FOR USE 0900-1800Z. TEMPS NEG ABV 24000

FT  3000    6000    9000   12000   18000   24000  30000  34000  39000
SPI 2415 2223+13 2137+08 2143+02 2049-08 2059-18 197632 208942 710753
JOT 2322 2232+14 2336+09 2241+03 2040-08 2052-18 207532 219142 229953
```

IND 2136 2142+15 2141+10 2139+04 2138-07 2151-16 215631 225641 237052
EVV 2046 2148+15 2046+10 2042+05 2145-07 2156-17 215631 215641 236953

===>NOTICE TO AIRMEN (NOTAMS)<===

NOTAMS
CMI 08/016 CMI 4R/22L CLSD PERM
CMI 08/017 CMI 4L/22R NOW 4/22
CMI 08/022 CMI 18/36 CLSD
CMI 08/024 CMI 14L/32R CLSD PERM
CMI 08/025 CMI 14R/32L IS NOW 14/32 NON STD MARKINGS
CMI 09/008 CMI 14/32 CLSD WEF 0209112000
CMI 09/009 CMI 32L ILS LLZ OTS
STL 09/037 C16 TOWER 969 (234 AGL) 2.8 SW LGTS OTS TIL 0209220112
HUF 09/144 1I7 TOWER 1045 (315 AGL) 9.5 NE LGTS OTS TIL 0210011235
HUF 09/140 SIV TOWER 811 (266 AGL) 7.3 NE LGTS OTS TIL 0210010118
HUF 08/269 ZID WV.. MOGAS UNUSBL AVIATION
HUF 08/277 ZID OH.. MOGAS UNUSBL AVIATION
HUF 08/278 ZID KY.. MOGAS UNUSBL AVIATION
HUF 06/080 TTH TFR TTH335023 5NMR 5000 AGL/BLW SEE ZID NOTAM FDC
1/0661

FLIGHT DATA CENTER NOTAMS
FDC 2/8998 CMI FI/T UNIVERSITY OF ILLINOIS-WILLARD,
CHAMPAIGN-URBANA, IL.
ILS RWY 32L, AMDT 11A...
LOC BC RWY 14R, AMDT 7B...
VOR/DME OR GPS RWY 22R, AMDT 7B...
VOR OR GPS RWY 4L, AMDT 11...
VOR RWY 18, ORIG...
NDB OR GPS RWY 32L, AMDT 10B...
GPS RWY 18, ORIG-A...
GPS RWY 36, ORIG-A...
CHANGE ALL REFERENCE TO RWY 4L/22R TO RWY 4/22.
CHANGE ALL REFERENCE TO RWY 14R/32L TO RWY 14/32.
FDC 0/1468 ZAU WI.. FI/T AIRWAY ZAU.
FDC 1/0661 ZID IN.. FLIGHT RESTRICTIONS NEWPORT, IN.
EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE. PURSUANT TO TITLE
14 CFR SECTION 91.137A(1) TEMPORARY FLIGHT RESTRICTIONS ARE IN
EFFECT DUE TO NATIONAL SECURITY ARE NOT AUTHORIZED WITHIN A 5
NAUTICAL MILES RADIUS OF 395100N/0872518W OR THE TERRE HAUTE
/TTH/ VORTAC 335 DEGREE RADIAL AT 23 NAUTICAL MILES AT AND BE-
LOW 5000 FEET AGL TO PROVIDE FOR A SAFE ENVIRONMENT FOR DOD
OPERATIONS. TERRE HAUTE AFSS /HUF/ 812-877-7530 IS THE FAA
COORDINATION FACILITY.
FDC 1/3364 HUF FI/T TERRE HAUTE INTL-HULMAN FIELD, TERRE HAUTE, IN.
VOR/DME RNAV RWY 32, AMDT 8...
S-32 MDA 1140/HAT 551, ALL CATS, VIS CAT C 1 1/2,
CAT D 1 3/4.
CIRCLING MDA 1140/HAA 551, ALL CATS.
1.3 NM TO MAP WP STEPDOWN FIX, NA.

Flight Lesson 42

Only the 20-hour Frasca groups will fly the CMI-MTO-CMI cross country in the Frasca 141 flight training device.

Teach your student X-C flight planning procedures as though you would be flying in the airplane. ***A sample weather briefing is included at the end of this document. This weather should be used to provide the student with a weather briefing in order to make decisions about the best approach to fly and the weather to expect during that approach***. Also be sure to cover all the content items in the lesson.

The student should "file" a flight plan for each leg with the instructor who will act as ATC and any other necessary entity during the flight.

The student should follow the checklist for starting, run up, instrument taxi check, etc. Have the student obtain ATIS (you'll have to be the voice of ATIS). A sample follows:

"Champaign Willard Airport information Charlie, time _53 zulu, wind 010 at 9; visibility 10; sky condition broken 600, overcast 4000; temperature 17, dew point 16; altimeter 2970; ILS 32R approach in use, landing and departing runways 32R and 4, advise on initial contact you have information Charlie"

The student should obtain the clearance from clearance delivery or ground (your choice, it's a better learning experience to have him use clearance delivery). Here's a sample clearance ATC would give:

"Archer 4144K, you're cleared to Mattoon as filed, climb and maintain 3000, expect 5000 ten minutes after departure, departure frequency will be 132.85, squawk 2355."

