

CHAPTER 1

MV-22 PILOT

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NOTE

*Crew Resource Management (CRM) will be briefed for all flights and aircrew positions.*

CHAPTER 1  
MV-22 PILOT

100. MARINE MEDIUM TILTROTOR SQUADRON - MV-22 UNIT TEMPLATE

NOTE

The capabilities defined and described in the unit core capability and unit core competencies paragraphs are provided to ensure each squadron maintains a common base of training and depth of capabilities. When resources permit, and when in the judgment of the commander additional training would significantly increase the unit's war fighting capability, training to a level above these base capabilities is permitted. It is incumbent upon and expected of the commander to balance any increase in the depth of core capabilities against the long-term health and readiness of the unit, while staying within resource constraints.

1. Mission. Provide those applicable tasks of the assault support function of Marine Aviation, across the spectrum of expeditionary operations, in support of the MAGTF.

2. Mission Essential Task List (METL)

a. Conduct long-range combat assault transport in support of ship-to-objective maneuver and subsequent operations ashore.

b. Maintain the capability to self deploy and conduct extended range operations utilizing aerial refueling.

c. Conduct assault support for the execution of Tactical Recovery of Aircraft and Personnel (TRAP).

d. Conduct assault support for air evacuation operations and other special maritime operations.

e. Maintain the capability to conduct assault support operations from amphibious shipping and forward operating bases.

f. Maintain a self defense capability from ground-to-air and air-to-air threats.

g. Operate at night, in adverse weather, and under instrument flight conditions at extended ranges.

3. Table Of Organization

PAA = 12 MV-22  
28 Pilots  
20 Crew Chiefs  
12 Gunners/Observers

4. Squadron Core Capability

a. A core capable squadron is able to sustain the following minimum performance on a daily basis during sustained contingency/combat operations, assuming 100% PAA, 90% in reporting status and 90% T/O on hand in all MOSSs. If < 90%, core capability will be degraded by a like percentage. The extent

to which a core capable squadron is able to surge beyond its core capability is situational dependent.

b. A core capable squadron is able to sortie a four-plane division of Mission Capable (MC) aircraft twice within a 24-hour period crewed by NSQ aircrew on any Mission Essential Task (MET) in a medium threat environment.

## 5. Qualifications And Designations

a. Qualification. A qualification is a status assigned to personnel based on demonstration of proficiency in a specific skill. Specific criteria to achieve qualifications shall be delineated in individual T&R chapters. Upon successful completion of qualification criteria, commanding officers may issue an appropriate qualification letter for inclusion in the NATOPS jacket and APR/MPR. Aircrew do not lose a qualification as a function of re-fly factor for individual events. Loss of proficiency (delinquent re-fly factor) for all associated qualification core skill events constitutes loss of that qualification. Re-qualification requires demonstration of proficiency. Specific re-qualification criteria shall be delineated in individual T&R chapters.

b. Designation. A designation is a status assigned to an individual based on leadership ability. A designation is a command specific, one-time occurrence and remains in effect until removed for cause. Specific designation requirements shall be delineated in individual T&R chapters. Commanders shall issue a designation letter to the individual upon the occasion of original designation, with appropriate copies for inclusion in the NATOPS jacket and APR/MPR.

c. Qualifications And Designations Matrix. These tables serve to delineate the events required for initial and re-qualification of all qualifications and designations. All phase lectures, briefs, squadron training and prerequisites must be complete prior to completing final events. Qualification and designation letters signed by the commanding officer should be placed in the NATOPS and APR jackets. Loss of proficiency for all associated core skill events (200-300 level) causes the associated qualification to be lost. Regaining the qualification requires a demonstration of proficiency through the "R" coded syllabus. The commanding officer may tailor a syllabus based on the experience of the individual pilot.

<b>Qualification</b> (TRACKING CODE)	<b>Initial Event Qualification Requirements</b>
	All qualifications require a letter signed by the commanding officer to be placed in the NATOPS and APR. <b>Re-qualification:</b> A pilot shall fly all associated qualification "R" coded events. Modification to this standard is at the discretion of the commanding officer.
Instrument (600)	IAW OPNAV 3710.7 and an annual qualification letter signed by the commanding officer.
NATOPS (601)	IAW OPNAV 3710.7 and an annual qualification letter signed by the commanding officer.
VLAT (602)	230, 231, 232, 233
NSQ HLL (603)	240, 241, 242, 243, 244, 245, 246, 247
NSQ LLL (604)	310, 311, 312, 313, 314, 315, 316
AR (605)	250, 251, 252, 253
CQ (606)	300, 301, 302, 303, 304
DCM (610)	330, 331, 400, 401, 402, 403, 404, 405

<b>Designation</b> (TRACKING CODE)	<b>Designation Requirements</b>
	All designations require a letter signed by the commanding officer to be placed in the pilot's NATOPS jacket and APR.
T2P (600)	IAW OPNAV 3710.7 and an annual designation letter signed by the commanding officer. Successful completion of the <u>Combat Ready phase including RQD-600 (eval)</u> .
TAC (609)	Successful completion of the Combat Ready phase and the Combat Qualified phase, as well as RQD-607, 608, and 609 (eval). The PUI will fly any of the previously flown Combat Ready or Combat Qualification sorties in conjunction with the 609 tracking code.
SECTION LEAD (615)	613, 614, 615 (eval). PUI will fly any of the previously flown Combat Ready or Combat Qualification sorties in conjunction with the 615 tracking code.
DIVISION LEAD (620)	618, 619, 620 (eval). The PUI will fly any of the previously flown Combat Ready or Combat Qualification sorties in conjunction with the 618 tracking code.
FLIGHT LEAD (625)	The PUI will fly any of the previously flown sorties in conjunction with the 625 tracking code.
AMC (628)	Upon completion of the RQD-628 evaluation flight, the commanding officer may designate the PUI an Air Mission Commander (AMC).
VLATI (630)	500, 501, 502, 503, 504
ARI (635)	510, 511
FCP (640)	IAW OPNAV 4790 and command-specific directives.
DCMI (650)	
NSI (654)	IAW the MAWTS-1 Course Catalog.
WTI (655)	

6. Operator Core Skills. Core skills are depicted in the following matrix and directly support the METL for each T/M/S. Core skills shall be a determining factor in developing T&R training requirements. Core Plus skills and training requirements must receive appropriate prioritization and emphasis in respective T&R manuals.

**CORE SKILLS**

MET	FAM	CAL	FORM	VLAT	NS	TAC	CQ	AR	DCM	AIE	AG	EXT	MAT
A	X	X	X	X	X	X	X	X	X		X	X	X
B	X		X		X	X		X	X				
C	X	X	X	X	X	X	X	X	X	X	X	X	X
D	X	X	X	X	X	X	X	X	X	X	X		X
E	X	X	X		X	X	X						X
F	X		X	X	X	X			X		X		
G	X		X	X	X	X		X					

**CORE PLUS SKILLS**

MET	TAC	AIE	NBC	EXT	DCM
A	X		X	X	X
B	X				X
C	X	X	X	X	X
D	X	X			
E					
F	X				X
G	X				

7. Basic Aircrew Qualifications. As a minimum, to be considered Core Competent, a squadron must possess the following numbers of aircrew who are competent in each core skill (Note: If a squadron is < T/O, required numbers are reduced by a like %). To be considered competent in a core skill, an individual must attain and maintain competency in that core skill as delineated in paragraphs 8 and 9 below.

CORE SKILL	SQDN TOTAL PILOTS
CAL	16
FORM	16
EXT	16
VLAT	16
AG	16
DCM	16
TAC	16
NS	16
AR	16
AIE	16
CQ	16

8. Sorties Required To Attain Core Skills. To attain competency in a core skill, an aircrew must as a minimum complete the sorties listed in the table below. Initial aircrew must fly all sorties. Refresher aircrew, previously core skill complete in a specific core skill, at a minimum must complete the "R" coded sorties.

	FAM	CAL	FORM	VLAT	AG	EXT	DCM	TAC	NS	AR	AIE	CQ	MAT	TOTAL
Initial	3	3	3	4	4	3	3	8	15	4	3	5	3	61
Refresh	0	2	1	3	3	2	2	5	9	2	1	5	2	37
T&R CODES	S200	S210	S220	S230	S260R	S320	S270R	S280	S240R	S250	350	S300R	S360	
	201	211R	221R	231R	261	321R	S330	281R	241R	251R	351	301R	361R	
S= Simulator	S202	212R	222	S232R	S262R	322R	331R	S282	242R	S252	352R	302R	362R	
R= Refresher				233R	263R			283R	S243	253R		303R		
								S340	244			304R		
								341R	245R					
								S342R	S246					
								343R	247R					
									S310R					
									311R					
									312					
									S313					
									314R					
									S315					
									316R					

9. Sorties Required To Maintain Core Skills. To maintain competency in a core skill, an aircrew must maintain proficiency in at least the number of associated 200-300 level core skill events listed below. These values satisfy the refly factor for proficiency, but do not necessarily maintain currency requirements.

	CAL	FORM	VLAT	AG	EXT	DCM	TAC	NS	AR	AIE	CQ
PROFICIENCY	1	2	2*	2	2	2	3	6*	3	2	2*

\* Core skills that have currency requirements.

10. Flight Leader/Instructor Designations. As a minimum, for a squadron to be considered Core Competent, it must possess the following numbers of aircrew in the listed flight leadership/instructor categories (Note: If the squadron is < T/O or PAA, required numbers are reduced by a like %).

DESIGNATION	SQDN PILOT
TAC	12
SEC LDR	6
DIV LDR	3
FLT LDR	2
AMC	2
VLATI	6
ARI	4
DCMI	4
NSI	6
WTI	2*
FCP	4

\* At least one individual shall be designated as Squadron WTI.

11. Training Progression Model. Per Chapter 2 of the T&R Manual, Administrative, the MV-22 Pilot Notional Training Progression Model is depicted as follows:

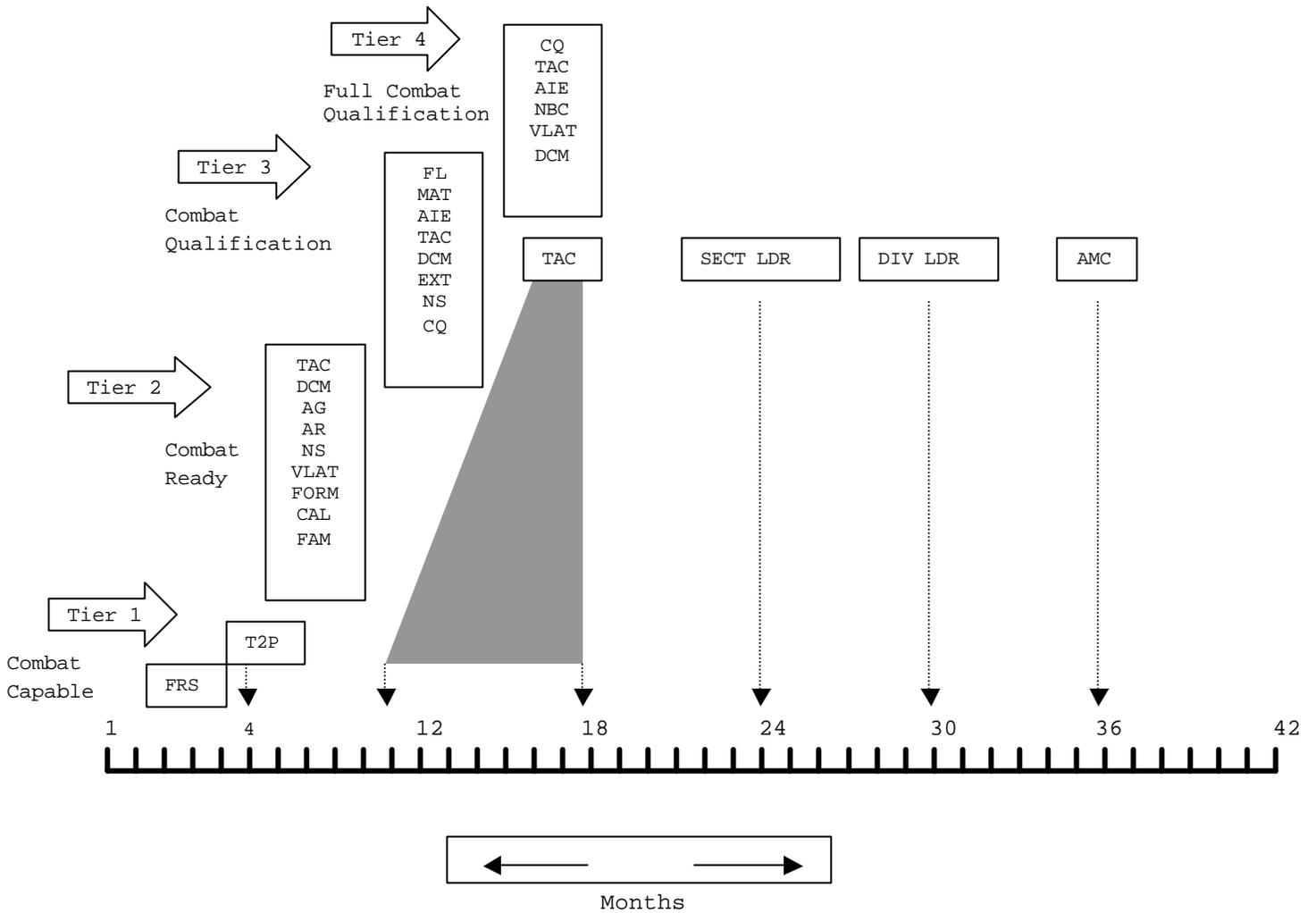


Figure 1-1.--MV-22 Pilot Notional Training Progression Model.

