

NAVAL AIR TRAINING COMMAND



**NAS CORPUS CHRISTI, TEXAS
CIN Q-2A-0055**

CNATRINST 1542.146A

CHIEF OF NAVAL AIR TRAINING



NATIONAL AERONAUTICAL AND SPACE ADMINISTRATION (NASA) MISSION SPECIALIST BASIC AVIATION CURRICULUM

2009



DEPARTMENT OF THE NAVY

CHIEF OF NAVAL AIR TRAINING
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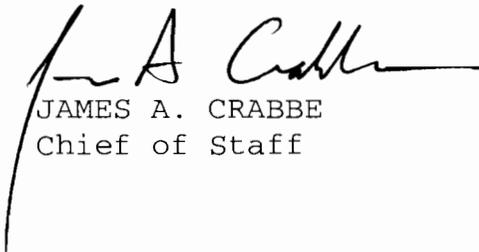
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N712

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CNATRA INSTRUCTION 1542.146A

Subj: NATIONAL AERONAUTICAL AND SPACE ADMINISTRATION (NASA)
MISSION SPECIALIST BASIC AVIATION CURRICULUM

1. Purpose. To issue the curriculum for training NASA military, civilian, and international astronaut candidates in an abbreviated Naval Flight Officer (NFO) aircraft familiarization and instrument navigation curriculum.
2. Cancellation. CNATRAINST 1542.146
3. Action. This instruction is effective on receipt. No changes will be made without written authorization by the Chief of Naval Air Training (CNATRA).
4. Forms. The Aviation Training Forms required by this directive are computer generated in the Training Integration Management System (TIMS) computer program. This system has been assigned a system form number of CNATRA 1542/2022. CNATRA point of contact is the current NFO Pipeline Training Officer, CNATRA (N712), DSN 861-3903. An update of these forms shall be accomplished no later than the issuance of this curriculum.


JAMES A. CRABBE
Chief of Staff

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COURSE DATA

1. Course Title. National Aeronautical and Space Administration (NASA) Mission Specialist Basic Aviation Curriculum.
2. Course ID Number (CIN). Q-2A-0055.
3. Location. NAS Pensacola.
4. Course Status. Active.
5. Course Mission. The mission of the NASA Mission Specialist Basic Aviation training is to provide NASA military, civilian, and international Astronaut Candidates (ASCANs) with the skills and knowledge required to safely aviate, navigate, and communicate in preparation for follow-on training and responsibilities as NASA flight crew. The course is intended for all Mission Specialists that have not had previous aviation training.
6. Prerequisite Training. Aviation Physiology and Aircrew Water Survival (pool), B-4N-0102, conducted at NAS Pensacola during initial preparation week preceding flight training. Land survival is not a prerequisite for this course. In addition, 31 computer-assisted instruction (CAI) lessons (listed as up to 41.5 hours on page II-2) are expected to be completed in support of Systems, Operating Procedures/NATOPS, and Instrument Navigation prior to commencing this curriculum. These CAI lessons may be accomplished before arrival in Pensacola or during the initial Physiology/Admin week, but no later than noted on the flow chart shown on page I-3.
7. Security Clearance Required. None.
8. Follow-on Training. As assigned by NASA.
9. Course Length. Overall time to train is calculated in accordance with CNATRAINST 1550.6E*. Training Days account directly or provide margin for factors including weather, personnel and equipment availability, briefing and preparation time, and historical delays. Calendar Weeks further account for weekends, holidays, safety standdowns, and other expected nonworking days throughout the year.

*With the following modifications: a) Two simulator events allowed per day, and b) Calendar Weeks only include weekends and one holiday due to short duration and summer schedule.

<u>Course Name</u>	<u>Training Days</u>	<u>Calendar Weeks</u>
NASA Mission Specialist Basic Aviation	26.7	5.09

10. Class Capacity. As required.

11. Instructor/Requirements. As established by Chief of Naval Operations (CNO) planning factors.

12. Course Curriculum Model Manager. Commander, Training Air Wing SIX (COMTRAWING SIX).

13. Quota Management Authority. Chief of Naval Air Training.

14. Quota Control. Chief of Naval Operations.

15. Course Training Subjects

a. Ground Training. Ground training is listed in Chapter II and includes 64.0 hours of administrative and academic training.

GROUND TRAINING		
Category	Symbol	Hours
Administration/Check-in/Checkout	G0101-4	3.0
Ejection/Egress Trainer	G0201-2	3.0
Crew Resource Management	G0301	3.0
VFR Communication Procedures	G0401-3	3.5
Meteorology	G0501-2	5.0
T-6A Aircraft Systems	G0601-3	5.5
Operating Procedures/NATOPS	G0701-5	10.0
EP Test	G0706	0.5
Instrument Ground Training	G0801-16	24.5
Flight Planning/Procedures	G0901-6	6.0
Total		64.0

b. Flight Support

FLIGHT SUPPORT		
Category	Symbol	Hours
Contact Ground Procedures	C0101	2.0
Contact Indoctrination	C0201	3.0
Instrument Preparation	I0101	5.5
Total		10.5

c. Flight Training. Below are the programmed times for each phase, stage, and media:

Flight/Events	CPT		T-6 Dual	
	Flts	Hrs	Flts	Hrs
Contact	3	4.5	4	6.0
Instruments	4	6.0	8	16.0
Totals	7	10.5	12	22.0

16. Training Preparation Time. In addition to the hours planned for classes, simulators, and flights, significant additional time to prepare and study should be expected outside of scheduled training hours. This range will vary depending on the complexity of the material and individual student needs, and may be several hours per event. For simulator and flight events, specific brief and taxi times will be accounted for on the flight schedule. The times shown are estimates only to help in planning and scheduling, and are not used directly in the CNATRAINST 1550.6E time-to-train calculations. They are used by CNATRA N3 division (Operations, Plans, and Requirements) to facilitate instructor resource planning.

ADDITIONAL FORMAL TRAINING TIME PER EVENT			
Training Area	Brief/Preflight/Taxi	Taxi/Debrief	Total
Simulator/CPT	0.5	0.5	1.0
Flight	2.0	1.0	3.0

17. Physical Requirements. As specified in the Manual of Medical Department, Chapter 15, and all applicable anthropometric standards.
18. Obligated Service. Refer to MILPERSMAN for Naval personnel or to Air Force Instruction (AFI) 36-2107 for USAF personnel.
19. Primary Instructional Methods. Lecture, CAI, self- and group-paced study, 2B47, simulator, and in-flight instruction.
20. Preceding Curriculum Data. This curriculum replaces CNATRAINST 1542.146.
21. Student Performance Measurement/Application of Standards. The standards outlined in Chapter VIII, Course Training Standards, are used to evaluate student performance of individual items and maneuvers. Final judgment regarding the satisfactory performance of any flight maneuver rests with the flight instructor who must assess the environmental and systems factors affecting the conditions under which the performance is measured and the student's experience within the stage.

ABBREVIATIONS

The following is a list of abbreviations used in the curriculum:

AGL	-	Above Ground Level
AP-1	-	Area Planning 1
ASCAN	-	Astronaut Candidate
ASR	-	Airport Surveillance Radar
ATC	-	Air Traffic Controller
ATF	-	Aviation Training Form
ATIS	-	Automatic Terminal Information Service
ATJ	-	Aviation Training Jacket
ATS	-	Aviation Training Summary or Approach Turn Stall
AWOS	-	Automated Weather Observation System
BAC	-	Basic Aircraft Control
CAI	-	Computer-Assisted Instruction
CFS	-	Canopy Fracturing System
CNATRA	-	Chief of Naval Air Training
CNO	-	Chief of Naval Operations
CO	-	Commanding Officer
COMTRAWING	-	Commander, Training Air Wing
CPT	-	Cockpit Procedures Trainer
CRM	-	Crew Resource Management
CTAF	-	Common Traffic Advisory Frequency
CTS	-	Course Training Standard
DH	-	Decision Height
DME	-	Distance Measuring Equipment

ELP - Emergency Landing Pattern
EOB - End of Block
EP - Emergency Procedure
ET - Extra Training
ETA - Estimated Time of Arrival
ETE - Estimated Time Enroute
FAA - Federal Aviation Administration
FAF - Final Approach Fix
FLIP - Flight Information Publication
FP - Flight Procedures
FSS - Flight Service Station
FTI - Flight Training Instruction
GCA - Ground-Controlled Approach
GPS - Global Positioning System
H/X - Hours per X
IAF - Initial Approach Fix
IAW - In Accordance With
ICS - Intercom System
IFR - Instrument Flight Rules
ILS - Instrument Landing System
INAV - Instrument Navigation
IP - Instructor Pilot or Intercept Procedures
JPATS - Joint Primary Aircraft Training System
KIAS - Knots Indicated Airspeed
LSC - Level Speed Change

MAF	-	Maintenance Action Form
MDA	-	Minimum Descent Altitude
METARS	-	Meteorological Aviation Report or Aviation Routine Weather Report
MIF	-	Maneuver Item File
MIL	-	Mediated Interactive Lecture
MNTS	-	Multi-service Navigator Training System
NAS	-	Naval Air Station
NASA	-	National Aeronautical and Space Administration
NATOPS	-	Naval Air Training Operating Procedures and Standards
NFO	-	Naval Flight Officer
NG	-	No Grade
NM	-	Nautical Mile(s)
NOTAMs	-	Notices to Airmen
OBOGS	-	On-Board Oxygen Generating System
PAR	-	Precision Approach Radar
PAT	-	Power, Attitude, Trim
PCL	-	Pocket Checklist
PEL	-	Precautionary Emergency Landing
PMSV	-	Pilot-to-Metro Service
PMU	-	Power Management Unit
POS	-	Power Off Stall
PPEL	-	Practice PEL
RA	-	Radar Approach
RIOT	-	Radio Instrument Orientation Trainer