The student should call ground when ready to taxi. A sample ATC transmission:

"Archer 4144K, taxi to runway 22"

The student should call tower when ready to take off. Sample:

"Archer 4144K, turn left heading 190, runway 22 cleared for takeoff"

When the student is about 500 feet AGL, send them to departure. Sample:

"Archer 4144K, contact departure."

When the student calls departure, he/she should report the altitude leaving and altitude cleared to, as well as assigned heading or course. Sample reply:

"Archer 4144K, radar contact, climb and maintain 5000, turn left heading 170, join V429 on course."

At some point enroute, the student should obtain ASOS at Mattoon. You may wish to change the wind depending on what approach you want your student to fly. Sample:

"Coles County Memorial Airport, Mattoon/Charleston, IL, automatic weather observation, _53 zulu, wind 360 at 6; visibility 5, mist; sky condition overcast 400; temperature 17, dew point 17; altimeter 2968.

You will need to choose what approach and how the student will navigate to the final approach course, via procedure turn or radar vectors. At some point, you will need to descend your student to a lower altitude for the approach and clear him for the approach. Samples:

"Archer 4144K, descend and maintain _____."

"Archer 4144K, fly heading _____."

"Archer 4144K, maintain 3000 until established, cleared for the _____ approach."

"Archer 4144K, maintain 3000 until the MTO VOR, cleared for the _____ approach via procedure turn."

Both the ILS and NDB 29 approaches have transitions to the procedure turn from ARCOL intersection. Both VOR approaches end in a missed approach procedure with a hold at the VOR. There are GPS overlay approaches to runways 6, 24, and 29.

At some point prior to the FAF, you'll need to tell your student to contact advisory frequency. You may wish to have your student fly a missed approach; or land, cancel IFR, then obtain a clearance void time for the return to

CMI. Sample: *"Archer 4144K, missed approach instructions are to fly the published missed approach procedure, report the missed approach on this frequency"*

"Archer 4144K, missed approach instructions are fly heading _____, climb and maintain 3000 report the missed approach on this frequency."

"Archer 4144K, change to advisory frequency approved. Report cancellation of IFR on this frequency or on the ground through flight service."

You will need to choose how to end the approach at MTO, either in a miss or a landing. Even if you do a missed approach, you may wish to re-position the student on the ground at MTO to go through the process of obtaining a clearance back to CMI. Or you can have the student obtain a clearance in the air, either before the approach or after. Sample clearance to CMI:

"Archer 4144K, you are cleared to Champaign as filed, climb and maintain 3000, expect 4000 ten minutes after departure, departure frequency will be 132.85, squawk 5254."

At some point enroute, the student should obtain ATIS at Champaign. You may wish to change the wind depending on what approach you want your student to fly (see sample above).

You will need to choose what approach and how the student will navigate to the final approach course, via procedure turn or radar vectors. At some point, you will need to descend your student to a lower altitude for the approach and clear the student for the approach (see sample above).

At some point prior to the FAF, you'll need to tell your student to contact tower. After your student contacts tower, you can either issue a clearance to land or issue missed approach instructions (see sample above). There may be time to perform more than one approach at MTO or CMI.