101. PROGRAMS OF INSTRUCTION (POI) FOR BASIC AND TRANSITION PILOT

<u>WEEKS</u>	<u>COURSE/PHASE</u>	<u>ACTIVITY</u>
1-3	Pre-FAM IMI	Training Squadron
4-22	IMI/Combat Capable Phase	Training Squadron
23-33	IMI/Combat Ready Phase	Tactical Squadron
34-54	IMI/Combat Qualification Phase	Tactical Squadron
55-63	IMI/Full Combat Qualification	Tactical Squadron

102. POI FOR REFRESHER PILOT

<u>WEEKS</u>	<u>COURSE/PHASE</u>	<u>ACTIVITY</u>
1-15	IMI/Combat Capable Phase	Training Squadron
16-21	Combat Ready Phase	Tactical Squadron
22-27	Combat Qualification Phase	Tactical Squadron
28-31	Full Combat Qualification	Tactical Squadron

103. POI FOR MODIFIED REFRESHER PILOT

1-8	IMI/Combat Capable Phase <i>Affects FRS only</i>	Training Squadron
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110. GROUND TRAINING COURSES OF INSTRUCTION

<u>COURSE</u>	<u>ACTIVITY</u>
Pre-FAM IMI	Training Squadron
Combat Capable IMI	Training Squadron
Combat Ready IMI	Tactical Squadron
Combat Qualification IMI	Tactical Squadron
Full Combat Qualification IMI	Tactical Squadron
Crew Resource Management (CRM)	Trng/Tact Squadron
VMPS Training	Trng/Tact Squadron
Combat Service Support	Trng/Tact Squadron
Instrument Ground School	Trng/Tact Squadron
Low Altitude Training	Trng/Tact Squadron
NITE Lab	Trng/Tact Squadron
Night Vision Goggles	Trng/Tact Squadron
SERE	NAS Brunswick, Maine

111. AIRCREW TRAINING REFERENCES. Aircrews shall use the following references to ensure safe and standardized training and maintenance procedures, grading criteria, and aircraft operation:

OPNAVINST 3710.7_	NATOPS Gen Flt & Operating Inst
OPNAVINST 4790.2_	Naval Aviation Maintenance Program
NAVAIR 00-80T-106	LHA/LHD/MCS NATOPS Manual
NWP-42	Shipboard Helicopter Ops Manual
NWP 3-22.5 MV22	MV-22 Tactical Manual (TACMAN)
A1-V22AB-NFM-000	MV-22 NATOPS Flight Manual
MCO P3500.14	T&R Manual, Administrative
MCO P4790.12	Individual Training Standards
	Systems (MATMEP)
MCO 3501.4	Marine Corps Combat Readiness and
	Evaluation System (MCCRES)
MCO 3500.27/OPNAV 3500.39	Operational Risk Management (ORM)

MCO P3500.12

Weapons and Tactics Training  
Program (WTPP)112. SQUADRON LEVEL TRAINING. MAWTS-1 Academic Support Package (used in conjunction with Integrated Media Instruction (IMI)).120. FLIGHT TRAINING FOR BASIC AND TRANSITION PILOT1. Combat Capable Phase

<u>STAGE</u>	<u>EVENTS</u>	<u>HOURS</u>	<u>CRP</u>
	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM/IMI</u>
Basic Qualification	--	--	25.0
Pre-FAM IMI	0/0/37	0.0/0.0/69.0	0/0/0
Familiarization	8/13/41	13.0/26.0/73.0	5.4/7.8/0
Instruments	3/4/3	6.0/8.0/6.0	2.0/2.4/0
Confined Area Landings	1/1/1	1.5/2.0/2.0	0.8/0.7/0
Navigation	1/1/1	1.5/2.0/2.0	0.7/0.7/0
Tiltrotor Low Altitude Training	2/1/2	4.0/2.0/4.0	1.8/0.7/0
Formation	1/2/1	2.0/4.0/2.0	0.9/1.4/0
Night Systems	4/4/6	8.0/8.0/11.0	3.6/2.8/0
Combat Capable Check	2/2/1	3.5/3.0/2.0	1.9/1.4/0
<b>TOTAL FOR PHASE</b>	<b>22/28/95</b>	<b>39.5/55.0/171.0</b>	<b>17.1/17.9/0</b>
<b>COMBINED TOTAL</b>	<b>50</b>	<b>94.5</b>	<b>60.0</b>
<b>TOTAL</b>	<b>50</b>	<b>94.5</b>	<b>60.0</b>

2. Combat Ready Phase

<u>STAGE</u>	<u>EVENTS</u>	<u>HOURS</u>	<u>CRP</u>
	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM</u>
Familiarization	1/2/1	1.5/3.0/1.0	0.3/0.6/0
Confined Area Landings	2/1/1	3.5/2.0/1.0	0.8/0.3/0
Formation	2/1/1	3.0/2.0/1.0	0.9/0.3/0
Tiltrotor Low Altitude Training	2/2/1	3.0/4.0/1.0	1.0/0.6/0
Night Systems	5/3/1	8.5/6.0/3.0	3.2/1.1/0
Aerial Refueling	2/2/1	3.0/3.0/2.0	1.0/0.6/0
Aerial Gunnery	2/2/1	3.0/4.0/3.0	0.8/0.6/0
Defensive Combat Maneuvers	0/1/1	0.0/2.0/3.0	0.0/0.5/0
Tactics	2/2/1	4.0/4.0/4.0	1.4/1.0/0
<b>TOTAL FOR PHASE</b>	<b>18/16/9</b>	<b>29.5/30.0/19.0</b>	<b>9.4/5.6/0</b>
<b>COMBINED TOTAL</b>	<b>34</b>	<b>59.5</b>	<b>15.0</b>
<b>TOTAL</b>	<b>84</b>	<b>154.0</b>	<b>75.0</b>

3. Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u>	<u>HOURS</u>	<u>CRP</u>
	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM/IMI</u>
Carrier Qualification	4/1/1	5.5/2.0/2.0	3.4/0.7/0
Night Systems	4/3/1	6.5/6.0/2.0	3.7/1.9/0
Externals	2/1/1	4.0/2.0/1.0	1.5/0.5/0
Defensive Combat Maneuvers	1/1/1	1.5/2.0/3.0	0.9/0.7/0
Tactics	2/2/1	5.0/4.0/2.0	1.8/1.4/0
Alternate Insertion/Extraction	3/0/1	5.0/0.0/2.0	1.8/0.0/0
Mountain Area Training	<u>2/1/1</u>	<u>3.0/2.0/2.0</u>	<u>1.2/0.5/0</u>
<b>TOTAL FOR PHASE</b>	<b>18/9/7</b>	<b>30.5/18.0/14.0</b>	<b>14.3/5.7/0</b>
<b>COMBINED TOTAL</b>	<b>27</b>	<b>48.5</b>	<b>20.0</b>
<b>TOTAL</b>	<b>111</b>	<b>202.5</b>	<b>95.0</b>

4. Full Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u>	<u>HOURS</u>	<u>CRP</u>
	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM/IMI</u>
Defensive Combat Maneuvers	4/2/1	6.0/4.0/4.0	1.2/0.5/0
Externals	0/1/1	0.0/2.0/1.0	0.0/0.25/0
Nuclear, Biological, and Chemical	1/1/1	1.0/2.0/2.0	0.25/0.25/0
Alternate Insertion/Extraction	2/0/1	3.0/0.0/2.0	0.55/0.0/0
Tactics	2/2/1	6.0/4.0/4.0	0.7/0.55/0
Carrier Qualification	<u>2/1/1</u>	<u>2.5/1.0/1.0</u>	<u>0.5/0.25/0</u>
<b>TOTAL FOR PHASE</b>	<b>11/7/6</b>	<b>18.5/13.0/14.0</b>	<b>3.2/1.8/0</b>
<b>COMBINED TOTAL</b>	<b>18</b>	<b>31.5</b>	<b>5.0</b>
<b>TOTAL</b>	<b>129</b>	<b>234.0</b>	<b>100.0</b>

121. FLIGHT TRAINING FOR REFRESHER PILOT1. Combat Capable Phase

<u>STAGE</u>	<u>EVENTS</u>	<u>HOURS</u>
	<u>ACFT/SIM</u>	<u>ACFT/SIM</u>
Familiarization	4/4	6.5/8.0
Instruments	2/2	4.0/4.0
Confined Area Landings	1/0	1.5/0.0
Navigation	1/0	1.5/0.0
Tiltrotor Low Altitude Training	2/0	4.0/0.0
Formation	1/0	2.0/0.0
Night Systems	4/3	8.0/6.0
Combat Capable Check	<u>2/1</u>	<u>3.5/1.0</u>
<b>TOTAL FOR PHASE</b>	<b>17/10</b>	<b>31.0/13.0</b>
<b>COMBINED TOTAL</b>	<b>27</b>	<b>44.0</b>
<b>TOTAL</b>	<b>27</b>	<b>44.0</b>

2. Combat Ready Phase

<u>STAGE</u>	<u>EVENTS ACFT/SIM</u>	<u>HOURS ACFT/SIM</u>
Confined Area Landings	2/0	3.5/0.0
Formation	1/0	1.5/0.0
Tiltrotor Low Altitude Training	2/1	3.0/2.0
Night Systems	4/1	7.0/2.0
Aerial Refueling	2/0	3.0/0.0
Aerial Gunnery	1/2	1.5/4.0
Defensive Combat Maneuvers	0/1	0.0/2.0
Tactics	2/0	4.0/0.0
<b>TOTAL FOR PHASE</b>	<b>14/5</b>	<b>23.5/10.0</b>
<b>COMBINED TOTAL</b>	<b>19</b>	<b>33.5</b>
<b>TOTAL</b>	<b>46</b>	<b>77.5</b>

3. Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS ACFT/SIM</u>	<u>HOURS ACFT/SIM</u>
Carrier Qualification	4/1	5.5/2.0
Night Systems	3/1	4.5/2.0
Externals	2/0	4.0/0.0
Defensive Combat Maneuvers	1/0	1.5/0.0
Tactics	2/1	5.0/2.0
Alternate Insertion/Extraction	1/0	2.0/0.0
Mountain Area Training	2/0	3.0/0.0
<b>TOTAL FOR PHASE</b>	<b>15/3</b>	<b>25.5/6.0</b>
<b>COMBINED TOTAL</b>	<b>18</b>	<b>31.5</b>
<b>TOTAL</b>	<b>64</b>	<b>109.0</b>

4. Full Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS ACFT/SIM</u>	<u>HOUR ACFT/SIM</u>
Defensive Combat Maneuvers	2/2	3.0/4.0
Externals	0/1	0.0/2.0
Nuclear, Biological, and Chemical	0/1	0.0/2.0
Tactics	2/0	6.0/0.0
Carrier Qualification	2/0	2.5/0.0
<b>TOTAL FOR PHASE</b>	<b>6/4</b>	<b>11.5/8.0</b>
<b>COMBINED TOTAL</b>	<b>10</b>	<b>19.5</b>
<b>TOTAL</b>	<b>74</b>	<b>128.5</b>

122. FLIGHT TRAINING FOR MODIFIED REFRESHER PILOT1. Combat Capable Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u> <u>ACFT/SIM</u>
Familiarization	1/3	1.5/6.0
Instruments	1/1	2.0/2.0
Confined Area Landings	1/0	1.5/0.0
Navigation	0/0	0.0/0.0
Tiltrotor Low Altitude Training	1/0	2.0/0.0
Formation	1/0	2.0/0.0
Night Systems	4/1	8.0/2.0
Combat Capable Check	<u>1/1</u>	<u>2.0/1.0</u>
<b>TOTAL FOR PHASE</b>	<b>10/6</b>	<b>19.0/11.0</b>
<b>TOTAL</b>	<b>16</b>	<b>30.0</b>

123. FLIGHT TRAINING FOR FRS INSTRUCTOR/CONTRACT SIMULATOR INSTRUCTOR

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u> <u>ACFT/SIM</u>
Familiarization	2/0	3.0/0.0
Instruments	0/1	0.0/2.0
Confined Area Landings	1/0	1.5/0.0
Navigation	0/1	0.0/1.5
Formation	1/0	1.5/0.0
Externals	1/0	1.5/0.0
Tiltrotor Low Altitude Training	0/1	0.0/2.0
Night Systems	0/4	0.0/6.0
Standardization Check	<u>1/0</u>	<u>2.0/0.0</u>
<b>TOTAL FOR PHASE</b>	<b>4/5</b>	<b>9.5/11.5</b>
<b>TOTAL</b>	<b>9</b>	<b>21.0</b>

124. FLIGHT TRAINING FOR VLAT INSTRUCTOR

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u> <u>ACFT/SIM</u>
VLAT	<u>2/1</u>	<u>3.5/2.0</u>
<b>TOTAL FOR PHASE</b>	<b>2/1</b>	<b>3.5/2.0</b>
<b>TOTAL</b>	<b>3</b>	<b>5.5</b>

125. FLIGHT TRAINING FOR AR INSTRUCTOR

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u> <u>ACFT/SIM</u>
AR	<u>1/1</u>	<u>2.0/2.0</u>
<b>TOTAL FOR PHASE</b>	<b>1/1</b>	<b>2.0/2.0</b>
<b>TOTAL</b>	<b>2</b>	<b>4.0</b>

126. FLIGHT TRAINING FOR REQUIREMENTS, QUALIFICATIONS, DESIGNATIONS

<u>STAGE</u>	<u>EVENTS</u>	<u>HOURS</u>
	<u>ACFT/SIM/IMI</u>	<u>ACFT/SIM/IMI</u>
RQD	11/0/3	16.5/0.0/5.0
<b>TOTAL FOR PHASE</b>	<u>11/0/3</u>	<u>16.5/0.0/5.0</u>
<b>TOTAL</b>	<b>11</b>	<b>16.5</b>

130. SIMULATOR TRAINING

1. General. Events designated by an "S" in the event header shall be flown in a training device equipped to meet the objectives listed in the event description; each event requires specific simulator capabilities. For each individual event, a flight simulator is categorized as Full Mission Capable (FMC), Partial Mission Capable (PMC), or Non-Mission Capable (NMC) based on the status of mission essential simulator subsystems. The following definitions apply:

a. FMC. All simulator subsystems required to meet the training objectives for the event to be flown are installed and operating properly.

b. PMC. A simulator subsystem or capability considered highly desirable, but not essential, to meet the training objectives is not installed or is not operating properly. While the event can still be completed, the quality of training is degraded.

c. NMC. The device lacks the capability to complete the event due to a critical subsystem or capability being inoperative or not installed.

2. Simulator Mission Essential Subsystems Matrix (MESM). Figure 1-2 illustrates how the absence of a particular simulator subsystem or capability effects simulator MC status for each training event in this Manual. All simulator events will be completed in a FMC or PMC simulator as determined by the MESM. Completion of an event in a PMC simulator shall be noted on the ATF with a description of the impact to training. Under no circumstances will an event be completed in a device determined to be NMC for that event without the approval of the commanding officer.

3. Motion. Motion systems significantly enhance training quality and are always preferred if available. Allocation of full motion simulators shall favor the Combat Capable phase due to the fundamental nature of this training.

4. Tactical Environment. Events designated as "S-TEN" require an approved tactical environment simulation capable of introducing both semi-autonomous threats and moving models controllable from the tactical operator station.

5. Networked Simulation. Events designated as "S-TEN+" require an approved tactical environment simulation and at least one additional, networked, man-in-the-loop MV-22 simulator to meet the training objectives. A moving model controlled from the operator station does not satisfy the man-in-the-loop requirement.

6. Database Selection. Gaming areas should be selected based on their ability to best meet the training objectives for the event.

7. Briefing. Simulator event briefs shall be identical, both procedurally and in content, to aircraft event briefs.

8. If the flight simulator is not available, simulator periods may be flown in the aircraft.

9. Scheduling. The time between a simulator event and the corresponding aircraft event should be minimized to the maximum extent possible.