SOP	-	Standard Operating Procedures
SSR	-	Special Syllabus Requirement
SYS	-	Systems
TAD	-	Trim Aid Device
TAF	-	Terminal Airdrome Forecast
TIMS	-	Training Integration Management System
UHF	-	Ultra High Frequency
USAF	-	United States Air Force
VFR	-	Visual Flight Rules
VHF	-	Very High Frequency
VMC	-	Visual Meteorological Conditions
VOR	-	VHF Omnidirectional Range
WINFLIR	-	Windows Flight Information Record
WX	-	Weather

GLOSSARY

1. Advancing X. Completed event within the normal syllabus flow. Excludes events with last characters in the range 84-89.
2. Aviation Training Form. A grade sheet documenting student performance for all categories of training regardless of media, phase, or stage.
3. Aviation Training Jacket. The ATJ is the student's training record. It contains ATFs, calendar card, grade reports, and all other associated training information. It is filed in student control and follows the student through all phases of training.
4. Aviation Training Summary. A tabular sheet listing the MIF and maneuver grades within a training stage.
5. Block of Training. A sequential series of lessons within a training stage sharing an identical MIF. The third character in the lesson designator identifies a block.
6. Contact. The stage of training that combines flight familiarization and precision aerobatic maneuvers.
7. Course of Training. The entire program of preflight, flight, simulation, academics, and officer development conducted in all media during the programmed training days.
8. Course Training Standard. A description of required behaviors and standards of performance for a specific maneuver. These standards are in Chapter VIII.
9. Courseware. The technical data, flight training instructions, audio, video, film, CAI, instructor guides, student study guides, and other training materials developed to support and implement the syllabus of instruction.
10. Critical Item. Any maneuver coded with a plus sign (+). This symbol indicates the maneuver is required and must be accomplished to the specified standard in that block of training.
11. Emergency Procedure. Any degradation of aircraft systems or flight conditions requiring aircrew action or intervention.

12. Flight Training Instruction. A CNATRA-approved manual describing flight procedures and techniques for each training stage.

13. Hours per X. The average length for each event in a block, rounded to the nearest tenth of an hour.

14. Lesson Designator. All syllabus events have a five-character lesson designator in the following format:

Char	Meaning	Remarks
1 st	Stage	G—Ground C—Contact I—Instrument
2 nd	Media	0—Class 2—Simulator 4—Aircraft 1—CAI 3—N/A
3 rd	Block	Sequential, indicating block within stage.
4 th & 5 th	Event/Check Identifier	Sequential, indicating event within block.

The lesson designators and sequential numbering system are specific and logically ordered for each syllabus. Another syllabus may use a different lesson designator for the exact same event, such as a crew coordination class.

15. Maneuver Item File. A listing of required maneuvers and associated proficiency levels for each block of training.

16. Master Syllabus. Chapters I-VII list all training syllabus activities, prerequisites, and training flow for MNTS.

17. Special Syllabus Requirement. A one-time, ungraded demonstration item.

18. Stage of Training. All training of a particular type (Ground, Contact, Instrument) within a phase. The first letter in the lesson designator identifies the stage of each lesson (Example: C4001 is in the Contact stage). Note that the "Ground" stage does not necessarily include all of the academic and other non-flight lessons, it is usually the traditional name for the initial preparation stage prior to flying.

19. Standard Operating Procedures. A training wing or squadron directive describing standard operating procedures for local aircraft.

20. Training Media. MNTS media include aircraft, operational flight trainers (OFTs), cockpit procedures trainers (CPTs), classroom training, and CAI. The second character in the lesson designator identifies the general category of training media (Example: I4001 is a T-6 flight). Note that academic and other events on the "ground" can occur during any Stage and will be reflected in this Training Media character.

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Chapter I

General Instructions

1. Syllabus Management

- a. Distribution. Participating squadron personnel.
- b. Interpretation. The syllabus is directive. Should circumstances create situations not covered within the scope of this syllabus, or specific course of action appears to conflict with other directives, consult CNATRA (N71).
- c. Deviations. Document all deviations on the event's ATF.
- d. Changes. Recommended changes shall be submitted in accordance with CNATRAINST 1550.6E.
- e. Execution. All students will execute all the ground training, flight, and simulator events.
- f. Syllabus Description. The Mission Specialist training consists of three stages: Ground, Contact, and Instrument. Each stage is subdivided into training blocks. The training blocks consist of a specified number of classes, flights, and simulator events. Maneuver item files (MIF) identify the acceptable level of performance that should be achieved at the completion of each applicable training block. The MIF grading standards have not been modified from the original version used for full-time military students.

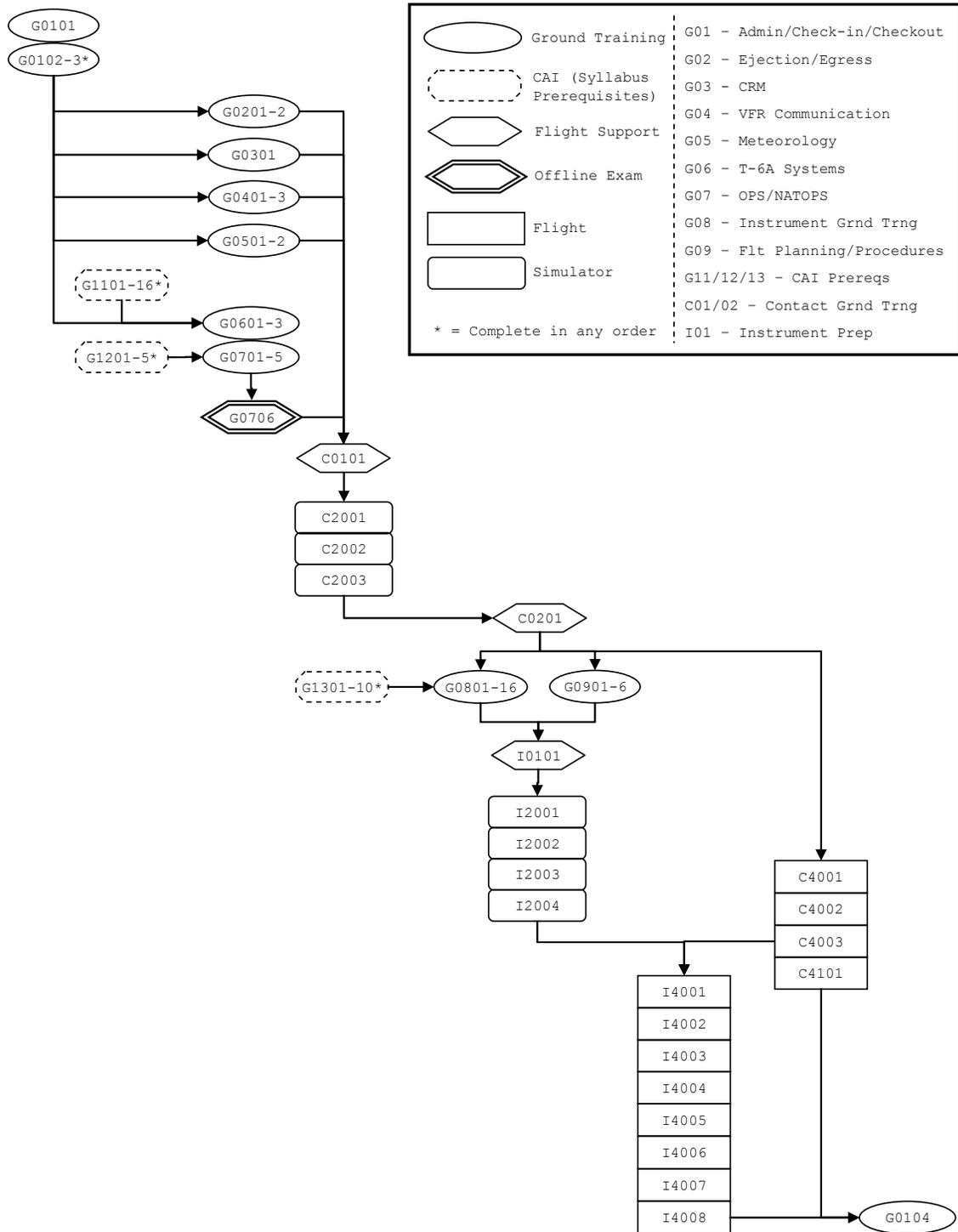
2. Training Management

- a. Syllabus Progression. Fly syllabus events within each stage sequentially. Do not start a block without all prerequisites completed. The course flowchart on page I-3 delineates the sequence of flying events and their ground training prerequisites. System training management is designed to facilitate up to two graded events (flight, simulator, or exam) per student per day.
- b. Maneuver Continuity. Students must accomplish previously graded maneuvers frequently enough to ensure they maintain required proficiency.

c. H/X. Instructor pilots shall plan and execute missions to meet H/X as closely as practical. If actual event length varies from H/X by more than 0.3 hours, annotate reason(s) in ATF's general comments section. A student's deficiency is not an acceptable reason to exceed H/X by more than 0.3 hours.

d. Special Syllabus Requirements. SSRs may be allocated to flights. Unless noted otherwise, IPs may accomplish SSRs on any flight within the block. The SSRs shall be completed in the specified block. Annotate completed SSRs in the ATF's SSR Comments section. Assign NG/1 as the SSR maneuver grade.

MISSION SPECIALIST BASIC AVIATION COURSE FLOW



3. Unsatisfactory Performance. This curriculum is primarily intended as demo/exposure; however, grading is essential in some areas to ensure safety of flight and for feedback purposes. No remediation or reflys are planned. In the unlikely event that performance is unsatisfactory, Training Wing 6 should contact the NASA liaison officer for further direction.