```
=== Standard Route Briefing  Depart:KCMI Arrive:KMTO
===  Route:DIRECT

===>ADVERSE CONDITIONS<===

   SYNOPSIS AND VFR CLOUDS/WEATHER FORECASTS
CHIC FA 270945
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 280400
CLDS/WX VALID UNTIL 272200...OTLK VALID 272200-280400
ND SD NE KS MN IA MO WI LM LS MI LH IL IN KY
.
SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HGTS DENOTED BY AGL OR CIG.
.
SYNOPSIS...CDFNT NRN LWR MI-CNTRL MO-CNTRL OK BY 18Z OVR SERN MI-
SWRN IN-CNTRL AR-NWRN TX AND BY 04Z E AND S OF FA. REMAINS OF
ISIDORE OVR WRN TN WL MOV NEWD OVR CNTRL OH BY 18Z.
.
IL
XTRM NRN/ERN...CIG BKN010-015 BKN025 LYRD FL250. OCNL VIS 3-5SM
BR. XTRM ERN PTNS WDLY SCT -SHRA. 15Z CIG BKN015-025. 18-20Z
BECMG AGL SCT040. OTLK...VFR.
RMNDR...CIG BKN-SCT020 TOP 080. OCNL VIS 3-5SM BR. 16Z CIG
BKN040. 20Z AGL SCT040. OTLK...VFR.
.
```

```
   SIGMETS
CHI WS NO CURRENT DATA

   CONVECTIVE SIGMETS
MKCC WST 271155
CONVECTIVE SIGMET...NONE

OUTLOOK VALID 271355-271755
TS ARE NOT EXPD TO REQUIRE WST ISSUANCES.

FISCHER

   AIRMETS
CHIS WA 271055 AMD
AIRMET SIERRA UPDT 3 FOR IFR AND MTN OBSCN VALID UNTIL 271400
.
AIRMET IFR...NE KS MN IA MO WI LS MI LM LH IL IN KY TN...UPDT
FROM 50NNW MQT TO SSM TO YVV TO DXO TO FWA TO CVG TO HNN TO HMV
TO GQO TO FAM TO BDF TO 30ESE IOW TO 20S MKC TO 40N GAG TO 40E
SNY TO 60NNW RWF TO 50NNW MQT
OCNL CIG BLW 010 VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 14Z ENDG
NE-KS-MN-IA-MO-WI-IL-UPR MI-LS-NRN LM-SWRN KY 15-17Z ELSW CONTG
THRU 20Z.
.
CHIT WA 270745
AIRMET TANGO UPDT 1 FOR TURB VALID UNTIL 271400
.
AIRMET TURB...MO IL IN KY AR TN MS AL
FROM DXO TO FWA TO CVG TO HNN TO HMV TO GQO TO 50SW ABY TO 40W
CEW TO 50SW SQS TO 40WNW ARG TO STL TO 40ESE JOT TO GIJ TO DXO
OCNL MOD TURB BLW 120. CONDS MOVG NEWD AND ENDG MO-AR-CNTRL MS BY
14Z ELSW CONTG BYD 14Z ENDG SWRN TN-RMNDR MS BY 20Z ELSW CONTG
THRU 20Z.
....
CHIZ WA 270745
AIRMET ZULU UPDT 2 FOR ICE AND FRZLVL VALID UNTIL 271400
.
AIRMET ICE...MI IL IN KY
FROM YVV TO DXO TO FWA TO CVG TO HNN TO HMV TO PXV TO DEC TO GIJ
TO MBS TO YVV
OCNL MOD RIME/MXD ICGICIP BTN 160 AND FL280. CONDS ENDG IL-KY BY
14Z ENDG IN-WRN MI BY 20Z ELSW CONTG THRU 20Z.
.
FRZLVL...050-080 N OF DIK-ABR-MSP-MQT LN
         SLPG 120 BFF-MCK-PWE-DBQ-BAE-ECK LN
         SLPG 140 FSM-STL-FWA LN
         140-165 SE OF THAT LN.
....