<u>Failed Sub-system</u>	<u>NMC for:</u>	<u>PMC for:</u>
Any VMS component	Any event	
Motion		Any 100-level event, SFORM, SAR
Aural	Any SDCM, STAC	Any event
Visual	Any event other than SINST	Any event coded A/S
NVG Visual	Any event designated NS	
DIGMAP	Any SFAM-110, SNAV, SCAL, SVLAT, STAC	Any event
FLIR	Any 100-level event designated N or NS, SFAM-110	Any event designated N or NS
NVG HUD	Any 100-level event designated NS	Any event designated NS
Flight Director	Any 100-level SINST, SNAV, SFAM-110	Any SINST
Basic ENAV functions	Any SINST	
Basic INAV functions	Any SNAV, SCAL, SVLAT, STAC	Any event
Basic Moving Models	SFORM, SEXT, SCQ, SAR	
Tactical Environment	Any event designated TEN	
Networked Players	Any STAC event designated TEN+	Any event designated TEN+
Lead-ship/Demo Record/Playback	SFORM	Any 100 level event
EW Suite	SDCM, STAC	
Gun	TBD	TBD
RADALT	Any 100-level SFAM, SCAL, SVLAT, SNS	Any event
Debrief Station		Any event
Left Pilot MFDs	Any event with a PUI in the left seat	Any event
Left Pilot RFIS		Any event
Right Pilot MFDs	Any event with a PUI in the right seat	Any event
Right Pilot RFIS		Any event
MDL	SFAM-110, SNAV, SVLAT navigation, STAC, SNS VLAT	Any event
Standby Instruments		Any event

Figure 1-2.--Simulator Mission Essential Subsystems Matrix (MESM).

131. EVENT TRAINING NOMENCLATURE. Per T&R Manual, Administrative, the following nomenclature is used to differentiate aircraft and simulator events. The aircraft is used for those events designated with an "A" and the flight simulator is used for those events designated with an "S" in the event header. To give commanding officers the maximum amount of flexibility for training, some events allow for the optional use of simulators or aircraft. Those types of events will use the designator "A/S" for aircraft preferred, simulator optional and "S/A" for simulator preferred, aircraft optional.

### 132. TRAINING EVENT PERFORMANCE REQUIREMENTS

1. Purpose. To become familiar with aircraft limitations, operating procedures, and emergency procedures; demonstrate knowledge of NATOPS, local course rules, and safety regulations pertinent to flight operations. Develop and maintain tactical proficiency and knowledge.

#### 2. General

a. This Manual generalizes mission guidance to allow for local conditions and to allow this Manual to remain unclassified. HQMC (DC AVN) and CG MCCDC encourage squadrons to use the full range of tactics contained in the tactical manuals and adopt the latest developed and proven tactics.

b. Compliance with the written event description is mandatory for syllabus event completion. In the absence of a flight simulator, completion of S-coded syllabus events are not required to complete a stage of training. Completion of those events should be accomplished as soon as practicable upon simulator availability. Should the command desire, simulator events can be flown as aircraft flight events for T&R credit. CRM shall be stressed and evaluated throughout all training.

c. This Manual requires the use of an aerial observer for all dual point external flights and all DCM flights versus an air threat. However, the squadron commanding officer may, at his discretion, employ an aerial observer on any flight event. The requirement for an aerial observer is intended to provide a second crewmember in the aircraft cabin section. A designated aerial observer or crew chief may fill this requirement.

d. If, in the instructor's opinion, the PUI does not adequately perform a required event, then all or parts of the sortie shall be repeated until adequate performance is demonstrated.

e. All flights shall terminate with a comprehensive debrief with emphasis on the aircrew's performance. Instructors should use all available debriefing techniques.

f. Pilots shall fly events annotated with an "N" or "NS" at least 30 minutes after official sunset.

g. Pilots shall fly events annotated with an "NS" with Night Vision Devices (NVD). Events annotated with "(N)" are night optional. Events annotated with "(NS)" may be flown in the day or with NVDs at night.

#### 3. Syllabus Assignment

a. Basic and Transition pilots will be assigned to fly the entire syllabus. Conversions, Refreshers, and Modified Refreshers will fly the flights designated by a "C," "R," or "M" respectively in the flight description.

b. Refresher Syllabus. The Refresher syllabus is predicated on the experience of the Refresher pilot. A pilot in the Refresher syllabus should fly all "R" coded events. **However, a Refresher pilot need not fly every event within a stage of training to be re-qualified in that stage. The unit commanding officer may tailor the Refresher syllabus to fit the experience of the Refresher pilot per T&R Manual, Administrative.** Any modification to the Refresher syllabus by the unit commanding officer shall be documented in Section 3 of the pilot's APR prior to commencement of training. When the "R" coded events within a stage of training are complete, the pilot may be credited with the CRP for the entire stage of training. This assumes that the Refresher has had previous proficiency in that stage of training. If the Refresher pilot has no previous proficiency in a stage or particular event, then the Refresher should fly the entire stage or all events not previously flown.

c. Modified Refresher Program (MRF). Personnel who have been out of the cockpit for 486-730 days will receive a MRF IAW T&R Manual, Administrative. Following completion of the MRF at the FRS, the pilot will complete the Refresher syllabus in accordance with figure 1-3.

4. Aircrew Evaluation Flights. All pilots shall have an appropriate NATOPS evaluation form completed annually upon completion of the following:

a. NATOPS Check (CCX-180, RQD-601). A designated NATOPS Instructor/Assistant NATOPS Instructor shall evaluate RQD-601.

b. Instrument Check (RQD-600). A designated Instrument Instructor who is a member of the Instrument Flight Board shall evaluate RQD-600.

c. All initial events shall be documented using applicable training forms. An aircraft commander proficient in a given event, with requisite instructor qualifications, and acting in the capacity as an aircraft commander, shall evaluate any initial event required for a Basic, Conversion, or Refresher pilot unless a specific instructor pilot requirement is assigned to the event.

5. Integrated Multimedia Instruction (IMI). Pilots shall not fly an aircraft or simulator event without first completing the corresponding IMI lesson or lessons for the event. All replacement aircrew (RACs, Refreshers, etc.) shall complete the Pre-FAM IMI course prior to commencing simulator/aircraft training at the FRS. Completion of IMI lessons shall be documented in the APR. Courseware shall be reviewed on an annual basis to ensure concurrency with the aircraft, procedures, and tactics.

6. Crew Position Designator. Basic and Transition pilots should fly in the left seat during the Combat Capable phase of training whenever practical. Refresher pilots should fly in the right seat for Combat Capable training whenever practical.

7. Aircrew Training Forms (ATFs)

a. An ATF is required for any initial event completed by a Basic, Transition, and Refresher pilot or as recommended by the Squadron Standardization Board.

b. **If the commanding officer has waived a syllabus event, the squadron training officer shall place a waiver letter in section 3 of the APR.**

## 8. Instructor Requirements

a. The instructor requirement is noted at the right margin of each event. If an instructor is not listed for the event, the minimum requirement is a Tiltrotor Aircraft Commander (TAC) proficient and current in the event to be instructed.

### b. Simulator Events

(1) For Combat Capable simulator events, the minimum instructor requirement is a Contract Simulator Instructor (CSI) or an FRS Instructor Pilot (IP) qualified to operate the device. Except for SFAM-100 and SFAM-101, Combat Capable simulator events shall be instructed from one of the pilot seats for Basic RACs. Once designated by the FRS Commanding Officer, a CSI may instruct any Combat Capable simulator event to include VLAT and Night Systems. Certification as a CSI may be withdrawn by the FRS Commanding Officer at any time.

(2) A designated squadron IP is required for Combat Ready, Combat Qualification and Full Combat Qualification simulator events. The type of squadron IP required is contained in the right margin of the event header. If the event header contains no instructor requirement, then the minimum requirement is a TAC proficient and current in the event to be instructed. Not all post-FRS simulator events require the instructor to occupy a crew station.

(3) Basic networked events require a tactical network operator. Networked STAC events require a scenario created and controlled by a qualified Tactical Simulation Instructor (TSI). During events designated as S-TEN or S-TEN+, the simulator(s) shall be configured (fuel, internal load, ordnance, etc.) in accordance with the flight brief and the mission scenario.

### c. Flight Events

(1) For Combat Capable flight events, the minimum instructor requirement is an FRS IP. An IP, once designated by the FRS Commanding Officer, may instruct any day or night unaided Combat Capable flight event. Additional instructor designation requirements are specified in the right margin of the event header. Certification shall be in accordance with the specific syllabus contained in paragraph 150 of this chapter or the MAWTS-1 course catalog.

(2) If a specific designation of IP is required for a Combat Ready, Combat Qualification, or Full Combat Qualification the requirement will be contained in the right margin of the event header.

9. Event Completion. The event is complete once the training objectives have been met. Times indicated for each event are for planning purposes only.

10. Weight and Balance. V-22 Mission Planning System (VMPS) will be the primary method used to complete weight and balance sheets, with paper products as the alternate, per NATOPS guidelines and Standing Operating Procedures.

11. VMPS. All tactical and non-tactical applications of the VMPS will be discussed in detail for each event.

12. Crew Requirements/Position Designations. Crew requirements are listed for each stage of training.

13. Sequence. Training should be accomplished by flying events within a stage in sequence and stages in sequence when practical.

14. Definitions

a. Discuss

(1) The IP shall discuss a system, procedure, or maneuver during the brief, in flight, or debrief.

(2) The PUI shall demonstrate an understanding of all discussed items listed in the event description.

(3) All Demonstrated/Introduced flight events shall be discussed during the brief.

(4) Emergencies listed in the event description are treated as discussion items during the brief and may be simulated during the flight at the option of the IP and in accordance with unit SOP. EPs for Simulator events will be treated as Demonstrate/Introduce items on the event in which they are listed and are subject to review during any subsequent event.

b. Demonstrate

(1) The IP performs the maneuver with accompanying description. Playback of recorded demonstrations may be used during simulator events.

(2) The PUI observes the maneuver and is responsible for knowledge of the procedures during the brief.

c. Introduce

(1) At his option, the IP may perform the maneuver with an accompanying description, or he may coach the PUI through the maneuver without demonstration.

(2) The PUI shall perform the maneuver with coaching as necessary and is responsible for knowledge of the procedures prior to the flight.

d. Review

(1) The IP observes and grades the maneuver without coaching the PUI. An airborne critique of the PUI's performance is at the option of the instructor.

(2) The PUI is expected to perform the maneuver without coaching, devoid of procedural error, and at a level acceptable to warrant progress in the syllabus.

e. Expose

(1) The IP shall expose the PUI to the procedure or consideration during the brief, in flight or debrief.

(2) The PUI is not responsible for the knowledge of the procedure or consideration prior to the flight.

15. Crew Resource Management (CRM). Aircrews **shall** brief techniques of CRM for all flights and/or events.

16. Operational Risk Management (ORM). Aircrews shall brief those factors that affect risk mitigation decisions for every flight or mission.

17. Rules of conduct for Defensive Combat Maneuvers (DCM)

a. Purpose. To standardize the training rules for tiltrotor aircraft conducting DCM training. These training rules apply to all DCM sorties. Subject matter experts review training requirements and qualification criteria for crewmembers and the inherent responsibilities of commanders and supervisory personnel to ensure crewmembers achieve training toward combat readiness by the safest and most realistic means available. The DCM training rules set forth herein and in the MAWTS-1 DCM Guide are minimum requirements. Squadron commanders should promulgate supplementary directives to delineate syllabus contents, proficiency levels, communications procedures, safety precautions, and other applicable areas of concern. Responsibility for the safe and efficient implementation of realistic combat training rests with all levels of command.

b. Scope. DCM training is designed to develop the high level of skill required to defend against the current and future threat. The T&R Manual, Administrative, OPNAVINST 3710.7, the MAWTS-1 DCM Guide, and this Manual contain the overall policies, responsibilities, training syllabi, and flight objectives for DCM training. DCM consists of four types of events:

- (1) Introduction of Aircraft Survivability Equipment (ASE).
- (2) 2 Tiltrotor vs a ground threat.
- (3) 2 Tiltrotor vs R/W.
- (4) 2 Tiltrotor vs F/W.

c. Authority. CG MCCDC tasks the Commanding Officer, MAWTS-1 with developing training courses (both ground and flight), establishing standards and presenting said courses in support of operating units. Appropriate T&R syllabi and the MAWTS-1 Course Catalog contain MAWTS-1 course topics, USMC standards of performance, and criterion for instructor certification. Authority and responsibility for overall supervision of DCM flight rests with Operational Commanders.

d. Safety. Squadrons conducting DCM will conduct it within the guidelines of this chapter and the MAWTS-1 DCM Guide. Squadron commanders shall ensure that crewmembers conducting DCM training are properly qualified and appropriate flight leadership is represented within the flight. Chapter 6 describes DCM qualifications and designations.

(1) Squadrons shall conduct training flights pursuant to the applicable T&R syllabus under direct supervision of experienced flight leaders. Moreover, the DCM lead shall thoroughly brief/debrief all participants in the conduct of the flight.

- (2) Unscheduled DCM is strictly prohibited.

e. DCM Training Areas

(1) Training shall only be conducted in designated warning areas, restricted areas, Military Operating Areas (MOAs), appropriate blocks of controlled airspace as assigned by air traffic control (ATC), or in other

designated areas where safe separation from non-participants can be maintained.

(2) At a minimum, designated DCM training areas shall be clear of Federal airways, control zones, and other areas of air traffic congestion, unless established pursuant to a letter of agreement with the Federal Aviation Administration (FAA) or host nation agreement.

f. DCM Flight Requirements. Crewmembers participating in DCM will conform to the following flight guidelines.

(1) When all crewmembers of a flight are DCM qualified, the flight does not require a Defensive Combat Maneuvering Instructor (DCMI).

(2) Minimum crew requirements shall be IAW the applicable T&R syllabus.

(3) A non-DCM qualified pilot may participate in DCM training, provided the Tiltrotor Aircraft Commander is a designated DCMI. Non-DCM qualified aircrew serving in the cabin section may participate in DCM training, provided the other aircrew serving in the cabin section is a designated DCMI.

(4) DCM must be conducted in day VMC conditions.

(5) Minimum tiltrotor altitude is 200 feet AGL.

(6) The tactical wingman is always responsible for separation during the engagement.

(7) Minimum weather for DCM vs 1 F/W shall be 3000/5 with a definable horizon and shall not be conducted through an under/overcast.

(8) Pilots of F/W aircraft participating in DCM shall be LAT qualified and proficient.

(9) Minimum F/W altitude is 500 feet AGL.

(10) No slow speed, high AOA maneuvering below 10,000 ft by F/W.

(11) No supersonic flight is authorized.

g. DCM Syllabus. Squadrons shall conduct DCM training per the appropriate syllabus contained in T&R Manual and the MAWTS-1 course catalog.

h. DCM Flight Briefs

(1) Crewmembers shall brief DCM training rules per the MAWTS-1 DCM Guide, the T&R Manual, Administrative, and OPNAVINST 3710.7 prior to DCM training.

(2) DCM participants shall conduct face-to-face briefs. Operational commanders may waive DCM face-to-face brief requirements as outlined below.

(a) At a minimum, one individual from each participating unit shall attend a face-to-face brief.

(b) For units not co-located, a telephone brief may satisfy the face-to-face briefing requirement. The following guidelines for telephone briefs and debriefs apply:

1 The flight leaders shall conduct the telephone brief.

2 All applicable training rules shall be covered during the telephone brief.

3 The flight leaders receiving the telephone brief will brief all other participating crewmembers prior to their flights.