4. Ground Training and Briefing Requirements

a. Mission Preparation, Briefings, and Debriefings

(1) EOB Events. The IP shall carefully review the ATS in planning the EOB event to ensure the profile includes opportunities to reach MIF on all critical and optional items attempted in the block. Since dedicated check rides are not provided in this syllabus, the last event in a particular block will be used.

(2) Preparation. Students shall arrive for each flight with:

(a) Thorough knowledge of:

1. The discuss items, as listed in Chapters III-IV.

2. Procedural knowledge of the critical items for the event's training block.

(b) A flight profile tailored to training requirements, weak areas, and continuity.

(c) The latest ATS for the stage.

(d) A weather brief for the area/route of flight.

(e) A DD 175 and jet card for the route(s) of flight (where applicable).

(f) List of applicable NOTAMs for departure, arrival, and alternate airfield.

(3) Briefing. Thoroughly cover the mission's:

(a) Specific objectives.

(b) Techniques and required procedures for accomplishing those objectives.

(c) Planned profile and contingencies.

(4) Debriefing

(a) After each event, the IP shall critique the student's performance using cause/effect analysis, particularly with respect to the CTSS.

(b) The mission's complexity and student's progress will govern the time required for the debrief.

(c) The instructor shall provide the student with a new ATS and may provide a copy of the event's ATF.

b. Emergency Procedures Briefing and Training

(1) EP training builds the student's confidence in the aircraft. The IP shall conduct emergency procedures training on all aircraft events, either on the ground or in the aircraft. Correct procedural deficiencies through additional instruction and study assignments.

(2) Incorporate EP training into trainer events when practical; however, instructional block objectives take precedence.

(3) Grade the student's overall EP knowledge and performance under EPs.

5. Mission Grading Procedures and Evaluation Policies

a. General Grading and Evaluation Policy. Maneuver item files listed in this document are desired minimum stage/phase completion standards per maneuver. Since these MIF's are the same used for full-time students, lower grades may be encountered in this reduced course. This will not preclude progression unless evaluated on a case-by-case basis by the NASA liaison. The intent of using the original standards is not to

present unattainable goals, but to allow both students and instructors to use consistent grading criteria that correctly show where to focus on improvement for the next event and follow-on training at NASA. There will be no EOB "check rides" in this syllabus.

b. Grading Procedures (Aircraft and Training Devices)

(1) Absolute Maneuver Grading. Use the following grading scale to document the student's characteristic performance on maneuvers attempted during each event. This is an absolute grading scale. Judge the student's proficiency **only** against the item's CTS. Maneuver grades shall be consistent with ATF comments.

(a) Demonstrated (NG/1 Level). Enter "NG":

1. When the IP demonstrates the maneuver and the student does not subsequently perform it during the event.

2. To indicate accomplishing SSRs. Specify completed SSRs in the ATF's SSR comments section.

(b) Unable (U/2 Level). Performance is unsafe or lacks sufficient knowledge, skill, or ability. Deviations greatly exceed CTS, significantly disrupting performance. Corrections significantly lag deviations or aggravate the deviation.

(c) Fair (F/3 Level). Performance is safe, but with limited proficiency. Deviations exceed CTS, detracting from performance. Corrections noticeably lag deviations and may not be appropriate. EXAMPLE: using bank angle to compensate for poor rudder trim would be an inappropriate correction for heading deviations.

(d) Good (G/4 Level). Characteristic performance is within CTS. Deviations outside CTS are allowed, provided they are brief, minor, and do not affect safety of flight. Corrections must be appropriate and timely.

(e) Excellent (E/5 Level). Greatly surpasses CTS. Performance is correct, efficient, and skillful. Deviations are very minor. Corrections, if required, are initiated by the student and are appropriate, smooth, and rapid.

(2) Overall Event Grades. Overall event grades represent the student's progression through MNTS. Grade events "Pass," "Marginal," or "Unsatisfactory." Use the following definitions to characterize event grades. See **Awarding Overall Event Grades** below for specific rules defining unsatisfactory performance.

(a) Pass

1. Prior to EOB. Progress is adequate to meet standards by EOB.

2. EOB. The student's performance meets or exceeds standards.

(b) Marginal. Ability to meet the standards by the EOB is questionable. IPs may not award a Marginal on an EOB event.

(c) Unsatisfactory. Student exhibits dangerous tendencies or progress toward meeting EOB standards is insufficient. Awarding an overall event grade of Unsatisfactory is at the IP's discretion.

(3) Awarding Overall Event Grades. The student's overall grade is based on the student's performance against the MIF. The following rules govern overall event grading:

(a) EOB. Performance must meet MIF by EOB. If the student has previously met MIF in the block, he must still meet MIF in the EOB flight if the maneuver is reattempted.

(b) Prior to EOB. Performance must meet or exceed previous block MIF.

(c) Students shall maintain or exceed MIF performance from one block to the next within stage or between media within stage. The exception is when MIF on a subsequent block is below the preceding block MIF. In these cases, the lower MIF applies.

(4) Maneuver Requirements. For each block:

(a) Mandatory Items. Items with a number and a plus (+) are mandatory and the student must meet the required proficiency by EOB. When a maneuver is performed multiple times in a block of training, the last grade assigned for the maneuver will determine if the student meets EOB MIF.

(b) Optional Items. Items with a number, but without a plus (+), are optional. However, if flown, the student must meet the required proficiency by EOB.

(c) Not Demonstrated/Not Performed. The IP will not demonstrate, nor will the student perform:

1. Unnumbered items.
2. Items not in the block.
3. Exceptions:
 - a. Weather-driven instrument approaches.
 - b. Prebriefed maneuvers for IP proficiency.

(5) Incomplete Events. In general, IPs should consider an event complete if the student is able to accomplish either all high or all low work. This is particularly true when weather precludes one or the other, and the IP is able to emphasize training where weather permits. Subsequent events in the block, when available, can reverse this emphasis, hence achieving overall training balance. If a student has had ample opportunity to learn a task and subsequently flies a short mission, do not incomplete the mission solely to provide unwarranted extra training.

(a) Assessment. Assess the event complete if:

1. Seventy-five percent of the event's H/X was used for training, and

2. Sufficient events remain in the block to redress the imbalance, and

3. Individual maneuvers can still be accomplished within the block.

4. Otherwise, assess the event incomplete.

(b) Completion Events. An event may both complete a previous event and count as an advancing X.

(c) Simulator Event Completion. Assess a simulator event complete if the student has received a full 1.5-hour training period.

6. Special Instructions and Restrictions

a. Flight Hour/Event Requirements and Restrictions

(1) Programmed Hours and Events. Syllabus-programmed flight hours are 22.0. Accomplish all syllabus events.

(2) Minimum Night Hours. 2.0, incorporated into any existing instrument flight(s).

(3) Minimum Solo Hours. N/A.

(4) Minimum Instrument Hours (Actual or Simulated).
N/A.

(5) Maximum Daily Student Activities (Aircraft or Simulator). Students shall not exceed two activities during one duty day.

(6) Minimum Student Turn-Times. The student must have at least one hour between debriefing one event and briefing a follow-on event or simulator event. This does not apply to out-and-in or cross-country profiles. However, the IP shall ensure adequate debrief and brief time is allocated.

(7) Crew Day. The period from the beginning of the student's first event or official duty of the day until completion of the last event of the day, including associated paperwork and debrief. Crew day shall not exceed 12 hours.

(8) Crew Rest. A minimum of twelve hours shall elapse between the conclusion of the student's last scheduled event of the day (including associated debrief) and his first scheduled instructional event of the following day.

b. Maneuver Demonstrations. The student shall not perform a maneuver for the first time until the IP demonstrates the maneuver, unless previous training adequately fulfills this role. This does not apply to simulator events.

c. Aircraft/Simulator Interchangeability. Simulator events may not be substituted for the flight events. Simulator events may be substituted by a flight in the applicable aircraft when the simulator is unavailable for extended periods of time.

Chapter II

Ground Training

1. Philosophy. Ground training will focus on the basic information and skills necessary to enhance flight safety and efficiency. General topics common to the aviation community should be stressed over T-6 specifics whenever appropriate. For example, a detailed knowledge of all T-6 systems is not needed, but some exposure helps to fully understand and execute the emergency procedures, a critical skill that can be applied to any follow-on aircraft. While streamlined to the essentials, both students and instructors should be aware that this course still presents a large amount of information to learn in a very short period of time compared to the standard NFO syllabus.

Block	Media	Title	Events	Hrs	Category
G11-13	CAI	Prerequisite Training	31	41.5	See Below

1. Events

G1101	CAI	Flight Controls		1.0	SYS
G1102	CAI	Hydraulic Systems, Part 1		1.5	SYS
G1103	CAI	Hydraulic Systems, Part 2		2.0	SYS
G1104	CAI	Flight Instruments, Part 1		2.0	SYS
G1105	CAI	Flight Instruments, Part 2		1.5	SYS
G1106	CAI	Communication Systems		2.0	SYS
G1107	CAI	Navigation Systems		2.0	SYS
G1108	CAI	Global Positioning System		0.5	SYS
G1109	CAI	Electrical System		1.5	SYS
G1110	CAI	Fuel System		1.0	SYS
G1111	CAI	Propulsion 1		2.0	SYS
G1112	CAI	Propulsion 2		1.5	SYS
G1113	CAI	Environmental System 1		1.0	SYS
G1114	CAI	Environmental System 2		0.5	SYS
G1115	CAI	Canopy System		1.0	SYS
G1116	CAI	Ejection System		1.0	SYS
G1201	CAI	Exterior Inspection		1.0	OPPROC
G1202	CAI	Postflight Checks		0.5	OPPROC
G1203	CAI	Preflight Checks		1.5	OPPROC
G1204	CAI	In-flight Checks		1.0	OPPROC
G1205	CAI	Aircraft Operating Limitations		2.0	OPPROC

1. Events (cont)

G1301	CAI	Instrument Displays and Cross-check	1.0	INST
G1302	CAI	Introduction to Radio Instruments	1.5	INST
G1303	CAI	FLIP, NOTAMs, and Charts	2.0	INST
G1304	CAI	Instrument Takeoff and Departures	1.0	INST
G1305	CAI	Arrival Preparation and Holding	1.0	INST
G1306	CAI	Descent and Penetration	1.0	INST
G1307	CAI	Low Altitude Approaches	1.0	INST
G1308	CAI	Final Approach	1.5	INST
G1309	CAI	Radar Approaches	1.5	INST
G1310	CAI	Transition to Landing and Missed Approach	2.0	INST

2. Syllabus Notes. Events may be done in any order, but will not be tracked, launched, or graded within TIMS. The G11/12/13 blocks are prerequisites for this curriculum, and will be needed no later than G06/7/8 respectively.