===>CURRENT CONDITIONS<===

   SURFACE WEATHER OBSERVATIONS
METAR KCMI 271153Z 01009KT 10SM BKN006 OVC040 17/16 A2970 RMK AO2
     SLP054 60000 T01670156 10172 20161 51011
METAR KTIP 271145Z AUTO 35010KT 2SM RA SCT003 BKN016 OVC026 16/15 A2970 RMK
AO2
METAR KTIP 271205Z AUTO 35008KT 1 1/2SM BR SCT003 BKN011 OVC031 15/15 A2971
RMK AO2
```

```
METAR KTIP 271225Z AUTO 36008KT 1 1/2SM BR BKN016 BKN022 OVC029 15/15 A2972
RMK AO2
2I5 METAR NO CURRENT DATA
METAR KMTO 271153Z AUTO 36006KT 5SM BR OVC004 17/17 A2968 RMK AO2
     SLP047 70003 T01670167 10172 20167 53013
SPECI KMTO 271234Z AUTO 35008KT 2 1/2SM -RA BR OVC004 17/17 A2969
     RMK AO2 RAB02E13B29 P0001
KDEC METAR NO CURRENT DATA
METAR KDEC 271254Z 36005KT 1 1/2SM BR FEW005 SCT016 15/14 A2973


   PILOT REPORTS
CMI UA /OV CMI/TM 1230/FL170/TP PAY3/SK OVC-TOP100/ SKC/TA M02/WV
     193032KT/TB SMOOTH
CMI UA /OV CMI320008/TM 1142/FL110/TP AEST/SK OVCUNKN-TOPS073

   RADAR REPORTS

ILX 1135 PPINE AUTO
VTI SD NO CURRENT DATA
IND 1135 AREA 7RW++ 33/120 172/122 154W MT 330 43/92  C3239
        AUTO
        ^HN32 IM2342 JM13333 KM133334 LM123443 ML1323444 NM222342 OL1222343
        PM122222
        QN2222 RN221

===>FORECAST CONDITIONS<===

   TERMINAL FORECASTS
TAF AMD KCMI 271205Z 271212 02009KT P6SM BKN006 TEMPO 1214 4SM BR BKN004
     FM1400 01010KT 5SM BR OVC005
     FM1800 36011KT P6SM BKN020
     FM2300 36007KT P6SM SCT035
     FM0400 03005KT 5SM BR SKC
     FM0800 05004KT 2SM BR SCT007
TAF KDEC 271130Z 271212 36004KT 2SM BR SKC TEMPO 1214 1SM BR BKN007
     FM1400 35009KT 5SM BR SCT015
     FM1600 36011KT P6SM BKN020 BECMG 1820 BKN040
     FM2300 02005KT P6SM SCT040
     FM0700 06004KT 4SM BR SCT060