### 133. COMBAT CAPABLE PHASE

1. Purpose. To develop a Combat Capable copilot. At the completion of this phase the PUI will be a NATOPS qualified T2P and rate the 7532 MOS as specified in CCX-193.

#### 2. Familiarization (FAM)

a. Purpose. To develop familiarity with aircraft flight characteristics, limitations, and emergency procedures. Develop proficiency in all maneuvers and instill basic CRM behaviors throughout the familiarization stage.

b. General. During all stages, the PUI shall complete a weight and balance form before each flight and present it to the IP for verification.

c. Crew requirements. SFAM-100 and 101: IP not required in cockpit seat. Events can be conducted using two RACs or PUIs.

d. Prerequisites. Pre-FAM IMI (1.100 series) complete. Egress training complete prior to flights in the aircraft.

e. Ground Training. IMI 1.101 to 1.120 series.

f. Simulator Training. (12 Events, 24.0 Hours).

g. Flight Training. (8 Flights, 13.0 Hours).

SFAM-100            2.0                    S

Goal. Introduce cockpit preflight, basic CMS functionality and aircraft start-up and shutdown procedures.

#### Requirement

##### (1) Discuss

- (a) Capabilities and limitations of the training device.
- (b) Cockpit layout, controls and checklist.
- (c) Digital information vs. analog information.
- (d) Battery operations and APU starting procedures.
- (e) Basic CMS functionality.

1 Major components of the CMS (to include avionics busses and interface units).

2 Human interface (input/manipulation of information).

3 CMS power-up configuration.

4 MFDs, CDU/EICAS and Multi Function Keyboard.

5 Crew Alerting System (W/C/As, voice warning, color/priority logic, ASIs and OIDs).

6 Communications internal (ICS) and external (AN/A.RC-210 normal modes and functions).

(f) Engine start-up and shutdown procedures.

(g) Blade fold wing stow system/procedures.

1 BFWS Sequence Fail.

(h) CRM.

(i) VMPS utilization.

(j) Maintenance downloads.

(2) Introduce

(a) Cockpit preflight and checklist procedures.

(b) Battery operations, APU start and CMS power-up.

(c) Engine start-up and shutdown procedures.

(d) Communication procedures (Internal/External).

(e) Blade fold wing stow procedures.

#### Performance Standards

(1) Properly use the prestart, start, and shutdown checklists.

(2) Locate and identify cockpit switches and equipment.

Prerequisite. IMI 1.100.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-101

2.0

R S

Goal. Review cockpit preflight, basic CMS functionality and aircraft start-up and shutdown procedures. Introduce ground emergencies.

#### Requirement

(1) Discuss

(a) Engines and related systems.

1 Major assemblies of the AE1107C.

2 FADEC, FPMU, PMA.

3 TCRS.

4 Engine control panel.

5 Engine starting, ignition and oil systems.

- (b) APU.
- (c) No APU shutdown.
- (d) External power shutdown.
- (e) Engine limitations.
- (f) Engine W/C/As.
- (g) Basic CMS functions (COMM, ENAV and IFF, with VMPS considerations).
- (h) Ground emergencies.
- (i) CRM.
- (j) BFWS sequence fail.
- (k) Hot Start.
- (l) Hung Start.
- (m) Wet Start.

(2) Introduce

- (a) Basic CMS functions (COMM, ENAV and IFF).
  - 1 COMM plan upload, CDU/EICAS, RFIS and radio select panel use.
  - 2 Tune and identify TACAN station and select TACAN needle and CDI.
  - 3 Tune and identify VOR station and select VOR needle and CDI.
  - 4 IFF mode 3A/3C operations.
- (b) External power shutdown.
- (c) W/C/As (those associated with the emergencies of this event).

(3) Review

- (a) Cockpit preflight and checklist procedures.
- (b) Battery operations, APU start and CMS power-up.
- (c) Engine start-up and shutdown procedures.
- (d) Communication procedures.

(e) Blade fold wing stow procedures.

(4) Emergencies

- (a) Emergency egress on the ground.
- (b) Emergency shutdown.
- (c) APU fail/no APU shutdown.
- (d) Rotor brake on (Caution).
- (e) Engine fire on ground/during start.
- (f) Wing fire on ground.

Performance Standards

- (1) Recognize ground emergencies and execute proper procedures IAW Aircrew Pocket Checklist (APCL).
- (2) Demonstrate knowledge of basic CMS functions required of introduced and reviewed items.

Prerequisites. SFAM-100, IMI 1.101 series.

Ordnance. None.

External Syllabus Support. N/A.

SFAM-102

2.0 S

Goal. Introduce ground taxi and low work. Demonstrate hovering emergencies below 30 feet.

Requirement

(1) Discuss

- (a) Capabilities and limitations of the training device.
- (b) Engines and related systems (continued from SFAM-101).
  - 1 Nacelle air management system.
  - 2 IR suppression/exhaust deflection system.
  - 3 Engine monitoring system.
  - 4 Engine and related systems W/C/As.
  - 5 Engine displays and CMS information.
- (c) Ground taxi operations.
- (d) Low work (demonstrate/introduce events).
- (e) Utilization of VMPS & NATOPS Manual to determine performance data.

- (f) Use of the nacelle trim switch.
  - (g) Nacelle angle/nose attitude relationship in the hover, "hover nacelle."
  - (h) TCL vs. Collective.
  - (i) HIGE/HOGE.
  - (j) Flight displays and symbology.
  - (k) Hovering emergencies below 30 feet.
  - (l) CRM.
- (2) Demonstrate/Introduce
- (a) All required checklists.
  - (b) Normal ground taxi (power steering on and off).
  - (c) Rearward ground taxi.
  - (d) Vertical takeoff to a hover.
  - (e) Power/systems check.
  - (f) Precision hover (level nose, nose high/low at various altitudes).
  - (g) Air taxi.
    - 1 Forward, left and right.
    - 2 Rearward with nacelles.
    - 3 Rearward with cyclic to show adverse effects.
  - (h) Hover turns.
  - (i) Square patterns.
  - (j) Hover and taxi nacelle drills.
  - (k) Vertical landing from a hover.
  - (l) W/C/As (those associated with the emergencies of this flight).
- (3) Review
- (a) Cockpit preflight and checklist procedures.
  - (b) Aircraft start-up and shutdown procedures.
  - (c) Basic CMS proficiency.
  - (d) Previous ground emergencies.

(4) Emergencies

- (a) Single engine failure - hover.
- (b) Dual engine failure - hover below 30 feet.
- (c) Wheel brake failure.
- (d) Nose wheel steering malfunction.

Performance Standards

- (1) Conduct taxi and low work IAW MV-22B Stan Manual.
- (2) Execute hovering EPs IAW APCL.

Prerequisite. SFAM-101, VMVT-204 IMI 1.102 series.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-103

2.0

S

Goal. Review low work and ground emergencies. Introduce forward flight in conversion mode and OEI emergencies.

Requirement(1) Discuss

- (a) VMS basic architecture/overview.
- (b) #1 and #2 Hydraulic systems (basic knowledge, covered in more detail during FAM-112).
- (c) Primary Flight Control System (PFCS).
  - 1 FCCs.
  - 2 PFCS operation.
  - 3 PFCS fail/reset light.
  - 4 Mechanical flight controls.
  - 5 Electro-hydraulic controls.
  - 6 Flight Control Laws (CLAWS).
  - 7 TCRS.
  - 8 Conversion protection system "Conversion Corridor."
  - 9 PFCS W/C/As.
- (d) Transition to forward flight from a hover.

(e) Power adjustments during transitions from hover to forward flight and approach to hover.

(f) Flight characteristics in the conversion mode; including level flight, turns, climbs, descents and level speed changes.

(g) Flight characteristics during nacelle rotation, nacelle angle/airspeed relationship.

(h) Normal landing pattern.

(i) Normal approach to a hover.

(j) Running Landing.

(k) Single engine takeoff/inflight emergencies.

(l) Single engine failure aborted takeoff.

(m) Single engine failure non-aborted takeoff.

(n) CRM.

(2) Demonstrate/Introduce

(a) All required checklists.

(b) Transition to forward flight from a hover.

(c) Normal landing pattern.

(d) Normal approach to a hover.

(e) Running Landings.

(f) Level speed changes in conversion mode using nacelle trim.

(g) W/C/As (those associated with the emergencies of this flight).

(3) Review

(a) Ground taxi operations.

(b) Low work (introduced events from SFAM-102).

(4) Emergencies

(a) Single engine failure inflight.

(b) Engine emergency restart inflight.

Performance Standards

(1) Conduct normal pattern operations IAW MV-22B Stan Manual.

(2) Properly recognize normal approach glide slope.

Prerequisites. SFAM-102, IMI 1.103 series.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-104

2.0 S

Goal. Introduce conversion mode maneuvers.

Requirement

(1) Discuss

(a) VMS basic architecture/overview (continued from SFAM-103).

(b) Automatic Flight Control System (AFCS).

1 Control panel.

2 Full time and selectable modes of operation.

3 Cyclic grip and TCL switches (AFCS unique).

4 CDU default pages (AFCS unique).

5 AFCS Reset.

6 AFCS DISENGAGE caution and AFCS FAULT advisory.

(c) Vortex ring state.

(d) STO (60 and 70 degrees nacelle settings).

(e) Steep approach.

(f) No hover landing.

(g) Use/limitations of OBOGS.

(h) CRM.

(2) Demonstrate/Introduce

(a) STO (60 and 70 degrees nacelle settings).

(b) Steep approach.

(c) No hover landing.

(d) W/C/As (those associated with the emergencies of this flight).

(3) Review

(a) Transition to forward flight (from a hover).

(b) Normal landing pattern.

- (c) Normal approach to a hover.
  - (d) Level speed changes in conversion mode.
  - (e) Running landing.
  - (f) OEI takeoff/inflight emergencies.
- (4) Emergencies
- (a) Inflight fires.
    - 1 Engine fire.
    - 2 Wing fire.
    - 3 Cockpit or cabin fire.
  - (b) Smoke and fume elimination.
  - (c) OEI waveoff.
  - (d) Single engine landing.
  - (e) Recovery from high rate of descent/vortex ring state.

Performance Standards

- (1) Conduct STOs IAW MV-22B Stan Manual.
- (2) Properly recognize steep approach glide slope.

Prerequisites. SFAM-103, IMI 1.104 series.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-105

2.0

S

Goal. Review conversion mode maneuvers. Introduce transitions and conversions between modes of flight. Demonstrate pitch-up with side slip characteristics.

Requirement

- (1) Discuss
  - (a) Drive/Proprotor systems.
    - 1 MWGB.
    - 2 TAGB.
    - 3 PRGB.
    - 4 Gearbox oil systems/Emergency Lube System (ELS).
    - 5 Drive System Interface Unit (DSIU).

- (b) Interconnecting Driveshaft System (ICDS).
  - (c) Use of interim power.
  - (d) Max gross takeoff (from hover) and landings.
  - (e) Transition/conversion rates versus cyclic migration.
  - (f) Level transition to airplane mode (descending tendencies).
  - (g) Level conversion to conversion mode (ballooning tendencies).
  - (h) Airspeed limitations for conversion (220/200 knots).
  - (i) AFCS failed flight vs. AFCS off (conversion mode).
  - (j) CRM.
- (2) Demonstrate/Introduce
- (a) Level transition to airplane mode.
  - (b) Level conversion to conversion mode.
  - (c) Use of interim power.
  - (d) Max gross takeoff (from hover) and landings.
  - (e) AFCS failed flight (conversion mode only).
  - (f) Pitch-up with side slip characteristics.
  - (g) W/C/As (those associated with the emergencies of this flight).
- (3) Review
- (a) STO (60 and 70 degrees nacelle settings).
  - (b) Running landing.
  - (c) Steep approach.
  - (d) No hover landing.
  - (e) OEI waveoff/landing.
- (4) Emergencies
- (a) Engine Cautions.
    - 1 Engine Np overspeed.
    - 2 Engine Ng overspeed.
    - 3 Engine MGT overtemp.

- 4 Engine overtorque.
- 5 Engine surge/compressor stall.
- 6 Engine oil pressure low.
- 7 Engine oil quantity low.
- 8 Engine oil pressure/temp high.
- 9 Engine chips.
- 10 MGT time limit exceeded.
- 11 Nacelle blower failure.

Performance Standards

(1) Demonstrate proper transition and conversion procedures IAW MV-22B Stan Manual.

(2) Conduct EPs IAW with APCL.

Prerequisites. SFAM-104, IMI 1.105 series.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-106

2.0                      S

Goal. Introduce airplane mode flight.

Requirement

(1) Discuss

(a) Drive/Proprotor systems (continued).

1 Rotating controls.

2 Pendulum damper assembly.

3 Spinner.

4 Proprotor system sensors.

5 Drive system W/C/As.

6 Drive system displays/CMS information.

(b) Utility hydraulic system (basic function and system components).

(c) Landing gear system.

(d) Transition/conversion procedures.

(e) Proprotor/Nr efficiency in airplane mode.

- (f) Transition/conversion rates versus cyclic migration.
  - (g) Loss/gain of altitude characteristics during transitions/conversions.
  - (h) Aircraft trim (Power Attitude Trim principles).
  - (i) Airspeed restrictions below 10,000 feet.
  - (j) CRM.
- (2) Demonstrate/Introduce
- (a) Aircraft trim.
  - (b) Level speed changes (airplane mode).
  - (c) Climbs and descents at various airspeeds.
  - (d) Turns up to 30 degrees AOB at various airspeeds.
  - (e) Auto-beep response.
  - (f) AFCS failed (airplane mode).
  - (g) W/C/As (those associated with the emergencies of this flight).
- (3) Review
- (a) Level transition to airplane mode, 1,000 feet AGL min.
  - (b) Level conversion to conversion mode, 1,000 feet AGL min.
  - (c) Use of interim power.
  - (d) Max gross takeoff (from hover) and landings.
  - (e) AFCS failed (conversion mode).
- (4) Emergencies
- (a) Drive systems cautions.
    - 1 RPM LOW Warning.
    - 2 RPM HIGH.
  - (b) PRGB cautions.
  - (c) TAGB cautions.
  - (d) MWGB cautions.

Performance Standards

- (1) Conduct level transitions and conversions IAW MV-22B Stan Manual maintaining altitude +/- 200 ft.

(2) Conduct airplane mode maneuvers IAW MV-22B Stan Manual.

Prerequisite. SFAM-105, IMI 1.106 series.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-107

2.0

R S

Goal. Introduce airplane mode maneuvers (continued from SFAM-106).

Requirement

(1) Discuss

(a) Fuel system.

1 Fuel Management Unit (FMU).

2 Fuel system configuration (aux tanks).

3 Fuel flow/fuel planning normal operations.

4 Fuel system displays/CMS.

5 Fuel flow, AR/HIFR.

6 Hot refuel checklist.

(b) Transition to airplane mode from takeoff (Attention to descending tendencies).

(c) Landing pattern entry in airplane mode.

(d) Attitude versus rate control by AFCS.

(e) Pitch limiting (control laws/SLL).

(f) Conversion Corridor.

(g) Cabin door open.

(h) Inadvertent IMC.