3. Discuss Items. None.

Block	Media	Title	Events	Hrs	Category
G01	Class	Administration/ Check-in/Checkout	4	3.0	ADMIN

1. Events

G0101	MIL	Academic Welcome Aboard		0.5	
G0102	None	Paraloft/Equipment Fitting		2.0	
G0103	None	Medical Records Check-in		0.5	
G0104	None	Checkout		0.0	

2. Syllabus Notes

a. G0101 is the first event followed by G0102-3, which may be done in any order.

b. Complete I4008 and C4101 prior to G0104.

3. Discuss Items. None.

Block	Media	Title	Events	Hrs	Category
G02-05	Class	Preflight Ground Training	8	14.5	See below

1. Events

G0201	Lect	T-6A Ejection/Egress Brief		1.0	EGRESS
G0202	Lect	T-6A Ejection/Egress Trainer		2.0	EGRESS
G0301	MIL	Crew Resource Management		3.0	CRM
G0401	MIL	Contact Comm 1		1.0	VFRCOMM
G0402	None	Comm Tower Visit		1.5	VFRCOMM
G0403	MIL	Contact Comm 2		1.0	VFRCOMM
G0501	JPATS MIL	METARs and TAFs		2.5	METRO
G0502	JPATS MIL	Charts/WX Advisories		2.5	METRO

2. Syllabus Notes

- a. Complete G0102-3 prior to G02-5.
- b. G0201-2 (in order) includes classroom instruction and procedure trainer.
- c. Complete G0401-3 in order.
- d. Complete G0501-2 in order.

3. Discuss Items. None.

Block	Media	Title	Events	Hrs	Category
G06	Class/ UTD	T-6A Aircraft Systems	3	5.5	SYS

1. Events

G0601	None	T-6A Aircraft Tour		2.0	
G0602	UTD	Cockpit Familiarization 1		2.0	
G0603	UTD	Cockpit Familiarization 2		1.5	

2. Syllabus Notes

- a. Complete G0102-3 prior to G06.
- b. Complete events G0601-3 in order.

3. Discuss Items. None.

Block	Media	Title	Events	Hrs	Category
G07	Class	Operating Procedures/NATOPS	6	10.5	OPPROC

1. Events

G0701	JPATS MIL	Handling Emergency Procedures		1.0	
G0702	JPATS MIL	Takeoff Emergencies		1.5	
G0703	JPATS MIL	In-flight Emergencies, Part 1		2.5	
G0704	JPATS MIL	In-flight Emergencies, Part 2		3.0	
G0705	JPATS MIL	In-flight Emergencies 3		2.0	
G0706	P/P	EP Test		0.5	

2. Syllabus Notes

- a. Complete G06 prior to G07.
- b. Complete G0701-6 in order.
- c. G0706 requires a passing score of 100%.

3. Discuss Items. None.

Block	Media	Title	Events	Hrs	Category
G08	Class/ RIOT/ 2B47	Instrument Ground Training	16	24.5	INST

1. Events

G0801	JPATS MIL	Basic Instrument Review		2.0	
G0802	MIL	Intro to 2B47/TP-1 Brief		0.5	
G0803	RIOT	RIOT 1 (Direct, RT, Course Intercept)		2.0	
G0804	Lect	CR-2, Wind Analysis, and Time Gates		1.5	
G0805	2B47	TP-1 Fly (Direct, RT, Course Intercept)		2.0	
G0806	Lect	TP-1 Debrief/FLIP Homework		0.5	
G0807	JPATS MIL	Advanced Instruments Overview		1.0	
G0808	JPATS MIL	Instruments Review 1		2.0	
G0809	2B47	TP-2 FLY (Direct, PTP, Course Intercept, Arc)		1.5	
G0810	Lect	TP-2 Grading/Debrief and AIM Chapter 5 (Holding)		0.5	
G0811	JPATS MIL	Instruments Review 2		2.0	
G0812	JPATS MIL	Instruments Review 3		2.0	
G0813	MIL	Homework-INAV Supplement and Comms		2.0	

1. Events (cont)

G0814	JPATS MIL	Instruments Review 4	2.0
G0815	Lect	Comm Brief and Radar Pattern	1.5
G0816	Lect	INAV Supplement Review	1.5

2. Syllabus Notes

- a. Complete C0201 prior to this block.
- b. Complete events in block in order.

3. Discuss Items. None.

Block	Media	Title	Events	Hrs	Category
G09	Class	Flight Planning/Procedures	6	6.0	FLTPLAN

1. Events

G0901	MIL	Flight Planning Introduction and Overview		0.5	
G0902	MIL	Weather Requirements		1.0	
G0903	MIL	DD 175		0.5	
G0904	MIL	Jet Logs		1.0	
G0905	MIL	INAV Turnpoint Procedures		1.0	
G0906	JPATS MIL	IFR Navigation		2.0	

2. Syllabus Notes

- a. Complete C0201 prior to block.
- b. Complete events in block in order.

3. Discuss Items. None.

Chapter III

Contact Training

1. General. Initial instruction should focus on determining the instructional approach best suited for each student's problem areas so that mission profiles can be flown to correct deficient areas. Although the MIF does not require consistent student proficiency on the more complicated maneuvers until the instructional unit prior to EOB, students should show continued improvement as they progress in training. Regardless of the EOB MIF requirements, overall mission grades should reflect the student's progress toward meeting training requirements.
2. Pattern Training. Utilize the overhead/break traffic pattern as much as possible for pattern training.
3. Navigation. When possible, home and auxiliary field departures and recoveries should be visual with the assistance of the local area map. Weather may require the instructor to use navigational aids in place of visual navigation.
4. Seating. Students shall occupy the front seat for all events in the stage, except the Night Contact event. Students shall occupy the rear seat during C4101, Night Contact.
5. Philosophy. The intent of Contact Stage is not to produce backup pilots, but to provide exposure to the pilot's equipment, view, tasking, and hands-on flying. This experience will enable becoming a better overall Mission Specialist aircrew member and significantly increase flight safety. The events will be graded, but there will be no reflays or check rides.
6. Matrices. The following matrix is an overview of the Contact Stage. The purpose of this matrix is to provide the NASA Mission Specialist and IP the easiest way to track progress and overall status in relation to the MIF. In addition, there is a single matrix following each block description throughout this chapter.

7. Stage MIF

█ Simulator

CONTACT STAGE MANEUVER ITEM FILE				
CTS REF	MANEUVER	C2003	C4003	C4101
1	General Knowledge/Procedures	3+	4+	4+
2	Emergency Procedures/System Failures	3+	4+	4+
3	Headwork/Situational Awareness	3+	3+	3+
4	Basic Air Work Recognition	3+	4+	3+
6	Mission Specialist Aircrew Responsibilities	3+		
6	Strap-In/Interior Inspection	3+		
8	Radio Procedures	3+	4+	3+
6	Engine Start	3+		
2	Start Malfunctions	3		
2	Fire Warning on the Ground	3+		
2	Emergency Ground Egress	3+		
6	Before Taxi/Taxi Checklists	3+		
6	Overspeed Governor Check	3+		
6	Before Takeoff/Lineup Checks	3+		
2	Takeoff Abort	3+		
2	Emergency Engine Shutdown (Ground)	3+		
6	After Takeoff/Climb Checklists	3+		
6	Operations Check	3+		
6	Descent/Before Landing Checklists	3+		
6	After Landing/Engine Shutdown Checklists	3+		
2	Engine Failure During Flight	3+		
2	Compressor Stalls	3+		

MIF continued on next page.

CONTACT STAGE MANEUVER ITEM FILE				
CTS REF	MANEUVER	C2003	C4003	C4101
2	PMU Failure	3		
2	Fire Warning in Flight	3+		
2	Generator/Battery Bus Failure	3		
2	Low Fuel Pressure	3+		
2	OBOGS Inoperative	3		
2	Smoke or Fume Elimination	3+		
2	Oil System Malfunctions	3+		
2	Use of Canopy Fracturing System	3+		
2	Hydraulic Malfunctions	3		
2	Trim System/TAD Failure	3		
2	Canopy Unlocked	3		
2	Ejection	3+		
2	Inadvertent Departure from Controlled Flight	3+		
2	Landing Gear Emergency Extension	3+		
2	Emergency Landing Pattern	3+		
2	PEL	3+		
9	Ground Procedures		4+	2+
10	Takeoff		4+	1
11	Departure		4+	2
12	Use of Controls/Trim		4+	2+
13	In-Flight Checks		4+	4+
14	In-Flight Planning/Area Orientation		4+	2
15	Basic Transitions		4+	2
16	VFR Scan		4+	3
17	LSC		4+	2
18	Turn Pattern		4+	2
19	POS		4+	

MIF continued on next page.