   WINDS ALOFT FORECASTS

DATA BASED ON 270000Z
VALID 271200Z   FOR USE 0900-1800Z. TEMPS NEG ABV 24000

FT  3000    6000    9000   12000   18000   24000  30000  34000  39000
SPI 0724 0620+10 0419+07 0217+03 2215-08 2441-17 237231 237639 238150
JOT 0817 0908+11 0705+06 0506+00 2413-10 2246-19 236633 237940 228950
IND 0735 1125+11 1725+08 1928+04 2019-07 2332-14 246328 236938 237450
EVV 1830 2114+12 2117+10 2013+06 2427-01 2540-13 246028 236138 236450

===>NOTICE TO AIRMEN (NOTAMS)<===

   NOTAMS
CMI 08/016 CMI 4R/22L CLSD PERM
CMI 08/017 CMI 4L/22R NOW 4/22
CMI 08/024 CMI 14L/32R CLSD PERM
```

CMI 08/025 CMI 14R/32L IS NOW 14/32 NON STD MARKINGS
CMI 09/008 CMI 14/32 CLSD WEF 0209112000
CMI 09/009 CMI 32L ILS LLZ OTS
CMI 09/012 CMI TOWER 1172 (481 AGL) 6.4 ESE LGTS OTS TIL 0210080255
MTO 08/001 MTO 6/24 CLSD
DEC 09/009 DEC TOWER 2000 (1324 AGL) 7.2 NNE LGTS OTS TIL 0210021922

FLIGHT DATA CENTER NOTAMS
FDC 2/8998 CMI FI/T UNIVERSITY OF ILLINOIS-WILLARD,
CHAMPAIGN-URBANA, IL.
ILS RWY 32L, AMDT 11A...
LOC BC RWY 14R, AMDT 7B...
VOR/DME OR GPS RWY 22R, AMDT 7B...
VOR OR GPS RWY 4L, AMDT 11...
VOR RWY 18, ORIG...
NDB OR GPS RWY 32L, AMDT 10B...
GPS RWY 18, ORIG-A...
GPS RWY 36, ORIG-A...
CHANGE ALL REFERENCE TO RWY 4L/22R TO RWY 4/22.
CHANGE ALL REFERENCE TO RWY 14R/32L TO RWY 14/32.
FDC 1/0661 ZID IN.. FLIGHT RESTRICTIONS NEWPORT, IN.
EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE. PURSUANT TO TITLE 14 CFR SECTION 91.137A(1) TEMPORARY FLIGHT RESTRICTIONS ARE IN EFFECT DUE TO NATIONAL SECURITY ARE NOT AUTHORIZED WITHIN A 5 NAUTICAL MILES RADIUS OF 395100N/0872518W OR THE TERRE HAUTE /TTH/ VORTAC 335 DEGREE RADIAL AT 23 NAUTICAL MILES AT AND BELOW 5000 FEET AGL TO PROVIDE FOR A SAFE ENVIRONMENT FOR DOD OPERATIONS. TERRE HAUTE AFSS /HUF/ 812-877-7530 IS THE FAA COORDINATION FACILITY.
FDC 2/2183 ZID IN.. FLIGHT RESTRICTIONS CRANE, IN.
EFFECTIVE IMMEDIATELY UNTIL FUTHER NOTICE. PURSUANT TO 14 CFR SECTION 91.137A(2) TEMPORARY FLIGHT RESTRICTIONS ARE IN EFFECT WITHIN A 5 NAUTICAL MILE RADIUS OF 385021.4N/864831.1W AND THE HOOSIER /OOM/ VORTAC 209 DEGREE RADIAL AT 20.4 NAUTICAL MILES AT AND BELOW 5000 FT AGL TO PROVIDE A SAFE ENVIRONMENT FOR NATIONAL SECURITY. MR DAVID BROWN, DEPARTMENT OF NAVY, TELEPHONE 812-854-3581, IS IN CHARGE OF ON SCENE EMERGENCY RESPONSE ACTIVITIES. TERRE HAUTE /HUF/ AFSS, TELEPHONE 812-877-7530, IS THE FAA COORDINATION FACILITY.

APPENDIX 4

Guidelines for flying an IFR cross country flight in an FTD
AVI 140

Flight Lesson 53

Both the 15- and 20-hour Frasca groups will fly the CMI-C16-2K0-CMI cross country in the Frasca 141 flight training device.

Teach your student X-C flight planning procedures as though you would be flying in the airplane. ***A sample weather briefing is included at the end of this document. This weather should be used to provide the student with a weather briefing in order to make decisions about the best approach to fly and the weather to expect during that approach***. Also be sure to cover all the content items in the lesson.

The student should "file" a flight plan for each leg with the instructor who will act as ATC and any other necessary entity during the flight.

The student should follow the checklist for starting, run up, instrument taxi check, etc. Have the student obtain ATIS (you'll have to be the voice of ATIS). A sample follows:

"Champaign Willard Airport information Charlie, time _53 zulu, wind 360 at 11; visibility 5, mist; sky condition broken 900, overcast 2200; temperature minus 3, dew point minus 4; altimeter 3029; ILS Rwy 32R approach in use landing and departing runway 32R, advise on initial contact you have information Charlie"