(i) CDU back-up using MFD.

(j) DEU failure.

(k) CRM.

(2) Demonstrate/Introduce

(a) Transition to airplane mode from takeoff.

(b) Emergency descent in airplane mode.

(c) Landing pattern entry in airplane mode.

- (d) Attitude versus rate control by AFCS.
- (e) Pitch limiting.
- (f) CDU back-up using MFD.
- (g) DEU failure.
- (h) W/C/As (those associated with the emergencies of this flight).

(3) Review

- (a) Aircraft trim.
- (b) Level speed changes.
- (c) Climbs and descents at various airspeeds.
- (d) Turns up to 30 degrees AOB at various airspeeds.
- (e) AFCS failed (airplane mode).

(4) Emergencies

- (a) Fuel system cautions.
  - 1 Filter bypass cautions.
  - 2 Fuel quantity low cautions.
  - 3 Fuel venting.
  - 4 Fuel Management Unit (FMU) or FMU Interlink Failure.
  - 5 Trapped fuel.
- (b) Inadvertent IMC.

Performance Standards. Conduct airplane mode maneuvers IAW MV-22B Stan Manual.

Prerequisites. SFAM-106, IMI 1.107 series.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-108

2.0

R S

Goal. Introduce slow flight airplane mode maneuvers, high AOB turns, power on/off stalls and dual engine failures.

Requirement(1) Discuss

- (a) Fuel system (continued).
  - 1 Fuel dump system.
  - 2 Ground Refuel/Defuel Panel (GRDP).
  - 3 Fuel system W/C/As.
  - 4 Fuel system displays/CMS information.
- (b) Slow flight characteristics in airplane mode.
- (c) Weight/CG limitations in airplane mode.
- (d) Stall speeds versus angle of bank/load factor.
- (e) Stall characteristics and recovery procedures in conversion and airplane modes.
- (f) Practice power on/off stall procedures.
- (g) Dual engine failure procedures in conversion and airplane modes. Simulator modeling limitations.
- (h) Crash landing.
- (i) CRM.

(2) Demonstrate/Introduce

- (a) Slow flight in airplane mode.
- (b) High AOB turns in airplane mode (60 degrees AOB).
- (c) Practice power on/off stalls.
- (d) Conversion mode stalls.
- (e) Dual engine failure procedures in conversion and airplane modes.
- (f) W/C/As (those associated with the emergencies of this flight).

(3) Review

- (a) Transition to airplane mode from takeoff.
- (b) Landing pattern entry in airplane mode.

(4) Emergencies

- (a) Engine FADEC cautions.
  - 1 Dual FADEC failure.

- 2 Single FADEC failures.
- 3 Loss of engine control system data.
- 4 FADEC auto transfer failure.
- 5 FADEC manual transfer failure.
- 6 FADEC control redundancy failure.
- 7 FADEC B hot.

(b) Dual engine failure landing.

(c) Landing gear failures - fail to extend.

Performance Standards. Demonstrate proper power on/off stalls IAW MV-22B Stan Manual.

Prerequisites. SFAM-107, IMI 1.108 series.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-109

2.0

R M S

Goal. Review all airplane maneuvers to include slow flight (airplane mode), high AOB turns, power on/off stalls and dual engine failures. Introduce Flight Director.

Requirement

(1) Discuss

(a) Electrical systems (AC).

- 1 Generator Control Unit (GCU).
- 2 Constant Frequency Generators (CFG).
- 3 Variable Frequency Generators (VFG).
- 4 FCC power sources.
- 5 Six AC busses.
- 6 Power distribution panels/AC power receptacles.
- 7 External Power.

(b) Flight Director panel functionality (core modes).

(c) Flight Director cueing/Flight Director coupled modes.

(d) Pitch/Power cue versus mode of flight.

(e) Auto nacelle.

(f) Display fixation ("head down" tendencies).

(g) CRM.

(h) Hover Coupled.

(2) Demonstrate/Introduce

(a) Use of Flight Director and associated cueing in conversion mode.

(b) Use of Flight Director and associated cueing in airplane mode.

(c) Use of Flight Director and associated cueing during transitions and conversions.

(d) Coupled modes.

(e) W/C/As (those associated with the emergencies of this flight).

(3) Review

(a) Slow flight in airplane mode.

(b) High AOB turns in airplane mode.

(c) Practice power on/off stalls.

(d) Dual engine failure procedures in conversion and airplane modes.

(4) Emergencies

(a) SDC failure.

(b) Electrical system cautions.

1 Bus failures.

2 GEN 1 and GEN 2 fail.

3 GEN 3 and GEN 4 fail.

4 Dual Regulated Converter Failure.

Performance Standards

(1) Demonstrate basic knowledge of Flight Director operation and function.

(2) Conduct high AOB turns in airplane mode maintaining altitude +/- 200 ft.

Prerequisites. SFAM-108, IMI 1.109 series.

Ordinance. None.

External Syllabus Support. N/A.SFAM-1102.0R M S

Goal. Review basic CMS functionality. Introduce basic mission management, DIGMAP, and Flight Director.

Requirement(1) Discuss

(a) Waypoints (Adding, Editing, Deleting).

1 Via MDL upload (VMPS interface).

2 Via CDU Keyboard.

3 Via Overfly/Update Key.

4 Via DIGMAP.

5 Via FLIR.

(b) Flight plans (Building, Activating, Editing, Deleting).

1 Via MDL (VMPS interface).

2 Via CDU Keyboard.

3 Via DIGMAP.

(c) Threats (Adding, Editing, Deleting).

1 Via MDL (VMPS interface).

2 Via DIGMAP/CDU.

(d) Mission Management.

1 Bingo.

2 Introduce TOT displays/management.

(2) Introduce

(a) Waypoints (Adding, Editing, Deleting).

1 Via MDL upload (VMPS interface).

2 Via CDU Keyboard.

3 Via Overfly/Update Key.

4 Via DIGMAP.

5 Via FLIR.

(b) Flight plans (Building, Activating, Editing, Deleting).

1 Via MDL (VMPS interface).

2 Via CDU Keyboard.

3 Via DIGMAP.

(c) Threats (Adding, Editing, Deleting).

1 Via MDL (VMPS interface).

2 Via DIGMAP/CDU.

(d) Mission Management.

1 Bingo.

2 Introduce TOT displays and management.

(3) Review. Basic CMS functions.

(4) Expose. METT-TSL as a basis for tactical planning.

#### Performance Standards

(1) Demonstrate proper use of CMS.

(2) Accurately build, activate, and edit flight plans.

Prerequisites. SFAM-109, IMI 1.110 series, VMPS class.

Ordinance. None.

External Syllabus Support. N/A.

#### FAM-111

#### 1.5                      A (MV-22)

Goal. Introduce start-up/shutdown, ground operations, low work, normal landing pattern, normal approach, and emergencies.

#### Requirement

(1) Discuss

(a) Electrical systems (DC)

1 Aircraft battery/battery control system.

2 Converter Units.

3 Six DC busses.

4 Integrated Wiring System (IWS)/Wiring Interface Assemblies (WIA).

5 Generator cooling.

6 Electrical W/C/As.

7 Electrical displays/CMS information.

- (b) Vortex ring state.
- (c) Engine start malfunctions.
- (d) Cockpit emergency egress on the ground.
- (e) Emergency exits, ingress/egress system.
- (f) Single engine failure aborted takeoff.
- (g) Single engine failure non-aborted takeoff.
- (h) CRM.

(2) Introduce

- (a) Aircraft start-up and shutdown.
- (b) Normal taxi (power steering on and off).
- (c) Rearward taxi.
- (d) Vertical takeoff to a hover.
- (e) Power and gauge check.
- (f) Precision hover (level nose, nose high/low at various altitudes).
- (g) Air taxi.
- (h) Hover turns.
- (i) Square patterns.
- (j) Vertical landing from the hover.
- (k) Hover and taxi nacelle drills.
- (l) Transition to forward flight.
- (m) Normal landing pattern.
- (n) Level speed changes.
- (o) Normal approach.
- (p) W/C/As (those associated with the emergencies of this flight).

(3) Review

- (a) Aircraft preflight.
- (b) CMS knowledge and proficiency for stage of training.

- (c) Checklist procedures.
- (d) Communication procedures.
- (4) Emergencies
  - (a) Emergency shutdown.
  - (b) Engine fire on ground/during start.
  - (c) Single engine failure in a hover.
- (5) Expose. Aircraft signatures.

Performance Standards

- (1) Demonstrate proper pre-start, start, taxi, takeoff, landing, and shutdown procedures in accordance with APCL.
- (2) Conduct taxi, vertical takeoff, and low work IAW MV-22B Stan Manual.
- (3) Conduct vertical landings with minimal lateral drift.
- (4) Conduct normal pattern operations in accordance with MV-22B Stan Manual.
- (5) Recognize proper normal approach glide slope.

Prerequisites. SFAM-110, IMI 1.111 series.

Ordinance. None.

External Syllabus Support. N/A.

FAM-112

1.5                      R A (MV-22)

Goal. Review ground, low work, and normal landing pattern procedures. Introduce conversion mode maneuvers.

Requirement

- (1) Discuss
  - (a) Hydraulic Systems.
    - 1 Flight control actuators.
    - 2 Hydraulic Power Drive Unit (HPDU).
    - 3 Hydraulic control modules.
    - 4 Switching/Isolation Valves.
    - 5 Hydraulic swivel fittings.
    - 6 Hydraulic oil cooler.
    - 7 Hydraulic W/C/As.

8 Hydraulic displays/CMS information.

(b) Environmental Control System (ECS).

(c) CRM.

(2) Introduce

(a) STO (60 and 70 degrees nacelle settings).

(b) Level transition to airplane mode (1,000 ft AGL min).

(c) Level conversion to conversion mode (1,000 ft AGL min).

(d) Running landing.

(e) Steep approach.

(f) No hover landing.

(g) Use of interim power.

(h) Max gross takeoff (from hover) and landings.

(i) AFCS off flight.

(j) Pitch-up side slip characteristics.

(k) Use of Flight Director symbology.

(l) W/C/As (those associated with the emergencies of this flight).

(3) Review

(a) Aircraft start-up and shutdown.

(b) Ground taxi operations.

(c) Low work (introduced events from FAM-111).

(d) Normal landing pattern.

(e) Level speed changes (Conversion Mode).

(4) Emergencies

(a) Hydraulic hot, high pressure, or low pressure.

(b) Single HYD system failure.

(c) Dual HYD system failure.

(d) ECS failure.

(5) Expose. Threat Systems (Surface to Air).

Performance Standards

- (1) Conduct STOs IAW MV-22B Stan Manual.
- (2) Properly recognize steep approach glide slope.
- (3) Execute no hover landings with minimal drift.

Prerequisites. FAM-111, IMI 1.112 series.

Ordinance. None.

External Syllabus Support. N/A.

FAM-113

2.0

A (MV-22)

Goal. Introduce airplane mode flight.

Requirement(1) Discuss

(a) AN/A.RC-210 (V) Radio and VMPS considerations.

1 HAVEQUICK modes and functions.

2 SINCGARS modes and functions.

3 Maritime modes and functions.

4 SATCOM modes and functions.

5 Remote control head.

(b) AN/A.PX-100 IFF system and VMPS considerations.

(c) Pneumatic system.

(d) Fire detection system.

(e) Crash Survivable Memory Unit (CSMU).

(f) CRM.

(2) Introduce. Maneuvers in this section of the event are to be conducted twice. First, without Flight Director symbology and then with Flight Director symbology.

(a) Aircraft trim.

(b) Level speed changes (airplane mode).

(c) Climbs and descents at various airspeeds.

(d) Turns up to 30 degrees AOB at various airspeeds.

(e) W/C/As (those associated with the emergencies of this flight).

(3) Review

- (a) Level transition to airplane mode (1,000 ft AGL min).
- (b) Level conversion to conversion mode (1,000 ft AGL min).
- (c) Conversion mode maneuvers in the landing pattern.
- (d) Use of Flight Director symbology.
- (e) AFCS off flight.
- (f) Pitch-up side slip characteristics.

(4) Emergencies

- (a) Flight controls.
  - 1 AFCS Disengagement.
  - 2 Dual FCC failure.
  - 3 Multiple ADS failure.
  - 4 Critical swashplate fault.
  - 5 Single or multiple swashplate actuator fault.
  - 6 Conversion actuator failure.
  - 7 Elevator Actuator Failure or Critical Elevator Fault.
  - 8 Force Feel Failures.

(5) Expose. Threat Systems (Air to Air).Performance Standards

- (1) Conduct airplane mode maneuvers IAW MV-22B Stan Manual.
- (2) Conduct level transitions and conversions maintaining altitude +/- 100'.
- (3) Conduct level turns maintaining altitude +/- 100 feet.
- (4) Execute normal conversion mode landing pattern maintaining assigned altitude +/- 100 feet, airspeed +/- 10 knots, heading +/- 5 degrees, and maintaining normal glide slope.

Prerequisites. FAM-112, IMI 1.113 series.

Ordinance. None.

External Syllabus Support. N/A.

FAM-114

1.5                      A (MV-22)

Goal. Introduce airplane mode maneuvers (continued from FAM-113). Fly with or simulate a 4,000 pound load.

Requirement(1) Discuss

- (a) Ingress/Egress system.
- (b) Personnel equipment.
- (c) Emergency equipment.
- (d) Windshield wiper and washer system.
- (e) CRM.

(2) Introduce

- (a) Transition to airplane mode from takeoff (attention to descending tendencies).
- (b) Landing pattern entry in airplane mode.
- (c) Attitude versus rate control by AFCS.
- (d) Pitch limiting.
- (e) CDU back-up using MFD.
- (f) W/C/As (those associated with the emergencies of this flight).
- (g) Utilize internal cargo if possible.

(3) Review

- (a) Aircraft trim.
- (b) Level speed changes in conversion and airplane modes.
- (c) Climbs and descents at various airspeeds.
- (d) Turns up to 30 degrees AOB at various airspeeds.
- (e) W/C/As (those associated with the emergencies of this flight).

(4) Emergencies

- (a) Flight controls (continued).
  - 1 Dual flapping sensor failure.
  - 2 No response on PFCS Reset.
  - 3 Miscellaneous flight control Single Failure.
  - 4 Nacelle control cautions.

(5) Expose. Basic Survivability Concepts.

Performance Standards

- (1) Conduct airplane mode maneuvers IAW MV-22B Stan Manual.
- (2) Maintain +/- 100 feet during level speed changes.
- (3) Maintain altitude +/- 100 feet during 30 degree AOB turns in airplane mode.
- (4) Maintain positive rate of climb during transition to airplane mode from takeoff.

Prerequisites. FAM-113, IMI 1.114 series.

Ordinance. None.

External Syllabus Support. N/A.

FAM-115

1.5                      R A (MV-22)

Goal. Introduce slow flight airplane mode maneuvers, high AOB turns, and power on/off stalls.

Requirement(1) Discuss

(a) VSLED.

1 Architecture/Overview.

2 Airborne Unit (AU).

3 Vibration sensors.

4 Hanger bearing transducers.

5 Engine diagnostics.

6 Rotor track and balance.

(b) Rotor brake system.