CONTACT STAGE MANEUVER ITEM FILE				
CTS REF	MANEUVER	C2003	C4003	C4101
20	ATS		4+	
21	Spin		3+	
22	Simulated Power Loss		3+	
23	PPEL		3+	2
24	Landing Pattern		4+	2
25	Landings		2+	2
26	Go Around/Waveoff		3+	2
27	Course Rules/Home Field Entry		4+	
	Special Syllabus Requirements		1	

Block	Media	Title	Events	Hrs	Category
C01-02	Class	Contact Ground Training	2	5.0	CONFP

1. Events

C0101	MIL	T-6A Contact 2 - Ground Procedures		2.0	
C0201	Lect	Contact Indoctrination		3.0	

2. Syllabus Notes

a. Complete G02-7 prior to C0101.

b. Complete C2003 prior to C0201.

c. The following items will be accomplished (or simulated) by the student during C0201: Canopy operation (exterior/interior), before exterior/interior inspections, complete strap-in (all gear), all ground checklists, cockpit familiarization (identify all electronic displays and their function), RMU/backup UHF control head operation, safety pins stowage, emergency ground egress (with and without CFS), and ejection.

3. Discuss Items

C0201

Flight line expectations, scheduling/snivels, chain of command, ATF, training folders, what-to-bring-to-brief, conduct of preflight briefings, discuss items, weather briefs, weight and balance, flight gear check, aircraft issue, WINFLIR, MAF, ground safety, special syllabus requirements, procedures, emergency procedures, information resources, hangar/chair flying, drop on request (DOR), training time out (TTO) policy. General discussion of all planned items in paragraph 2c above.

Block	Media	Title	Events	Hrs	H/X
C20	CPT	Cockpit Procedure Training	3	4.5	1.5

1. Prerequisite. C0101 (T-6A Contact 2 - Ground Procedures).
2. Syllabus Notes. The following procedures will be performed by the student on the indicated event:

C2001

Cockpit familiarization - includes complete strap-in; rudder pedal and seat adjustments; location of cockpit displays, switches, engine controls, and standby instruments; interior inspection; start checklist (include one GPU start); start malfunctions/abort start procedure; before taxi/taxi checklists; overspeed governor check; before takeoff checklist; lineup check; after takeoff checklist; climb checklist; operations check; descent checklist; before landing checklist; after landing checklist; engine shutdown checklist; communication procedures; OBOGS inoperative; and VFR course rules (NPA RWY 7).

C2002

All normal operating procedures, radio procedures, fire warning on the ground, emergency engine shutdown (ground), emergency ground egress/use of canopy fracturing system, aborted takeoff, fire warning in flight, generator/battery bus failure, low fuel pressure, oil system malfunctions, ELP and PEL, and VFR course rules (NPA RWY 25).

C2003

All normal operating procedures, engine failure during flight, compressor stall, smoke or fume elimination, hydraulic malfunctions, canopy unlocked, ejection, emergency landing gear extension, ELP (with PEL), and VFR course rules (NPA RWY 19).

3. Special Syllabus Requirements. None.
4. Discuss Items

C2001

Strapping in, all normal checklists, communication procedures, course rules.

C2002

Emergency landing pattern (ELP), canopy fracturing system, all BOLD FACED emergency procedures, any item from paragraph 2, C2002.

C2003

Ejection and the ejection decision, power management unit, generator/battery bus inoperative, any item from paragraph 2, C2003, any previous discuss item.

5. Block MIF

CTS REF	MANEUVER	C2003
1	General Knowledge/Procedures	3+
2	Emergency Procedures/System Failures	3+
3	Headwork/Situational Awareness	3+
4	Basic Air Work Recognition	3+
6	Mission Specialist Aircrew Responsibilities	3+
6	Strap-In/Interior Inspection	3+
8	Radio Procedures	3+
6	Engine Start	3+
2	Start Malfunctions	3
2	Fire Warning on the Ground	3+
2	Emergency Ground Egress	3+
6	Before Taxi/Taxi Checklists	3+
6	Overspeed Governor Check	3+
6	Before Takeoff/Lineup Checks	3+
2	Takeoff Abort	3+
2	Emergency Engine Shutdown (Ground)	3+
6	After Takeoff/Climb Checklists	3+
6	Operations Check	3+
6	Descent/Before Landing Checklists	3+
6	After Landing/Engine Shutdown Checklists	3+

MIF continued on next page.

CTS REF	MANEUVER	C2003
2	Engine Failure During Flight	3+
2	Compressor Stalls	3+
2	PMU Failure	3
2	Fire Warning in Flight	3+
2	Generator/Battery Bus Failure	3
2	Low Fuel Pressure	3+
2	OBOGS Inoperative	3
2	Smoke or Fume Elimination	3+
2	Oil System Malfunctions	3+
2	Use of Canopy Fracturing System	3+
2	Hydraulic Malfunctions	3
2	Trim System/TAD Failure	3
2	Canopy Unlocked	3
2	Ejection	3+
2	Inadvertent Departure from Controlled Flight	3+
2	Landing Gear Emergency Extension	3+
2	Emergency Landing Pattern	3+
2	PEL	3+

Block	Media	Title	Events	Hrs	H/X
C40	T-6A	Contact	3	4.5	1.5

1. Prerequisite. C0201 (Contact Indoctrination).

2. Syllabus Notes. The purpose of this block is to introduce the student to visual field operations and landing patterns (day and night) and to provide exposure to the pilot's equipment, view, tasking, and hands-on flying. Emphasis should be placed on preflight briefings and procedural recall/execution.

3. Special Syllabus Requirements

C4001

Anti-g straining maneuver.

C4002 or C4003

Tower-controlled field operations; no flap, takeoff flap, and landing flap landings.

4. Discuss Items

C4001

NATOPS operating limitations, ground emergencies, CFS, communications procedures, takeoff procedures, basic transitions, turn pattern, LSC, approach turn stall, power-off stall, trim, landing gear emergency extension, CRM, ejection, any EP or limitation.

C4002

Tower-controlled field operations, Navy landing pattern, inadvertent departure from controlled flight, spins, hydraulic system and malfunctions, engine failure immediately after takeoff (suitable landing area available), canopy unlocked, any EP or limitation.

C4003

Emergency landing pattern, engine failure during flight, immediate airstart (PMU norm), fire warning in flight, rapid decompression, fuel system failures, OBOGS inoperative, and any EP or limitation.

5. Block MIF

CTS REF	MANEUVER	C4003
1	General Knowledge/Procedures	4+
2	Emergency Procedures/System Failures	4+
3	Headwork/Situational Awareness	3+
4	Basic Air Work Recognition	4+
8	Radio Procedures	4+
9	Ground Procedures	4+
10	Takeoff	4+
11	Departure	4+
12	Use of Controls/Trim	4+
13	In-Flight Checks	4+
14	In-Flight Planning/Area Orientation	4+
15	Basic Transitions	4+
16	VFR Scan	4+
17	LSC	4+
18	Turn Pattern	4+
19	POS	4+
20	ATS	4+
21	Spin	3+
22	Simulated Power Loss	3+
23	PPEL	3+
24	Landing Pattern	4+
25	Landings	2+
26	Go Around/Waveoff	3+
27	Course Rules/Home Field Entry	4+
	Special Syllabus Requirements	1

Block	Media	Title	Events	Hrs	H/X
C41	T-6A	Night Contact	1	1.5	1.5

1. Prerequisite. C4003.
2. Syllabus Note. Initial takeoff should be no earlier than 30 minutes after official sunset.
3. Special Syllabus Requirements. None.
4. Discuss Items

C4101

Airport lighting, night ground operations, night hand signals, T-6A interior and exterior lighting, tower ALDIS lamp signals, night vision, and battery and generator failure.

5. Block MIF

CTS REF	MANEUVER	C4101
1	General Knowledge/Procedures	4+
2	Emergency Procedures/System Failures	4+
3	Headwork/Situational Awareness	3+
4	Basic Air Work Recognition	3+
8	Radio Procedures	3+
9	Ground Procedures	2+
10	Takeoff	1
11	Departure	2
12	Use of Controls/Trim	2+
13	In-Flight Checks	4+
14	In-Flight Planning/Area Orientation	2
15	Basic Transitions	2
16	VFR Scan	3
17	LSC	2
18	Turn Pattern	2
23	PPEL	2
24	Landing Pattern	2
25	Landings	2
26	Go Around/Waveoff	2

Chapter IV

Instrument Training

1. Seating. Students shall occupy the rear cockpit.
2. Philosophy. The emphasis should be on general instrument navigation skills that can be applied to any aircraft. The flights are intended to provide introduction and exposure to the instrument flight environment while maximizing learning in a very demanding short course. The events will be graded, but there will be no reflys or check rides.
3. Matrices. The following matrix is an overview of the entire Instrument Stage. The purpose of this matrix is to provide the NASA Mission Specialist and IP the easiest way to track progress and overall status in relation to the MIF. In addition, there is a single matrix following each block description throughout this chapter.
4. Stage MIF

■ Simulator Event

INSTRUMENT STAGE MANEUVER ITEM FILE			
CTS REF	MANEUVER	I2004	I4008
1	General Knowledge/Procedures	4+	4+
2	Emergency Procedures/System Failures	4+	4+
3	Headwork/Situational Awareness	3+	3+
4	Basic Air Work Recognition	4+	4+
5	Flight Planning	3+	3+
6	Mission Specialist Aircrew Responsibilities	4+	4+
7	Crew Resource Management	3+	3+
8	Radio Procedures	3+	3+
11	Departure	4+	4+

MIF continued on next page.