The student should obtain the clearance from clearance delivery or ground (your choice, it's a better learning experience to have him use clearance delivery). Here's a sample clearance ATC would give:

"Archer 4144K, you're cleared to C16 as filed, climb and maintain 3000, departure frequency will be 121.35, squawk 2153."

The student should call ground when ready to taxi. A sample ATC transmission:

"Archer 4144K, taxi to runway 32R"

The student should call tower when ready to take off. Sample:

"Archer 4144K, turn left heading 190, runway 32R cleared for takeoff"

When the student is about 500 feet AGL, send them to departure. Sample:

"Archer 4144K, contact departure."

When the student calls departure, he/she should report the altitude leaving and altitude cleared to, as well as assigned heading or course. Sample reply:

"Archer 4144K, radar contact, climb and maintain 3000, fly heading 190, vectors for the (VOR or GPS)-A approach to Frasca."

You will need to choose what approach (VOR or GPS) and how the student will navigate to the final approach course, via procedure turn or radar vectors. At some point, you will need to descend your student to a lower altitude for the approach and clear him for the approach. Samples:

"Archer 4144K, descend and maintain _____."
"Archer 4144K, fly heading _____."
"Archer 4144K, maintain 3000 until established, cleared for the _____ approach."
"Archer 4144K, maintain 3000 until (fix), cleared for the _____ approach via procedure turn."

The C16 approaches require the Champaign altimeter setting (Decatur if Champaign is unavailable).

At some point prior to the FAF, you'll need to tell your student to contact advisory frequency. Sample:

"Archer 4144K, switch to advisory frequency approved, report the missed approach on this frequency."

You can issue alternate missed approach instructions or to fly the published missed approach. Samples:

"Archer 4144K, missed approach instructions are to fly the published missed approach procedure."

"Archer 4144K, missed approach instructions are fly heading _____, climb and maintain 3000."

You will need to choose how to end the approach at C16, either in a missed approach procedure or a landing. Even if you do a missed approach, you may wish to re-position the student on the ground at C16 to go through the process of obtaining a clearance on to 2K0. This can be done through obtaining a clearance void time via FSS or through CMI approach. Alternatively, you can have the student obtain a clearance in the air, either before the approach or after the missed approach. Sample clearance void time clearance:

"Archer 4144K, cleared to 2K0 as filed, climb and maintain 3000, departure frequency 121.35, squawk 4144, clearance void if not off by __, time now _____.

Your student will need to establish contact with Champaign approach again after departure from C16. Follow the procedures above for proceeding to 2K0, which has the VOR or GPS-A approach. You will again need to choose how to end the approach at 2K0, and then proceed to CMI for any of its approaches. You may wish to change the wind depending on what approach(es) you want your student to fly at CMI.

You will need to choose how the student will navigate to the final approach course, via procedure turn or radar vectors. At some point, you will need to clear the student for the approach (see sample above).

At some point prior to the FAF, you'll need to tell your student to contact tower. After your student contacts tower, you can either issue a clearance to land or issue missed approach instructions (see sample above). There may be time to perform more than one approach at CMI.

Flight Lesson 54

The 15-hour Frasca group will fly CMI-BMI, and the 20-hour Frasca groups will fly CMI-TIP-BMI-CMI cross country in the Frasca 141 flight training device.