(c) Aircraft stall characteristics and recovery procedures.

(d) Practice power on/off stall procedures.

(e) Dual engine failure procedures in conversion and airplane modes.

(f) CRM.

(2) Introduce

(a) Slow flight in airplane mode.

(b) High AOB turns in airplane mode (>45 degrees AOB).

(c) Practice power on/off stalls.

(d) W/C/As (those associated with the emergencies of this flight).

(3) Review

(a) Transition to airplane mode from takeoff.

(b) Landing pattern entry in airplane mode.

(4) Emergencies

(a) Avionics cautions.

1 Avionics bay hot.

2 Single/Dual mission computer failure.

3 Single/Dual DEU failure.

4 ABIU, NIU, WIU failures.

(b) Rotor brake failure.

(5) Expose. Basic supporting arms concepts.

Performance Standards

(1) Demonstrate/practice power on/off stall procedures IAW MV-22 Stan Manual.

(2) Conduct high AOB turns IAW MV-22B Stan Manual.

(3) Maintain assigned altitude +/- 200 feet, airspeed +/- 10 knots, and heading +/- 10 degrees during landing pattern entry in airplane mode.

Prerequisites. FAM-114, IMI 1.15 series.

Ordinance. None.

External Syllabus Support. N/A.

FAM-116

2.0 R A (MV-22)

Goal. Review all airplane maneuvers to include slow flight (airplane mode), high AOB turns, power on/off stalls.

Requirement

(1) Discuss

(a) Cargo provisions.

(b) Flight Director/Coupled modes.

(c) Auto nacelle.

(d) CRM.

(2) Introduce

(a) Flight Director/Coupled modes.

(b) W/C/As (those associated with the emergencies of this flight).

(3) Review

(a) Slow flight in airplane mode.

(b) High AOB turns in airplane mode.

(c) Practice power on/off stalls.

(4) Emergencies

(a) Landing gear malfunctions.

1 Landing gear fails to extend.2 Landing with hung gear.(5) Expose. Introduction to battlefield geometry.Performance Standards

(1) Demonstrate proper use of the Flight Director.

(2) Execute practice power on/off stalls IAW MV-22B Stan Manual without assistance.

Prerequisites. FAM-115, IMI 1.116 series.Ordinance. None.External Syllabus Support. N/A.SFAM-1172.0 M SGoal. Prepare the PUI for the FAM stage progress check.Requirement. Review all FAM normal and emergency procedures.Performance Standards. Demonstrate proper procedures for all FAM maneuvers IAW MV-22B Stan Manual.Prerequisites. SFAM-110, IMI 1.117 series.Ordinance. None.External Syllabus Support. N/A.FAM-1181.5 R M A (MV-22)Goal. FAM stage progress check. Fly with or simulate a 4,000 pound load.

Requirement. Review all normal and emergency procedures in stage. Demonstrate knowledge of aircraft systems and tiltrotor flight characteristics.

Performance Standards. Execute all FAM maneuvers IAW MV-22B Stan Manual.

Prerequisites. FAM-116, SFAM-117.

Ordnance. None.

External Syllabus Support. N/A.

SFAM-119

2.0

S N

Goal. Introduce FLIR and night unaided FAM maneuvers.

Requirement

(1) Discuss

(a) Lighting systems.

1 Interior lighting controls and MFD preflight.

2 Exterior lighting controls.

3 Searchlight.

(b) Night adaptation/visual effects.

(c) Night scanning techniques.

(d) Fixation tendencies.

(e) Radar altimeter low setting.

(f) Use of hover display.

(g) Use of Flight Director/coupled modes.

(h) Prelaunch communications with light signals.

(i) CRM.

(j) Blindfold cockpit check.

(k) Capabilities and use of FLIR.

1 Variables affecting FLIR performance.

2 Preflight planning for FLIR use.

3 FLIR thermal calibrate.

4 Manual versus Auto gain.

5 Track Handle and TCL.

6 FPV Mode.

7 LACE.

8 FWD Mode.

9 MAN Mode.

10 PT Mode.

11 SCAN Mode.

12 INS Update.

13 CRM considerations during FLIR employment.

(2) Introduce

(a) Low work.

(b) Transition to forward flight (from the hover).

(c) Normal landing pattern.

(d) Normal approach.

(e) STO (60 and 75 degrees nacelle as directed).

(f) Running landing.

(g) Steep approach.

(h) No hover landing.

(i) Transition to airplane mode from takeoff (attention to descending tendencies).

(j) Landing pattern entry in airplane mode.

(k) Use of Flight Director.

(j) Use of hover display.

(k) Use of FLIR.

1 Track Handle and TCL.

2 FPV Mode.

3 LACE.

4 FWD Mode.

5 MAN Mode.

6 PT Mode.

7 SCAN Mode.

8 INS Update.

(1) AFCS off flight.

(3) Emergencies

(a) Single engine hover, takeoff and inflight failures.

(b) Engine emergency restart inflight.

(c) Inflight engine fire.

(d) ICDS failure.

(e) OEI landing.

(f) OEI waveoff.

(4) Expose. Control of Aircraft and Missiles.Performance Standards. Demonstrate proper knowledge of FLIR function and procedures.Prerequisites. SFAM-110, IMI 1.119 series.Ordinance. None.External Syllabus Support. N/A.FAM-1201.5                      A (MV-22) NGoal. Introduce night unaided FAM maneuvers.Requirement(1) Discuss

(a) Crew day/crew rest.

(b) Civilian airfield traffic pattern and entry procedures.

(c) Civilian airfield lighting.

(d) Radar altimeter low setting.

(e) Use of hover display.

(f) Use of Flight Director/coupled modes.

(g) Use of FLIR.

1 Track Handle and TCL.2 FPV Mode.3 FWD Mode.4 MAN Mode.

5 PT Mode.

6 SCAN Mode.

7 INS Update.

(h) CRM.

(2) Review

(a) Low work.

(b) Transition to forward flight (from the hover).

(c) Normal landing pattern and normal approach.

(e) STO (60, 70, and 75 degrees nacelle as directed).

(f) Running landing.

(g) Steep approach.

(h) No hover landing.

(i) Transition to airplane mode from takeoff (attention to descending tendencies).

(j) Landing pattern entry in airplane mode.

(k) Use of Flight Director/coupled modes.

(l) Use of hover display.

(m) AFCS off flight.

(n) Capability and use of the FLIR.

1 Track Handle and TCL.

2 FPV Mode.

3 FWD Mode.

4 MAN Mode.

5 PT Mode.

6 SCAN Mode.

7 INS Update.

(o) Blindfold cockpit check.

(3) Emergencies

(a) Single engine hover, takeoff and inflight failures.

(b) Single engine landing.

(c) Single engine waveoff.

(d) Inflight engine fire.

(4) Expose. Introduction to tactical doctrinal publications.

Performance Standards

(1) Demonstrate proper use of FLIR in all modes.

(2) Conduct unaided FAM maneuvers IAW MV-22B Stan Manual.

Prerequisites. FAM-118, SFAM-119, and IMI 1.120 series.

Ordinance. None.

External Syllabus Support. N/A.

3. Instruments (INST)

a. Purpose. To develop proficiency in instrument flight using all installed navigational equipment.

b. General

(1) Instrument flights should be conducted under both day and night conditions. All instrument flights, whether day or night, should be conducted under instrument conditions for the PUI, using an instrument hood when necessary. One flight will be conducted at night. Refresher pilots will complete their annual instrument check in conjunction with INST-127. Therefore, they are required to have their semi-annual minimums and instrument ground school complete prior to INST-127. Basic pilots whose instrument check will expire within three months of leaving the FRS will also meet the above requirements. Computer aided flight planning will be used to the greatest extent possible.

(2) If any SINST code is to be conducted at night, PUI shall be SFAM-119 complete.

(3) If INST-125, 126, or 127 are to be conducted at night, PUI shall be FAM-120 complete.

c. Crew Requirement. For SINST-121, 122, 123, and 124, the IP is not required to be located in one of the pilot seats. Two RACs or PUIs may occupy the pilot seats.

d. Ground Training. IMI 2.121-2.123 series, Instrument Ground School for Annual Instrument Check.

e. Simulator Training. (4 Events, 8.0 Hours).

f. Flight Training. (3 Flights, 6.0 Hours).

SINST-121            2.0                    S (N)

Goal. Introduce basic instrument flight.

Requirement(1) Discuss

- (a) MFDs for IFR flight.
- (b) Instrument checklist.
- (c) Spatial disorientation/Vertigo.
- (d) Instrument scanning techniques.
- (e) Fixation tendencies.
- (f) ITO.
- (g) Transitions while in a climb.
- (h) Conversions while in a descent.
- (i) Vertical S-1 pattern.
- (j) Turn pattern.
- (k) Oscar pattern.
- (l) Timed turns/compass turns.
- (m) Unusual attitudes/recovery procedures.
- (n) "Black cockpit"/standby flight displays.
- (o) COMM 1 remote control.
- (p) CRM.

(2) Introduce

- (a) ITO.
- (b) Transitions while in a climb.
- (c) Conversions while in a descent.
- (d) Basic instrument exercises using raw data only in both modes of flight.
  - 1 Vertical S-1.
  - 2 Turn pattern.
  - 3 Oscar pattern.
  - 4 Timed turns/compass turns.
- (e) Basic instrument maneuvers applying full use of the Flight Director/coupled mode.
- (f) Unusual attitudes/recovery.

(g) "Black cockpit" operations.

(3) Emergencies

(a) Ice Prot Fail.

(b) AFCS Disengagement.

Performance Standards. Demonstrate proper procedures for Basic Instrument (BI) maneuvers IAW MV-22B Stan Manual.

Prerequisites. SFAM-106, and IMI 2.121 series.

Ordinance. None.

External Syllabus Support. N/A.

SINST-122

2.0

S (N)

Goal. Introduce non-precision approaches and airway navigation procedures with emphasis on raw data.

Requirement

(1) Discuss

(a) ENAV functions.

(b) IFR FLIPs and procedures.

(c) Controlled airspace/airway navigation procedures.

(d) Position reporting procedures.

(e) Non-precision approaches.

(f) Holding.

(g) Weather minimums.

(h) Approach and landing minimums.

(i) Minimum fuel requirements for IFR flights.

(j) Alternate airfield requirements.

(k) Flight plan filing criteria.

(l) Flight plan close-out procedures.

(m) CRM.

(2) Introduce

(a) Flight plan activation to IMC release.

(b) Departure/Climb-out.

(c) CMS ENAV functions.

(d) Airways navigation (raw data emphasis).

1 Radial to radial intercepts.

2 TACAN/VOR tracking.

3 Point-to-point navigation (FD inputs).

4 TACAN/VOR holding.

5 Wind corrections.

6 Time/Distance determination.

(e) Non-precision approaches (raw data emphasis).

1 TACAN.

2 VOR.

3 LOC/LOC back course.

4 UHF/ADF.

5 ASR.

(f) Missed approach.

(g) Flight plan close out.

(3) Review

(a) ITO.

(b) Unusual attitudes.

(c) "Black cockpit" operations.

(4) Emergencies

(a) RPM LOW warning.

(b) RPM HIGH.

(c) Flight control cautions.

Performance Standards

(1) Execute proper procedures for airways navigation maintaining altitude +/- 100 feet, course within 5 degrees, and airspeed +/- 10 knots.

(2) Execute proper procedures for non-precision approaches, arriving at the missed approach point at +/- 100 feet of MDA and +/- 3 degrees of course.

(3) Complete conversion and landing checks by the FAF.

Prerequisites. SINST-121, and IMI 2.122 series.

Ordinance. None.

External Syllabus Support. N/A.

SINST-123

2.0

R S (N)

Goal. Introduce precision approaches with emphasis on raw data, high altitude operations, and penetration procedures.

Requirement

(1) Discuss

- (a) High altitude FLIPs and procedures.
- (b) Penetration checklist.
- (c) Precision approaches.
- (d) Precision approach minimums.
- (e) Use of ATIS and AWOS.
- (f) Pilot to metro services.
- (g) PIREPS.
- (h) CRM.

(2) Introduce

- (a) Class A airspace procedures.
- (b) Penetration checklist.
- (c) Penetration/high altitude approach.
- (d) ILS approach.
- (e) PAR approach.

(3) Review

- (a) Flight plan activation to IMC release.
- (b) Departure/climb-out.
- (c) CMS/ENAV functions.
- (d) Airways navigation.
- (e) Holding.
- (f) Missed approach.
- (g) Flight plan close out.

(4) Emergencies

- (a) Hydraulic hot cautions.
- (b) Hydraulic pressure low cautions.
- (c) Hydraulic system high pressure cautions.
- (d) Single HYD system failure.
- (e) Dual HYD system failure.
- (f) Fuel cautions.
- (g) O2N2 system fail.

Performance Standards

- (1) Execute proper procedures for airways navigation maintaining altitude +/- 200 feet, course within 5 degrees, and airspeed +/- 10 knots.
- (2) Execute proper procedures for precision approaches, arriving at the decision height +/- 3 degrees of course.
- (3) Complete conversion and landing checks by the FAF.

Prerequisites. SINST-122, and IMI 2.123 series.

Ordinance. None.

External Syllabus Support. N/A.

SINST-124

2.0

R M S/A N

Goal. Review IFR, non-precision and precision approach procedures with emphasis on Flight Director functions and coupled modes.

Requirement(1) Discuss

- (a) Aircraft instrument equipment requirements.
- (b) Actual instrument conditions.
- (c) SIGMETS and AIRMETS.
- (d) Declaring emergencies (MAYDAY, PAN PAN).
- (e) Instrument approach lighting.
- (f) CRM.

(2) Review

- (a) TACAN approach.

- (b) VOR approach.
- (c) LOC/LOC back course approaches.
- (d) UHF/ADF approach.
- (e) ASR approach.
- (f) PAR approach.
- (g) GPS approach.
- (h) ILS approach.

(3) Emergencies

- (a) Inflight fire.
- (b) Avionics cautions.

Performance Standards. Display proper use of the Flight Director during IFR navigation and approaches.

Prerequisite. SINST-123, FAM-115 if flown in aircraft.

Ordinance. None.

External Syllabus Support. N/A.

INST-125

2.0 A/S (MV-22) (N)

Goal. Review previously introduced basic instruments, IFR, approach and airway navigation procedures.

Requirement

(1) Discuss

- (a) Icing (structural, rime, clear).
- (b) Lost comm procedures.
- (c) IFF during emergencies/lost comm.
- (d) Aldis lamp signals.
- (e) Aircraft de-ice and anti-ice systems.

1 Associated W/C/As.

2 Icing displays/CMS information.

- (f) CRM.

(2) Review

- (a) Flight plan filing and IMC release.
- (b) Departure procedures.

- (c) Airways navigation.
  - (d) Holding.
  - (e) Non-precision approach.
  - (f) Precision approach.
  - (g) Missed approach.
  - (h) Turn pattern (airplane mode).
  - (i) Unusual attitudes (airplane/conversion mode).
  - (j) Oscar pattern (conversion mode).
- (3) Emergencies
- (a) Icing and thunderstorms.
  - (b) Lost communications.