INSTRUMENT STAGE MANEUVER ITEM FILE			
CTS REF	MANEUVER	I2004	I4008
28	Use of ATIS/PMSV/FSS	3+	3+
29	In-Flight Computations	4+	4+
30	In-Flight Briefings	4+	4+
31	Direct to VOR	4+	4+
32	Enroute Procedures	4+	4+
33	Point-to-Point	3+	3+
34	Arcing	3+	4+
35	Station/Waypoint Passage	4+	4+
36	Holding (VOR)	3+	3
37	Holding (GPS)	3+	1
38	VOR Approach	3+	3
39	GPS Approach	3+	1
40	Localizer Approach	3+	3
41	ILS Approach	3+	3
42	Circling Approach		3
43	RA/GCA		3
44	Missed Approach		3+
45	Visual Glideslope Interpretation		4
46	Instrument Turnpoint Procedures		3+
	Special Syllabus Requirements		1

Block	Media	Title	Events	Hrs	Category
I01	Class	Instrument Preparation	1	5.5	IFP

1. Events

I0101 MIL Instrument Navigation Flight 5.5
Preparation

2. Syllabus Note. Complete G08-9 prior to this event.

3. Discuss Items. None.

Block	Media	Title	Events	Hrs	H/X
I20	CPT	Primary Instrument	4	6.0	1.5

1. Prerequisite. I0101 (Instrument Navigation Flight Preparation).
2. Syllabus Note. Introduce and practice instrument enroute procedures and instrument approach procedures.
3. Special Syllabus Requirements. None.
4. Discuss Items

I2001

Mission Specialist aircrew responsibilities, crew coordination, direct to a VOR, DRAFT procedures, radar approaches, and missed approach/climbout procedures.

I2002

Approach plates, VOR approach, arcing, GCA approaches, instrument scan, and instrument checklist.

I2003

Radar vectors to final, localizer approach, ILS approach, GPS approach, and timing adjustments from FAF to MAP.

I2004

Radar vectors to VOR/ILS/GPS final, intercept techniques, any emergency procedure, and any instrument navigation procedure.

5. Block MIF

CTS REF	MANEUVER	I2004
1	General Knowledge/Procedures	4+
2	Emergency Procedures/System Failures	4+
3	Headwork/Situational Awareness	3+
4	Basic Air Work Recognition	4+
5	Flight Planning	3+
6	Mission Specialist Aircrew Responsibilities	4+
7	Crew Resource Management	3+
8	Radio Procedures	3+
11	Departure	4+
28	Use of ATIS/PMSV/FSS	3+
29	In-Flight Computations	4+
30	In-Flight Briefings	4+
31	Direct to VOR	4+
32	Enroute Procedures	4+
33	Point-to-Point	3+
34	Arcing	3+
35	Station/Waypoint Passage	4+
36	Holding (VOR)	3+
37	Holding (GPS)	3+
38	VOR Approach	3+
39	GPS Approach	3+
40	Localizer Approach	3+
41	ILS Approach	3+

Block	Media	Title	Events	Hrs	H/X
I40	T-6A	Primary Instrument	8	16.0	2.0

1. Prerequisites

- a. I2004.
- b. C4003.

2. Syllabus Notes

a. Flights should be flown as local events, but may be flown as out-and-in or cross-country events based on squadron requirements.

b. Students shall prepare and have available a DD 175 and a jet card for both primary and alternative route.

c. Students shall fly a minimum of two instrument approaches per flight.

d. A minimum of 2.0 hours during the Instrument Stage should be conducted during nighttime, to provide the student with more exposure to the night environment. The time may be all during one flight, or broken up into two.

e. If possible, one of the flights in the Instrument Stage should be briefed and conducted as a formation flight, with one aircraft leading for the first half and the other for the second half. Emphasis should be placed on communication, coordination, and pilot support. (This is considered highly desirable, but not mandatory.)

3. Special Syllabus Requirements

I4001

GPS usage (load flight plan in GPS).

4. Discuss Items

I4001

High/Low chart symbology, lost communication procedures, emergency engine shutdown, abort, and procedure turn approaches.

I4002

Special use airspace, engine failure immediately after takeoff, engine failure during flight, and missed approach/climbout procedures.

I4003

Immediate airstart (PMU NORM), uncommanded propeller feather, VOR approach, and departure procedure versus radar vectors.

I4004

Base ops planning (AP-1, NOTAMs, weather minimums for takeoff, approach, alternate), CTAF usage, and ejection.

I4005

Any EP, class A operations, TCN, use of FSS/PMSV (in-flight change of flight plan, activate flight plans, and update weather).

I4006/7/8

Any discuss item.

5. Block MIF

CTS REF	MANEUVER	I4008
1	General Knowledge/Procedures	4+
2	Emergency Procedures/System Failures	4+
3	Headwork/Situational Awareness	3+
4	Basic Air Work Recognition	4+
5	Flight Planning	3+
6	Mission Specialist Aircrew Responsibilities	4+
7	Crew Resource Management	3+
8	Radio Procedures	3+
11	Departure	4+
28	Use of ATIS/PMSV/FSS	3+
29	In-Flight Computations	4+
30	In-Flight Briefings	4+
31	Direct to VOR	4+
32	Enroute Procedures	4+
33	Point-to-Point	3+
34	Arcing	4+
35	Station/Waypoint Passage	4+
36	Holding (VOR)	3
37	Holding (GPS)	1
38	VOR Approach	3
39	GPS Approach	1
40	Localizer Approach	3
41	ILS Approach	3
42	Circling Approach	3
43	RA/GCA	3
44	Missed Approach	3+
45	Visual Glideslope Interpretation	4
46	Instrument Turnpoint Procedures	3+
	Special Syllabus Requirements	1

Chapter V

Visual Navigation Training

This chapter does not apply to NASA Mission Specialist training, since low-levels are not conducted as part of the follow-on training or mission.

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Chapter VI

Formation Training

This chapter does not apply to NASA Mission Specialist training. However, a brief exposure to formation training may be provided optionally during the Instrument Stage, as detailed in Chapter IV.

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Chapter VII

Tactical Training

This chapter does not apply to NASA Mission Specialist training.

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Chapter VIII

Course Training Standards

1. Purpose. These standards outline the tasks and proficiency required of NASA Mission Specialists during the appropriate stages.
2. Student Duties and Responsibilities
 - a. Plan the mission.
 - b. Ensure the aircraft is preflighted, inspected, and equipped for the assigned mission.
 - c. Operate the aircraft to accomplish the mission using sound judgment and airmanship.
3. General Standards
 - a. Achieve training standards for VMC maneuvers in conjunction with visual clearing.
 - b. Unless otherwise specified, use **BASIC AIR WORK RECOGNITION** standards for all items with altitude, airspeed, or heading parameters.
 - c. "Standard" equates to **good** (G/4).
 - d. Momentary deviations outside CTS that do not compromise flight safety are acceptable if subsequent corrections are timely.
 - e. Procedural knowledge and application must comply with applicable directives and allow efficient mission accomplishment. If individual tasks require preflight planning, the standards from **Flight Planning** apply.
4. Execution. The MIF regulates student progression to meet required standards prior to phase completion. Instructor pilots shall evaluate student performance against these standards.

5. Job Tasks. Specific performance and standards required are described as follows:

BEHAVIOR STATEMENT	STANDARDS
GRADED ITEM	
<ul style="list-style-type: none"> • A brief description of the behavior, required action, and/or conditions. 	<ul style="list-style-type: none"> • The specific standards for the action. May be read as "The student..."

6. Graded Items. The MIF for specific graded items varies for each stage. Several items are graded on all complete syllabus events. The standards for these universally graded items are listed first. General items may apply to all stages, but not necessarily all events. Then beginning with Contact, each stage's MIF table is listed followed by the course training standards which are introduced in that stage. Some of the standards are unique to that stage, while others may apply to later stages. Once the standard for a graded item has been established, it will not be repeated in the CTS list of later stages, but remains available to be graded.

7. Course Training Standards

UNIVERSALLY GRADED ITEMS

BEHAVIOR STATEMENT	STANDARDS
1. General Knowledge/Procedures	
<ul style="list-style-type: none"> • Maintain working knowledge of all appropriate flight training instructions and directives. 	<ul style="list-style-type: none"> • Recites, discusses, and/or performs all applicable items essential to the operation of the airplane.

BEHAVIOR STATEMENT	STANDARDS
2. Emergency Procedures/System Failures	
<ul style="list-style-type: none"> ● Maintain in-depth knowledge of all NATOPS emergency procedures. ● Utilize the PCL as required by the NATOPS and FTI. 	<ul style="list-style-type: none"> ● Correctly analyzes situation given real or hypothetical situations. ● Performs/recites critical action steps from memory without error. ● Uses checklist to complete procedures when conditions permit. ● Is familiar with all information contained in the PCL, is able to access that information in a correct and timely manner.
3. Headwork/Situational Awareness	
<ul style="list-style-type: none"> ● Comply with the FTI and NATOPS while maintaining situational awareness sufficient for flight safety. 	<ul style="list-style-type: none"> ● Understands instructions, demonstrations, and explanations. ● Foresees and avoids possible difficulties and makes recommendations for the situation. ● Remains alert and spatially oriented. ● Maintains overall awareness with regard to fuel state, aircraft configuration, nearby traffic, and weather.
4. Basic Air Work Recognition (BAR)	
<ul style="list-style-type: none"> ● Establish and maintain (or recognize and direct) desired altitude, airspeed, and heading during flight. 	<ul style="list-style-type: none"> ● Makes recommendations to: <ul style="list-style-type: none"> ▶ Maintain aircraft within 100 feet, 10 KIAS, 5° of heading. ▶ Appropriately use power, attitude, and trim. ▶ Level off within 100 feet of desired altitude. ▶ Accomplish within ±10 seconds of correct time as applicable.