Teach your student X-C flight planning procedures as though you would be flying in the airplane. ***A sample weather briefing is included at the end of this document. This weather should be used to provide the student with a weather briefing in order to make decisions about the best approach to fly and the weather to expect during that approach***. Also be sure to cover all the content items in the lesson.

The student should "file" a flight plan for each leg with the instructor who will act as ATC and any other necessary entity during the flight.

The student should follow the checklist for starting, run up, instrument taxi check, etc. Have the student obtain ATIS (you'll have to be the voice of ATIS). A sample follows:

"Champaign Willard Airport information Charlie, time _53 zulu, wind 360 at 11; visibility 5, mist; sky condition broken 900, overcast 2200; temperature minus 3, dew point minus 4; altimeter 3029; ILS Rwy 32R approach in use landing and departing runway 32R, advise on initial contact you have information Charlie"

The student should obtain the clearance from clearance delivery or ground (your choice, it's a better learning experience to have him use clearance delivery). Here's a sample clearance ATC would give:

"Archer 4144K, you're cleared to C16 as filed, climb and maintain 3000, departure frequency will be 121.35, squawk 2153."

The student should call ground when ready to taxi. A sample ATC transmission:

"Archer 4144K, taxi to runway 32R"

The student should call tower when ready to take off. Sample:
"Archer 4144K, turn left heading 190, runway 32R cleared for takeoff"

When the student is about 500 feet AGL, send them to departure. Sample:
"Archer 4144K, contact departure."

When the student calls departure, he/she should report the altitude leaving and altitude cleared to, as well as assigned heading or course. Sample reply:
"Archer 4144K, radar contact, climb and maintain 3000, fly heading 190, vectors for the (VOR or GPS)-A approach to Frasca."

You will need to choose what approach (VOR or GPS) and how the student will navigate to the final approach course, via procedure turn or radar vectors. At some point, you will need to descend your student to a lower altitude for the approach and clear him for the approach. Samples:
"Archer 4144K, descend and maintain _____."
"Archer 4144K, fly heading _____."
"Archer 4144K, maintain 3000 until established, cleared for the _____ approach."
"Archer 4144K, maintain 3000 until (fix), cleared for the _____ approach via procedure turn."

The C16 approaches require the Champaign altimeter setting (Decatur if Champaign is unavailable).

At some point prior to the FAF, you'll need to tell your student to contact advisory frequency. Sample:

"Archer 4144K, switch to advisory frequency approved, report the missed approach on this frequency."

You can issue alternate missed approach instructions or to fly the published missed approach. Samples:

"Archer 4144K, missed approach instructions are to fly the published missed approach procedure."

"Archer 4144K, missed approach instructions are fly heading _____, climb and maintain 3000."

You will need to choose how to end the approach at C16, either in a missed approach procedure or a landing. Even if you do a missed approach, you may wish to re-position the student on the ground at C16 to go through the process of obtaining a clearance on to 2K0. This can be done through obtaining a clearance void time via FSS or through CMI approach. Alternatively, you can have the student obtain a clearance in the air, either before the approach or after the missed approach. Sample clearance void time clearance:

"Archer 4144K, cleared to 2K0 as filed, climb and maintain 3000, departure frequency 121.35, squawk 4144, clearance void if not off by __, time now _____.

Your student will need to establish contact with Champaign approach again after departure from C16. Follow the procedures above for proceeding to 2K0, which has the VOR or GPS-A approach. You will again need to choose how to end the approach at 2K0, and then proceed to CMI for any of its approaches. You may wish to change the wind depending on what approach(es) you want your student to fly at CMI.

You will need to choose how the student will navigate to the final approach course, via procedure turn or radar vectors. At some point, you will need to clear the student for the approach (see sample above).

At some point prior to the FAF, you'll need to tell your student to contact tower. After your student contacts tower, you can either issue a clearance to land or issue missed approach instructions (see sample above). There may be time to perform more than one approach at CMI.

APPENDIX 5

INSTRUMENT PILOT II

AVIATION 140

FLIGHT TRAINING COURSE

OBJECTIVES: The student will continue to improve Private Pilot skills and develop the skills necessary for control and accurate maneuvering of an airplane solely by reference to instruments, full and partial panel. The student will also perform IFR flight including IFR departure, enroute, arrival, approach, holding, and emergency procedures in order to achieve the Instrument Rating. (***NOTE: GROUND TRAINER (G.T.) = FRASCA***)

Week	Lesson	Dual/PIC	Solo /PIC	S.I.	X-C /PIC	G.T.	Stage Check /PIC	Content
1	46	1.0	6.0		6.0			Review VFR Maneuvers, Solo X-C
2	47	***To Prof.***						Review Basic IFR
3	48	***To Prof.***				***.7 FRASCA***		Review ILS, VOR, DME Arcs
4	49	***To Prof.***				***. 5 FRASCA***		Introduce NDB
5	*50*	***To Prof.***				***.7 FRASCA***		Review NDB, Introduce LOC/BC
6	51	***To Prof.***						Introduce Partial Panel Basic Attitude
7	52	***To Prof.***				***.7 FRASCA***		Intro. Partial Panel Approaches & Holds
8	53	***2.0 apprx.*****		1.7	2.0			C16 – 2K0 X-C
9	54	***2.0 apprx.*****		1.7	2.0			TIP - BMI X-C
10	55	***2.0 apprx.*****		1.7	2.0			IKK- X-C
11	56	***4.0 apprx.*****		3.5	4.0			250 NM X-C, See Lesson 56 for Routes
12	57	***2.5 apprx.*****		2.1	2.5			LAF - CFJ ***NIGHT*** X-C
13	58****	***To Prof.***						Simulated Stage Check
14	59****	***To Prof.***						Review
15	60			1.2			1.5	Stage Check
Total:		*****To Prof.***	**6.0**		**18.5**	***2.5***	**1.5**	

NOTE: A.*Lesson 57 LAF-CFJ Cross Country flight is to be conducted at Night, to give each student a total of 2.5 hours of Night PIC Cross Country.

B. Total flight time in this course used to be 30.2 Hours - flight time is now to proficiency,

except "C" below. Total Ground Trainer time is ***now 2.5*** Hours **(*No more, no less).* (.7 = :40 min., or as close as possible to :40 min)**

***** C. Approximate flight times - Extra to Proficiency as Needed.***

****** Total Time, except X-C, VFR dual and VFR Solo PIC, is to proficiency***

***** NOTE*: -* CHECK FLIGHT WITH *A PROJECT CHECK PILOT* AS SOON AS PRACTICAL POST-LESSON 57 if review not needed – SEE PAGE 140-83**

APPENDIX 6

FAA Research Project: Frasca/Incremental Transfer Project

Standardization Meeting, January 23, 2003

Bryan Room (PPD Meeting Room), 6:00 p.m.

AGENDA

6:00 Introductory Remarks - Emanuel

6:20 Pizza Break

7:00 Pilot Training Role - Weinberg

7:10 Procedures/Standardization and Equipment Problems - Talleur

7:30 Syllabus/Hand Out TCO's, Student Assignments – Phillips, Talleur, Emanuel

7:45 Performance Assessment - Phillips

8:15 Wrap Up, Flight Hours, Proficiency Based Advancement