Performance Standards

- (1) Execute proper procedures for airways navigation maintaining altitude +/- 100 feet, course within 5 degrees, and airspeed +/- 10 knots.
- (2) Execute proper procedures for non-precision and precision approaches, arriving at the missed approach point within 100 feet (above but not below) of MDA and +/- 3 degrees of course or at the decision height +/- 3 degrees of course.
- (3) Complete conversion and landing checks by the FAF.

Prerequisites. SINST-124, FAM-115, FAM-120 if flown at night.

Ordinance. None.

External Syllabus Support. N/A.

INST-126

2.0                      R A/S (MV-22) (N)

Goal. Review previously introduced basic instruments, IFR, approach and airway navigation procedures. Intent of training flight is to conduct first half under a preplanned/filed IFR flight plan and second half VFR plan with basic instrument work ending with inflight filing (IFR) to return to base.

Requirement

- (1) Discuss
  - (a) SIDs.
  - (b) STARs.
  - (c) Visual approach.

- (d) Contact approach.
  - (e) Aircraft category.
  - (f) Airspace classifications.
  - (g) Terminal RADAR services.
  - (h) Inflight filing (VFR/IFR).
  - (i) CRM.
- (2) Introduce. Inflight filing.
- (3) Review
- (a) Flight plan filing and IMC release.
  - (b) Departure procedures.
  - (c) Airways navigation.
  - (d) Holding.
  - (e) Non-precision approach.
  - (f) Precision approach.
  - (g) Missed approach.
  - (h) Turn pattern (airplane mode).
  - (i) Unusual attitudes (airplane/conversion mode).
  - (j) Oscar pattern (conversion mode).
- (4) Emergencies
- (a) Single engine failure.
  - (b) Simulated "Black Cockpit" (PUI will mask both MFDs).

#### Performance Standards

- (1) Execute proper procedures for airways navigation maintaining altitude +/- 100 feet, course within 5 degrees, and airspeed +/- 10 knots.
- (2) Execute proper procedures for non-precision and precision approaches, arriving at the missed approach point within 100 feet (above but not below) of MDA and +/- 3 degrees of course or at the decision height +/- 3 degrees of course.
- (3) Display proper voice and communication procedures.
- (4) Complete conversion and landing checks by the FAF.

Prerequisite. INST-125, FAM-120 if flown at night.

Ordinance. None.

External Syllabus Support. N/A.

INST-127

2.0

R M A/S (MV-22) (N)

Goal. Conduct instrument evaluation.

Requirement. IP will develop flight scenario. PUI will brief, plan, execute and debrief based on IP guidance.

Performance Standards. Execute an instrument evaluation flight IAW OPNAV 3710, NATOPS Instrument Flight Manual, and MV-22B Stan Manual.

Prerequisites. INST-126, instrument flight minimums per OPNAV 3710.

Ordinance. None.

External Syllabus Support. N/A.

#### 4. Confined Area Landings (CAL)

a. Purpose. To develop proficiency in performing single aircraft takeoffs and landings in confined areas in day VMC.

b. General. PUI must demonstrate the capability to safely takeoff and land in a confined area during the day.

c. Crew Requirement. IP/PUI/CC.

d. Ground Training. IMI 3.130 series.

e. Simulator Training. (1 Event, 2.0 Hours).

f. Flight Training. (1 Flight, 1.5 Hours).

SCAL-130

2.0

S

Goal. Demonstrate/introduce CALs at various sites.

Requirement

(1) Discuss

(a) Phases of CALs (enroute, site evaluation, approach, hovering, landing, takeoff).

(b) CAL types (confined area, pinnacle, ridge line).

(c) Site evaluations.

(d) CAL environment (size, shape, slope, winds, obstacles, ingress/egress route, suitability, topography).

(e) External factors (wind, visual illusions, temperature, time of day, altitude).

(f) Power requirements/performance charts (HIGE, HOGE, height velocity diagram) with VMPS considerations.

(g) Radar altimeter settings.

(h) Interim power.

(i) Pitch-up side slip characteristics.

(j) FLIR operation during CALs.

(k) INAV functions used during CALs.

(l) Digital map.

(m) "Power-on" approach.

(n) Closure rate versus descent rate.

(o) Vortex Ring State.

(p) Brown-out.

(q) Overfly versus offset approaches.

(r) Waveoff.

(s) EAPS operations.

(t) Standard terminology.

(u) CRM.

(2) Demonstrate/Introduce

(a) INAV functions (WYPT steer).

(b) FM Homing.

(c) CAL site evaluation.

(d) Landing pattern.

(e) Approach.

1 Normal.

2 Steep.

3 Overfly (180, 270, 360)

4 Offset (0, 90, 180, 270).

5 Low level.

(f) Vertical and no hover landings.

(g) Takeoff.

1 Obstacle.

2 Max performance.

3 Max gross weight (marginal power).

(h) Brown-out/White-out procedures.

(i) Waveoff.

(j) W/C/As (those associated with the emergencies of this flight).

(3) Emergencies

(a) Single engine failure in a hover.

(b) Single engine failure on takeoff.

(c) Single engine failure inflight.

(d) Single engine landing.

(e) Single engine waveoff.

(f) Power required exceeds power available.

(g) Vortex Ring State.

Performance Standards

(1) Demonstrate proper procedures for CAL approaches IAW MV-22B Stan Manual.

(2) Recognize proper glide slope for normal and steep approaches.

(3) Execute a minimum of 5 CALs.

Prerequisites. FAM-112 and IMI 3.130 series.

Ordinance. None.

External Syllabus Support. N/A.

CAL-131

1.5

R M A (MV-22)

Goal. Introduce CALs at various sites.

Requirement

(1) Discuss

(a) Zone brief.

(b) Aircraft clearance.

(c) Power requirements/performance charts (HIGE, HOGE, height velocity diagram) with VMPS considerations.

- (d) Radar Altimeter settings.
  - (e) Interim power.
  - (f) Pitch-up side slip characteristics.
  - (g) FLIR operation.
  - (h) INAV functions (WYPT steer).
  - (i) CRM.
- (2) Introduce
- (a) INAV functions (WYPT steer).
  - (b) FLIR operations.
  - (c) CAL site evaluation.
  - (d) Landing pattern.
  - (e) Approach (approaches from SCAL-130).
  - (f) Vertical and no hover landings.
  - (g) Takeoff (methods from SCAL-130).
  - (h) Brown-out/White-out procedures.
  - (i) Waveoff.
  - (j) W/C/As (those associated with the emergencies of this flight).
- (3) Emergencies
- (a) Single engine failure (hover).
  - (b) Single engine failure on takeoff.
  - (c) Single engine failure inflight.
  - (d) Single engine waveoff.

Performance Standards

- (1) Execute proper procedures for CAL approaches IAW MV-22B Stan Manual.
- (2) Maintain proper glide slope for normal and steep approaches.
- (3) Touchdown with minimum lateral and rearward drift.
- (4) Execute a minimum of 5 CALs.

Prerequisites. FAM-118, SCAL-130.

Ordnance. None.

External Syllabus Support. N/A.

5. Navigation (NAV)

a. Purpose. To develop the ability to conduct day VFR navigation utilizing the systems available in the MV-22.

b. General. The PUI will conduct a thorough map study and preparation using information provided by the IP along with computer aided flight planning and available electronic navigation systems.

c. Ground Training. IMI 4.140 series.

d. Crew Requirement. IP/PUI/CC.

e. Simulator Training. (1 Event, 2.0 Hours).

f. Flight Training. (1 Flight, 1.5 Hours).

SNAV-140

2.0

S

Goal. Introduce low level navigation (no lower than 300 feet AGL) using paper charts, pilotage, and aircraft navigational equipment.

Requirement

(1) Discuss

(a) Low level NAV techniques.

(b) WYPT/IP selection.

(c) Map preparation/map study.

(d) VMPS/MDL cartridge.

(e) GPS initialization.

1 Almanac data, cold start, warm start.

2 Accuracy (SPS, PPS, SA and A-S).

(f) GPS failure.

(g) LWINS (Kalman Filter, NAV initialization and alignment procedures).

(h) INS update methods, overfly store functions (when required).

(i) MSN Data Load, WYPT, FPLN, INAV, MSN key functionality.

(j) Flight Director/Flight Director panel operations.

(k) Digital map functions (Charts, DTED, CIB, HAT, CLOS and Threat Intervisibility).

(l) Integration of FLIR during navigation.

(m) CRM.

(2) Introduce. PUI will prepare and execute a navigation route.

(a) NAV initialization and alignment procedures during start-up.

(b) Time/distance checks, TOT and fuel management.

(c) Use of various maps/charts (e.g. 1:1,000,000, 1:500,000, 1:250,000, 1:50,000 etc.).

(d) MSN Data Load, WYPT, FPLN, INAV, MSN key functionality.

(e) FPLN activation/manipulation, NAV display (HSD) and Flight Director set-up operations.

(f) INS update methods, overfly store functions.

(g) Digital map functions.

(h) Integration of FLIR during navigation.

#### Performance Standards

(1) Execute a navigation route maintaining orientation +/- 1 nautical mile enroute and +/- 500 meters in the objective area.

(2) Prepare and execute a navigation route (including a paper product) 40 to 45 minutes in duration with a minimum of 6 intermediate checkpoints to an objective area (landing optional). Conversion shall be completed during ingress to the objective area. Ingress and egress using a paper chart, pilotage, and all CMS functions.

Prerequisites. SFAM-110, FAM-114, IMI 4.140 series, SCAL-130 if a CAL is planned at the objective.

Ordinance. None.

External Syllabus Support. N/A.

NAV-141

1.5

R A/S (MV-22)

Goal. Introduce low level navigation (no lower than 300 feet AGL) using time, distance and heading to an objective, then navigate using aircraft's navigational equipment to return to base. Navigate in both conversion and airplane modes. The focus should be on the use of charts, pilotage, and dead reckoning with an introduction to aircraft systems.

Requirement(1) Discuss

- (a) Low Level NAV techniques using an aeronautical chart.
- (b) WYPT/IP selection.
- (c) Map preparation/map study.
- (d) VMPS/MDL cartridge.
- (e) GPS initialization.
  - 1 Almanac data, cold start, warm start.
  - 2 Accuracy (SPS, PPS, SA and A-S).
- (f) LWINS (Kalman Filter, NAV initialization and alignment procedures).
- (g) INS update methods, overfly store functions (when required).
- (h) MSN Data Load, WYPT, FPLN, INAV, MSN key functionality.
- (i) Flight Director/Flight Director panel operations.
- (j) Digital Map functions (Charts, DTED, CIB, HAT, CLOS and Threat Intervisibility).
- (k) Integration of FLIR during navigation.
- (l) CRM.

(2) Introduce. PUI will prepare and execute a navigation route.

- (a) NAV initialization and alignment procedures during start-up.
- (b) Time/distance checks, TOT, and fuel management.
- (c) Use of various maps/charts (e.g. 1:1,000,000, 1:500,000, 1:250,000, 1:50,000 etc.).
- (d) MSN Data Load, WYPT, FPLN, INAV, MSN key functionality.
- (e) FPLN activation/manipulation, NAV display (HSD) and Flight Director set-up operations procedures.
- (f) Digital map functions.
- (g) Integration of FLIR during navigation.

Performance Standards

- (1) Execute a navigation route maintaining orientation +/- 1 nautical mile enroute and +/- 500 meters in the objective

area. Arrive at the objective area within 1 minute of planned time.

(2) Prepare and execute navigation routes (including a paper product) 25 to 30 minutes in duration with a minimum of 5 intermediate checkpoints, flown in conversion and airplane modes, to an objective area (landing optional). The ingress route (paper product) will exercise basic navigational skills without the use of the CMS. Egress using an equivalent route (VMPS derived) with the use of all CMS functions. Conversion shall be completed during ingress to the objective area.

(3) Demonstrate the knowledge of time/distance checks, TOT, and fuel management.

Prerequisites. FAM-118, SNAV-140, CAL-131 if a CAL is planned at the objective.

Ordnance. None.

External Syllabus Support. N/A.

#### 6. Tiltrotor Low Altitude Training (VLAT)

a. Purpose. To develop proficiency in VLAT maneuvers and navigation with emphasis on the importance of crew coordination, comfort level, common terminology and energy management.

##### b. General

(1) A designated VLATI is required for all initial aircraft VLAT instructional events. An FRS IP or CSI that has completed SVLAT-507 may instruct initial SVLAT events. The prerequisite academic lectures that support the VLAT stages are contained in the MAWTS-1 Academic Support Package except MITAC, which is self-contained. The academic training shall be completed prior to commencing the VLAT flight syllabus.

(2) Maneuver descriptions may be found in the MV-22 Tactics Manual, and are explained in the current MAWTS-1 Academic Support Package.

(3) Currency and altitudes are established and listed in the current edition of MCO P3500.14, T&R Manual, Administrative.

(4) The entire flight crew shall brief together for each flight.

c. Crew Requirement. VLATI/PUI/CC.

##### d. Ground Training

(1) IMI 5.150-5.151 series.

(2) Familiarity with Chapter 15, MV-22 Tactics Manual.

e. Simulator Training. (1 Event, 2.0 Hours).

f. Flight Training. (2 flights, 3.5 Hours).

SVLAT-1502.0S

Goal. Demonstrate/introduce aircraft maneuver performance and characteristics in the VLAT environment in airplane and conversion modes.

Requirement

(1) Discuss

- (a) Simulation limitations.
- (b) Purpose of VLAT maneuvering.
- (c) T&R Manual, Administrative, and MV-22 Tactics Manual information concerning VLAT rules of conduct.
- (d) VLAT altitude/airspeed restrictions (currency).
- (e) VLAT "stair step" to lower altitudes/proficiency.
- (f) Aircraft performance charts, energy maneuverability charts, aircraft capabilities and limitations.
- (g) Use of conversion mode in a low altitude environment.
- (h) Altitude effects with nacelle rotation.
- (i) Pitch-up side slip characteristics.
- (j) VLAT turns vs stall speeds.
- (k) Control laws, pitch limiting/SLL.
- (l) Radar altimeter setting.
- (m) Use of FLIR/Digital map.
- (n) Crew comfort levels/climb to cope.
- (o) Pilot techniques.
- (p) Tactical movement considerations.
- (q) Weather conditions/sun position and shadowing effects.
- (r) Flight safety/emergencies/pilot's reduced reaction times at low altitudes.
- (s) Standard terminology.
- (t) CRM.

(2) Demonstrate/Introduce

- (a) VLAT performance checks, interim power.
- (b) Low level flight/Contour profiles.

- (c) High AOB turns.
  - (d) Terrain masking/unmasking (traveling principles).
  - (e) Bunt.
  - (f) Roll.
  - (g) Low level quickstops.
  - (h) Slow speed flight.
  - (i) FLIR, Digital map and INAV operations.
- (3) Emergencies
- (a) Single engine failure at low altitude.
  - (b) Dual engine failure at low altitude.