GENERAL ITEMS

BEHAVIOR STATEMENT	STANDARDS
5. Flight Planning	
<ul style="list-style-type: none"> ● Perform flight planning to include takeoff, climb, enroute, descent, approach, and landing data. ● Plan alternate course of action. ● Prepare Flight Log/DD 175. 	<ul style="list-style-type: none"> ● Uses required directives and forms. ● Plans flight in a timely manner to meet requirements. ● Completes all forms correctly. ● Complies with all directives. ● Has all required materials (WX brief, FLIP publications, NOTAMS, charts as required) prior to brief.
6. Mission Specialist Aircrew Responsibilities	
<ul style="list-style-type: none"> ● Accomplish required in-flight duties. 	<ul style="list-style-type: none"> ● Makes recommendations to maintain proper aircraft flight parameters. ● Performs proper aircraft operations checklists IAW FTI and NATOPS. ● Gives takeoff calls, altitude warning calls and landing rollout calls.
7. Crew Resource Management (CRM)	
<ul style="list-style-type: none"> ● Use available crew and cockpit resources to minimize workload and enhance situational awareness. 	<ul style="list-style-type: none"> ● Coordinates and utilizes sound CRM principles.

BEHAVIOR STATEMENT	STANDARDS
8. Radio Procedures	
<ul style="list-style-type: none"> ● Communicates via two-way UHF/VHF radio using standard terminology. 	<ul style="list-style-type: none"> ● Understands and responds to 90 percent of incoming calls. ● Makes all calls when required, using standard FAA military terminology during ground operations, departure, enroute, and arrival. ● Makes timely transmissions without stepping on others. ● Exercises communications brevity consistent with FAA and voice communications FTI requirements.

CONTACT

These Contact standards call for an action to be accomplished in a safe and proper manner. If the student is at the controls at the time of the action, steps need not be verbalized to meet or exceed standards. If the IP is at the controls, the student will verbally direct the pilot in a timely and procedurally correct manner to accomplish the action(s). If the instructor deems the verbal direction sequentially correct and accurate to the situation/maneuver, the student may meet or, in some cases, exceed the training standard.

BEHAVIOR STATEMENT	STANDARDS
9. Ground Procedures	
<ul style="list-style-type: none"> ● Inspect the aircraft and direct safe taxi operations before and after flight. 	<ul style="list-style-type: none"> ● Correctly and efficiently performs exterior/interior inspections per NATOPS. ● Safely directs the taxi of the aircraft from the parking area to the runway via local procedures, using applicable airfield diagram as a reference. ● Visually clears the aircraft at every intersection or possible obstruction. ● Performs a postflight exterior inspection.

BEHAVIOR STATEMENT	STANDARDS
10. Takeoff	
<ul style="list-style-type: none"> ● Perform takeoff, starting with clearance for takeoff and ending with landing gear retraction. 	<ul style="list-style-type: none"> ● Completes the takeoff checklist. ● Adequately checks engine instruments. ● Ensures gear is safely raised, and verbally reports subsequent gear indication.
11. Departure	
<ul style="list-style-type: none"> ● Perform proper VFR or IFR departure procedures. 	<ul style="list-style-type: none"> ● Complies with departure procedures and ATC instructions. ● Maintains IFR course $\pm 5^\circ$. ● Performs an operations checklist at or before level off.
12. Use of Controls/Trim	
<ul style="list-style-type: none"> ● Manipulate the three primary flight controls. ● Properly trim the aircraft. 	<ul style="list-style-type: none"> ● Understands flight control movements and resulting action in all three primary axes. ● Recognizes balanced flight. ● Trims all three primary flight controls in the appropriate direction.
13. In-Flight Checks	
<ul style="list-style-type: none"> ● Complete checks as required. 	<ul style="list-style-type: none"> ● Performs: <ul style="list-style-type: none"> ▶ Instrument, fuel, ops checks, as required by FTI/NATOPS/SOP. ▶ Landing checklist as required by FTI/NATOPS. ▶ Stall/pre-aerobatic checklist as required by FTI/NATOPS.

BEHAVIOR STATEMENT	STANDARDS
14. In-Flight Planning/Area Orientation	
<ul style="list-style-type: none"> ● Visually navigate and remain within prescribed working area. 	<ul style="list-style-type: none"> ● Identifies nearest suitable landing field. ● Adjusts flight profile for external factors (weather, traffic, etc.). ● Maintains positional awareness using ground references, navigational aids, VFR charts, or FLIP publications. ● Maintains appropriate boundaries and altitude block within a working area as required.
15. Basic Transitions	
<ul style="list-style-type: none"> ● Properly climb, descend, and level off. 	<ul style="list-style-type: none"> ● Initiates level off at the correct altitude, using PAT principle. ● Performs clearing turns for climb and descents greater than 1000 feet, as appropriate.
16. VFR Scan	
<ul style="list-style-type: none"> ● Maintain aircraft control relying primarily on outside references. ● Clear for other aircraft and weather. 	<ul style="list-style-type: none"> ● Recognizes appropriate VFR nose attitudes for defined configurations (i.e., normal/fast cruise). ● Communicates traffic and weather conflicts and initiates proper response.
17. Level Speed Change (LSC)	
<ul style="list-style-type: none"> ● Perform a level speed change per the FTI. 	<ul style="list-style-type: none"> ● Begins in normal cruise configuration. ● Completes Landing Checklist. ● Attempts to trim off control pressures during maneuver.
18. Turn Pattern	
<ul style="list-style-type: none"> ● Perform a turn pattern per the FTI. 	<ul style="list-style-type: none"> ● Commences on cardinal heading. ● Recognizes bank angle $\pm 10^\circ$. ● Attempts to reverse turn/roll out within $\pm 20^\circ$ of proper heading.

BEHAVIOR STATEMENT	STANDARDS
19. Power Off Stall (POS)	
<ul style="list-style-type: none"> ● Perform power off stall and recover per the FTI. 	<ul style="list-style-type: none"> ● Understands this maneuver simulates the feathered condition. ● Recognizes proper glide attitude. ● Attempts to minimize altitude loss during recovery. ● Returns to appropriate glide attitude.
20. Approach Turn Stall (ATS)	
<ul style="list-style-type: none"> ● Perform an approach turn stall and recover per the FTI. 	<ul style="list-style-type: none"> ● Commences in the correct configuration. ● Performs clearing turn. ● Enters stall at/above 6500 feet AGL. ● Initiates recovery at stall entry. ● Attempts to minimize altitude loss during recovery.
21. Spin	
<ul style="list-style-type: none"> ● Perform spin per the FTI. 	<ul style="list-style-type: none"> ● Performs clearing turn. ● Must recover prior to 10,000 feet AGL. ● Communicates accurate spin indications over ICS. ● Initiates proper recovery after verifying spin indications.
22. Simulated Power Loss	
<ul style="list-style-type: none"> ● Perform simulated engine failure procedures, given simulated power loss above 3000 feet AGL. 	<ul style="list-style-type: none"> ● Maintains minimum flying speed. ● Selects suitable landing site. ● Navigates to intercept ELP. ● Configures properly for landing.
23. Practice Precautionary Emergency Landing (PPEL)	
<ul style="list-style-type: none"> ● Given simulated EP requiring PEL, perform PPEL procedures per the FTI. 	<ul style="list-style-type: none"> ● Selects nearest suitable landing field. ● Manages airspeed as appropriate for climb or acceleration to high key. ● Navigates to intercept ELP. ● Configures properly for landing.

BEHAVIOR STATEMENT	STANDARDS
24. Landing Pattern	
<ul style="list-style-type: none"> ● Execute/Direct landing pattern per the FTI. 	<ul style="list-style-type: none"> ● Maintains/Directs: <ul style="list-style-type: none"> ▶ Downwind <ul style="list-style-type: none"> ▪ Ensures proper downwind configuration and spacing. ▪ Initiates Before Landing Checklist. ▶ Abeam <ul style="list-style-type: none"> ▪ Executes four T's (transition, trim, turn, and talk). ▪ Ensures Landing Checklist complete. ▶ Approach turn/Final <ul style="list-style-type: none"> ▪ Maintains/Directs appropriate airspeed for selected flap setting ± 5 KIAS.
25. Landings	
<ul style="list-style-type: none"> ● Execute/Direct normal approach/landing per the FTI. 	<ul style="list-style-type: none"> ● Maintains/Directs: <ul style="list-style-type: none"> ▶ Correct glidepath until flare initiation. ▶ Minimum no flap (110 KIAS), takeoff flap (105 KIAS), and full flap (100 KIAS), ± 5 KIAS for all until landing transition. ● Attempts to touch down with: <ul style="list-style-type: none"> ▶ Appropriate crosswind controls. ▶ Main gear first (nose-high attitude). ▶ Nose gear ± 10 feet of centerline. ● Recognizes the touchdown zone as defined by Contact FTI and local instructions. ● Executes/Directs full stop or touch-and-go procedures per FTI.

BEHAVIOR STATEMENT	STANDARDS
26. Go Around/Waveoff	
<ul style="list-style-type: none"> ● When appropriate, discontinue approach to landing. 	<ul style="list-style-type: none"> ● Recognizes and initiates waveoff when required by the FTI and/or safety-of-flight. ● Ensures positive climb and configuration during waveoff.
27. Course Rules/Home Field Entry	
<ul style="list-style-type: none"> ● Return to home field in accordance with local procedures. 	<ul style="list-style-type: none"> ● Obtains ATIS information. ● Conducts adequate recovery briefing. ● Visually navigates via prescribed routing.

INSTRUMENTS

BEHAVIOR STATEMENT	STANDARDS
28. Use of ATIS/PMSV/FSS	
<ul style="list-style-type: none"> ● Use ATIS/PMSV to update destination conditions IAW the FTI. ● Use FSS as required to open, change, and close flight plans. 	<ul style="list-style-type: none"> ● Checks ATIS prior to contacting destination approach control. ● Updates destination and alternate weather with PMSV/AWOS/FSS enroute, when required. ● Contacts FSS to: <ul style="list-style-type: none"> ▶ Open flight plans after departure. ▶ Change flight plans enroute. ▶ Close flight plans after landing.
29. In-Flight Computations	
<ul style="list-style-type: none"> ● Compute IAW the FTI: <ul style="list-style-type: none"> ▶ Ground speed. ▶ ETE (to turnpoints). ▶ Fuel at destination IAF. 	<ul style="list-style-type: none"> ● Computes: <ul style="list-style-type: none"> ▶ Ground speed ± 12 knots. ▶ ETA ± 1 minute. ▶ Fuel at destination IAF within ± 30 pounds of instructor calculations. ● Correctly complete procedures IAW FTI.

BEHAVIOR STATEMENT	STANDARDS
30. In-Flight Briefings	
<ul style="list-style-type: none"> ● Accomplish in-flight briefings IAW the FTI. 	<ul style="list-style-type: none"> ● Provides takeoff brief, departure brief, holding brief, field brief, DRAFT report (as required), approach brief, and missed approach/climbout instructions when required.
31. Direct to VOR	
<ul style="list-style-type: none"> ● Establish the aircraft inbound to the station IAW the FTI. 	<ul style="list-style-type: none"> ● Establishes and maintains aircraft on inbound radial, within ± 3 radials or 1.5 miles (whichever is less). ● Correctly completes procedures IAW FTI.
32. Enroute Procedures	
<ul style="list-style-type: none"> ● Maintain aircraft's track on appropriate radial or airway. ● Identify an intersection using appropriate NAVAID(s). 	<ul style="list-style-type: none"> ● Maintains the lesser of ± 3 radials (VOR) or 1.5 miles (VOR) of centerline. ● Determines approximate wind direction $\pm 30^\circ$ and ± 15 knots and maintains proper crab angle $\pm 5^\circ$. ● Properly identifies required intersection using appropriate NAVAID(s). ● Gives position report as required. ● Leads turns when applicable IAW FTI.
33. Point-to-Point	
<ul style="list-style-type: none"> ● Proceed direct to an assigned fix using VOR/DME point-to-point procedures IAW FTI. 	<ul style="list-style-type: none"> ● Expeditiously establishes a correct initial heading. ● Continuously updates heading to: <ul style="list-style-type: none"> ▶ Avoid large ($>20^\circ$) heading changes within two minutes prior. ▶ Arrive within two miles of desired point. ● Correctly completes procedures IAW FTI.

BEHAVIOR STATEMENT	STANDARDS
34. Arcing	
<ul style="list-style-type: none"> ● Direct per FTI: <ul style="list-style-type: none"> ▶ VOR/DME arcing. ▶ Arc-to-radial intercepts. ▶ Radial-to-arc intercepts. 	<ul style="list-style-type: none"> ● Maintains the arc ± 0.5 DME. ● Calculates lead points IAW FTI to join: <ul style="list-style-type: none"> ▶ Arc ± 0.5 DME. ▶ Radial $\pm 3^\circ$.
35. Station/Waypoint Passage	
<ul style="list-style-type: none"> ● Identify Station/Waypoint Passage IAW FTI. 	<ul style="list-style-type: none"> ● Identifies station passage for the NAVAID in use or selected GPS waypoint.
36. Holding (VOR)	
<ul style="list-style-type: none"> ● Direct VOR holding IAW the FTI. 	<ul style="list-style-type: none"> ● Computes proper entry turn. ● Directs holding airspeed three minutes or less from the holding fix. ● Establishes and maintains aircraft within holding airspace. ● Properly calculates and applies drift corrections IAW the FTI. ● Properly calculates and applies timing corrections IAW the FTI.
37. Holding (GPS)	
<ul style="list-style-type: none"> ● Direct GPS holding IAW the FTI. 	<ul style="list-style-type: none"> ● Properly sets GPS for holding. ● Computes proper entry turn. ● Directs holding airspeed three minutes or less from the holding fix. ● Establishes and maintains aircraft within holding airspace. ● Properly calculates and applies drift corrections IAW the FTI.

BEHAVIOR STATEMENT	STANDARDS
38. VOR Approach	
<ul style="list-style-type: none"> ● Direct an approach IAW the FTI. 	<ul style="list-style-type: none"> ● IAF to FAF maintains course ± 1 dot or valid intercept. ● Properly directs the pilot to slow and take BAC IAW the FTI. ● By the FAF (when depicted) or initiating descent to MDA, completes landing checklist. ● Final: <ul style="list-style-type: none"> ▶ Maintains ± 1 dot of desired course. ▶ Reaches and maintains MDA $+100/-0$ feet. ● Properly calculates and applies backup timing at the FAF. ● Properly identifies VDP when published. ● Determines if the aircraft is in a position to execute a safe landing upon reaching the MDA. ● Directs the pilot as needed to execute the appropriate missed approach or climbout instructions.
39. GPS Approach	
<ul style="list-style-type: none"> ● Direct a GPS approach IAW the FTI. 	<ul style="list-style-type: none"> ● IAF to FAF maintains course ± 1 dot or valid intercept. ● By the FAF: <ul style="list-style-type: none"> ▶ Completes landing checklist. ▶ Ensures approach goes Active prior to descent from FAF. ● Final: <ul style="list-style-type: none"> ▶ Reaches and maintains MDA $+100/-0$ feet. ● Determines if the aircraft is in a position to execute a safe landing upon reaching the MDA. ● Directs the pilot as needed to execute the appropriate missed approach or climbout instructions.

BEHAVIOR STATEMENT	STANDARDS
40. Localizer Approach	
<ul style="list-style-type: none"> ● Direct a localizer approach IAW the FTI. 	<ul style="list-style-type: none"> ● Properly directs the pilot to slow and take BAC. ● By the FAF or initiating descent to MDA, completes landing checklist. ● Final: <ul style="list-style-type: none"> ▶ Maintains ±1 dot of desired course (LOC). ▶ Reaches and maintains MDA +100/-0 feet. ▶ Begins backup timing at the FAF when applicable. ▶ Ensures missed approach/climbout instructions briefed prior to descent to the MDA. ● Determines if the aircraft is in a position to execute a safe landing upon reaching the MDA. ● Directs the pilot as needed to execute the appropriate missed approach or climbout instructions.
41. ILS Approach	
<ul style="list-style-type: none"> ● Direct the approach IAW the FTI. 	<ul style="list-style-type: none"> ● Prior to initiating descent to DH, completes landing checklist. ● Final: <ul style="list-style-type: none"> ▶ Maintains ±1 dot of localizer course. ▶ Maintains ±1 dot on glideslope. ▶ Begins backup timing for the localizer approach when applicable. ▶ Ensures missed approach/climbout instructions briefed prior to descent to the DH. ● Determines if the aircraft is in a position to execute a safe landing upon reaching the DH. ● Directs the pilot as needed to execute the appropriate missed approach or climbout instructions.

BEHAVIOR STATEMENT	STANDARDS
42. Circling Approach	
<ul style="list-style-type: none"> ● Direct a circling maneuver to the landing runway IAW the FTI. 	<ul style="list-style-type: none"> ● Provides the pilot proper instructions to establish the aircraft into the circling maneuver for the landing runway. ● Selects appropriate MDA for aircraft category. ● Directs the pilot as needed to maintain at/above MDA consistent with weather. ● Directs the pilot as needed to execute the appropriate missed approach or climbout instructions.
43. Radar Approach (RA)/Ground-Controlled Approach (GCA)	
<ul style="list-style-type: none"> ● Direct the pilot, as needed, to properly comply with the FTI parameters of a PAR or ASR approach. 	<ul style="list-style-type: none"> ● Ensures lost communication and missed approach/climbout instructions are received prior to starting descent to DH or MDA. ● By glideslope intercept or descent to the MDA, completes landing checklist. ● Determines if the aircraft is in a position to execute a safe landing on reaching the DH or MDA. ● Directs the pilot as needed to execute the appropriate missed approach or climbout instructions.
44. Missed Approach	
<ul style="list-style-type: none"> ● Direct a missed approach per the FTI. 	<ul style="list-style-type: none"> ● Directs appropriate missed approach procedure when field not in sight and, <ul style="list-style-type: none"> ▶ Nonprecision: <ul style="list-style-type: none"> ▪ Inside FAF and full scale CDI deflection. ▪ At specified MAP. ▶ Precision, first of: <ul style="list-style-type: none"> ▪ Decision height. ▪ Controller-directed. ▶ Or, not in position for safe landing.

BEHAVIOR STATEMENT	STANDARDS
45. Visual Glideslope Interpretation	
<ul style="list-style-type: none"> ● Recognize and discuss various airport lighting aids, approach lighting systems, visual glideslope indicators. 	<ul style="list-style-type: none"> ● Provides IP with correct interpretation of visual glideslope indicators.
46. Instrument Turnpoint Procedures	
<ul style="list-style-type: none"> ● Perform instrument turnpoint calls. 	<ul style="list-style-type: none"> ● Makes appropriate instrument two minutes prior, mark on top, and wings level calls using proper format and terminology (80% accuracy).

Chapter IX

Master Materials List

Individually Issued Materials

<u>NOMENCLATURE</u>	<u>IDENTIFICATION</u>	<u>QTY PER STUDENT</u>
1. Flight Training Instructions		
a. All applicable T-6 Flight Training Instructions	CNATRA P	1

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