Performance Standards

- (1) Demonstrate proper procedures for VLAT maneuvers IAW MV-22B Stan Manual.
- (2) Maintain Rules of Conduct (ROC) IAW T&R Manual, Administrative.

Prerequisites. FAM-115, SNAV-140, IMI 5.150 series.

Ordinance. None.

External Syllabus Support. N/A.

VLAT-151

2.0

R A (MV-22)

VLATI

Goal. Demonstrate/introduce aircraft maneuver performance and characteristics in the VLAT environment (airplane and conversion mode).

Requirement

- (1) Discuss
  - (a) T&R Manual, Administrative, and MV-22 Tactics Manual information concerning VLAT ROC.
  - (b) Aircraft performance charts, energy maneuverability charts, aircraft capabilities and limitations.
  - (c) Aircraft dimensions, blade walk-around, aircraft lowest point vs AOB.
  - (d) VLAT "stair step" to lower altitudes (currency/comfort level).
  - (e) Pitch-up side slip characteristics.
  - (f) Altitude effects with nacelle rotation.

- (g) CRM.
  - (h) VLAT turns vs stall speeds.
  - (i) Control laws.
  - (j) Radar altimeter setting.
  - (k) Use of FLIR/Digital map.
  - (l) Crew comfort levels/climb to cope.
  - (m) Pilot techniques.
  - (n) Tactical movement considerations.
  - (o) Weather conditions/sun position and shadowing effects.
  - (p) Flight safety/emergencies/pilot's reduced reaction times at low altitudes.
  - (q) Standard terminology.
  - (r) CRM.
- (2) Demonstrate/Introduce
- (a) Blade walk-around.
  - (b) VLAT performance checks.
  - (c) Low level flight/Contour profiles.
  - (d) High AOB turns.
  - (e) Terrain masking/unmasking.
  - (f) Bunt.
  - (g) Roll.
  - (h) Slow speed flight.
  - (i) FLIR, Digital map and INAV operations.

Performance Standards

- (1) Execute VLAT maneuvers IAW the MV-22B Stan Manual.
- (2) Maintain ROC IAW T&R Manual, Administrative.

Prerequisites. NAV-141, SVLAT-151, IMI 1.151 series.

Ordinance. None.

External Syllabus Support. N/A.

VLAT-1522.0R M A (MV-22)VLATI

Goal. Introduce the ability to navigate a VLAT route in the VLAT environment (airplane and conversion mode).

Requirement

(1) Discuss

- (a) Review discussion items from VLAT-152.
- (b) CRM during VLAT navigation.
- (c) Lookout doctrine.
- (d) Crew comfort.
- (e) Common terminology used during VLAT navigation.
- (f) Preflight preparation/VMPS/Unit SOPs.
- (g) Hazard maps.
- (h) Tactical map preparation/Control and Fire Support Coordination Measures.
- (i) Area Planning FLIPs/VRs/SRs.
- (j) Transitions and conversions at VLAT altitudes.
- (k) Checkpoint identification techniques.
- (l) Magellan procedures/criteria.
- (m) Inflight threat/route modifications.
- (n) Fuel management.
- (o) Time/distance checks.
- (p) ASE/ordnance procedures.
- (q) The differences between low level, contour, and NOE flight.
- (r) FLIR, digital map and INAV operations during VLAT navigation.
- (s) Radius of turn versus airspeed considerations.
- (t) Susceptibility versus vulnerability and how VLAT applies.
- (u) Navigation system failure procedures/manual updates.
- (v) Emergency procedures in the VLAT environment.

- (w) Bird strikes.
- (x) Inadvertent IMC.
- (2) Introduce
  - (a) Navigate a VLAT route with a minimum of 8 checkpoints; navigate 3 of the checkpoints in conversion mode.
  - (b) Arrive at the last checkpoint within +/- 1 minute of the intended time on target.
- (3) Review. Maneuvers from VLAT-152 as required.

Performance Standards. Execute a VLAT navigation route maintaining orientation +/- 1 nautical mile enroute and arrive at the last checkpoint +/- 200 meters and +/- 1 minute.

Prerequisite. VLAT-152.

Ordinance. None.

External Syllabus Support. N/A.

## 7. Formation (FORM)

- a. Purpose. To develop proficiency in formation rendezvous procedures and execution of formation maneuvers.
- b. General. At the completion of this stage, the PUI will be proficient at formation takeoff, rendezvous, lead change, section landings, and formation maneuvers.
- c. Crew Requirements. IP/PUI/CC.
- d. Ground Training. IMI 6.160-6.161.
- e. Simulator Training. (2 Events, 4.0 Hours).
- f. Flight Training. (1 Flight, 2.0 Hours).

SFORM-160

2.0

S

Goal. Introduce cruise formation during conversion and airplane modes and section landings.

### Requirement

- (1) Discuss
  - (a) Cruise formation/radius of turn principles.
  - (b) Use of nacelles as an airspeed controller.
  - (c) Closure rates.
  - (d) Section takeoff.
  - (e) Running/Carrier rendezvous.

- (f) Cross-over/cross-under (per mode of flight).
  - (g) Turns/turn patterns.
  - (h) Over-run/under-run (per mode of flight).
  - (i) Breakup and rendezvous.
  - (j) Transition/conversion between modes.
    - 1 Nr settings (84-100%).
    - 2 Nacelle rotation coordination/timing between aircraft.
    - 3 Nacelle rotation rates.
  - (k) Lead changes.
  - (l) Section landings.
  - (m) Wingman responsibility for flight separation.
  - (n) Loss of visual contact/rejoining of flight.
  - (o) Use of FLIR.
  - (p) Limitations of simulator.
  - (q) CRM within flight/aircraft.
- (2) Demonstrate. Use of FLIR.
- (3) Introduce
- (a) Section takeoff.
  - (b) Running/Carrier rendezvous.
  - (c) Cruise position/principles.
  - (d) Cross-over/cross-under (per mode of flight).
  - (e) Turns/turn patterns.
  - (f) Over-run/under-run (per mode of flight).
  - (g) Breakup and rendezvous.
  - (h) Transition to airplane mode/conversion from airplane mode.
  - (i) Lead changes.
  - (j) Formation landings.
- (4) Emergencies. Discuss inter- and intra-cockpit communications/coordination during section emergencies.

Performance Standards

(1) Demonstrate proper procedures for formation maneuvers IAW MV-22B Stan Manual.

(2) Achieve proper cruise formation position IAW MV-22B Stan Manual.

Prerequisites. FAM-118, SCAL-130, IMI 6.160 series.

Ordinance. None.

External Syllabus Support. N/A.

SFORM-161

2.0

S

Goal. Introduce parade formation flight in conversion and airplane modes.

Requirement(1) Discuss

(a) Parade position/visual reference points.

(b) Considerations of close formation/situational awareness.

(c) Previous formation discussion items pertinent to this flight.

(d) CRM within flight/aircraft.

(2) Demonstrate

(a) Use of FLIR.

(b) Section STO.

(3) Introduce

(a) Section takeoff.

(b) Running/Carrier rendezvous.

(c) Parade position.

(d) Cross-over/cross-under (per mode of flight).

(e) Turns/turn patterns.

(f) Over-run/under-run (per mode of flight).

(g) Breakup and rendezvous.

(h) Transition to airplane mode/conversion from airplane mode.

(i) Lead changes.

(j) Formation landings.

(k) Use of FLIR where appropriate.

Performance Standards

(1) Demonstrate proper procedures for formation maneuvers IAW MV-22B Stan Manual.

(2) Achieve proper parade formation position IAW MV-22B Stan Manual.

Prerequisites. SFORM-160, IMI 6.161 series.

Ordinance. None.

External Syllabus Support. N/A.

FORM-162

2.0

R M A (2 MV-22)

Goal. Introduce parade and cruise formation in the aircraft.

Requirement

(1) Discuss

(a) Cruise/parade position and appropriate visual reference points.

(b) Previous formation discussion items pertinent to this flight.

(c) Sun position in reference to lead aircraft.

(d) CRM within flight/cockpit.

(2) Demonstrate

(a) Use of FLIR.

(b) Section STO takeoff.

(3) Review

(a) Section takeoff.

(b) Running/Carrier rendezvous.

(c) Cruise/parade position.

(d) Cross-over/cross-under (per mode of flight).

(e) Turns/turn patterns.

(f) Over-run/under-run (per mode of flight).

(g) Breakup and rendezvous.

(h) Transition to airplane mode/conversion.

(i) Lead changes.

(j) Formation landings.

(4) Emergencies. Review previous FORM EPs.

Performance Standards

(1) Execute proper procedures for formation maneuvers IAW MV-22B Stan Manual.

(2) Achieve proper cruise and parade formation positions IAW MV-22B Stan Manual.

Prerequisites. CAL-131, SFORM-161.

Ordinance. None.

External Syllabus Support. N/A.

8. Night Systems (NS) High Light Level (HLL)

a. Purpose. To provide initial exposure to operations while using night vision goggles under light levels greater than .0022 lux (HLL) as predicted by the Solar/Lunar Almanac Prediction (SLAP) module.

b. General. A designated NSI is required for all initial and Refresher aircraft NS instructional events. An FRS IP or CSI that has completed SNS-508 thru SNS-511 may instruct initial SNS events. The prerequisite academic lectures that support the NS stages are contained in the MAWTS-1 Academic Support Package. The academic training shall be completed prior to commencing the NS flight syllabus.

c. Crew Requirement. P/P/CC.

d. Academic Training. The following shall be complete prior to beginning this stage of training:

(1) Complete the NITE Lab Course "Night Vision Goggle Training Program."

(2) Be familiar with the appropriate chapters of the NWP 3-22.5 MV-22B, the MAWTS-1 Helicopter NVD Manual and the SLAP module.

e. Ground Training. IMI 8.180-8.186 series.

f. Simulator Training. (4 Events, 8.0 Hours).

g. Flight Training. (4 Events, 6.5 Hours).

SNS-170

2.0

R M S NS

Goal. Introduce HLL NVD FAM maneuvers.

Requirement(1) Discuss

- (a) Moon illumination data/nautical twilight (CNT, EENT, BMNT).
- (b) Weather brief/effects.
- (c) NVD preflight and adjustments.
- (d) NVD HUD symbology/control panel/declutter levels/failure.
- (e) NVD failures.
- (f) Goggle/de-goggle procedures.
- (g) Cockpit lighting/MFD preflight.
- (h) NVD field of view/scanning techniques.
- (i) Fixation tendencies.
- (j) Loss of visual acuity and distance estimation using NVDs.
- (k) Visual illusions.
- (l) Terrain Shadowing.
- (m) Radar altimeter low setting.
- (n) Emergency procedures during NVD use.
- (o) CRM.

(2) Introduce

- (a) Use of NVDs at varying locations under HLL conditions.
- (b) Ground taxi.
- (c) Low work.
- (d) Transition to forward flight (from the hover).
- (e) Normal landing pattern.
- (f) Normal approach hover.
- (g) STO (60 and 75 degrees nacelle as directed).
- (h) Running landing.
- (i) Steep approach.
- (j) No hover landing.

(k) Transition to airplane mode from takeoff (attention to descending tendencies).

(l) Landing pattern entry in airplane mode.

(m) Use of Flight Director/coupled modes.

(n) AFCS off flight.

(o) W/C/As (those associated with the emergencies of this flight).

#### Performance Standards

(1) Demonstrate proper procedures for NVD FAM maneuvers IAW MV-22B Stan Manual.

(2) Demonstrate proper NVD operation and HUD function IAW MAWTS-1 NVD Manual.

Prerequisites. FAM-114, SFAM-119, IMI 8.180 series.

Ordinance. None.

External Syllabus Support. N/A.

NS-171

2.0

R M A (MV-22) NS

NSI

Goal. Introduce HLL NVD FAM maneuvers.

#### Requirement

##### (1) Discuss

(a) NVD briefing guide.

(b) Review discussion items from SNS-180.

(c) CRM.

##### (2) Review

(a) Use of NVDs at varying locations under HLL conditions.

(b) Ground taxi.

(c) Low work.

(d) Transition to forward flight (from a hover).

(e) Normal landing pattern.

(f) Normal approach to a hover.

(g) STO (60 and 75 degrees nacelle as directed).

(h) Running landing.

(i) Steep approach.

- (j) No hover landing.
- (k) Transition to airplane mode from takeoff (attention to descending tendencies).
- (l) Landing pattern entry in airplane mode.
- (m) Use of Flight Director/coupled modes.
- (n) AFCS off flight.
- (o) W/C/As (those associated with the emergencies of this flight).

Performance Standards

- (1) Execute NVD FAM maneuvers IAW MV-22B Stan Manual.
- (2) Demonstrate effective NVD scan IAW MAWTS-1 NVD Manual.

Prerequisites. FAM-120, SNS-170.

Ordinance. None.

External Syllabus Support. N/A.

SNS-172

2.0                      R S NS

Goal. Demonstrate/introduce night CALs (HLL) at various CAL sites utilizing NVDs.

Requirement

- (1) Discuss
  - (a) NVD briefing guide.
  - (b) Cockpit/aircraft configuration and lighting.
  - (c) CAL lighting patterns.
  - (d) Cockpit displays.
  - (e) NVD HUD operations.
  - (f) INAV functions and digital map.
  - (g) FLIR operations.
  - (h) Use of Flight Director and coupled modes.
  - (i) Scanning techniques.
  - (j) Standard terminology.
  - (k) Loss of visual contact with the ground/reference points.
  - (l) Vortex ring state.

(m) Waveoff.

(n) CRM.

(o) Power requirements/performance charts (HIGE, HOGE, height velocity diagram) with VMPS considerations.

(2) Demonstrate/Introduce

(a) Use of NVDs at an unlit CAL site under ambient light levels greater than .0022 LUX according to the SLAP.

(b) FLIR operations/use at night.

(c) Power computations.

(d) CAL site evaluation.

(e) Approach.

1 Normal.

2 Steep.

3 Low level.

4 Offset (90, 180, 270 degrees).

(f) Vertical and no hover landings.

(g) Takeoff.

1 Max performance (zoom climb).

2 Max gross weight (marginal power).

3 Obstacle.

(h) Brown-out/White-out procedures.

(i) Waveoff.

(j) W/C/As (those associated with the emergencies of this flight).

(3) Emergencies. Single engine considerations at night.

Performance Standards

(1) Demonstrate proper NVD CAL approach and departure procedures IAW MV-22B Stan Manual.

(2) Recognize normal and steep approach glide slopes.

(3) Execute 5 NVD CALs.

Prerequisites. CAL-131, SNS-170, IMI 8.182 series.

Ordinance. None.

External Syllabus Support. N/A.

NS-173

2.0

R M A (MV-22) N NS

NSI

Goal. Introduce night CALs at various CAL sites utilizing NVDs.

Requirement

(1) Discuss

- (a) NVD briefing guide.
- (b) Review discussion items from SCAL-142.
- (c) CRM.

(2) Demonstrate/Introduce

- (a) Use of NVDs at an unlit CAL site under ambient light levels greater than .0022 LUX as depicted by the computer generated Light Level Calendar.
- (b) FLIR operations/use at night.
- (c) Power computations.
- (d) High reconnaissance.
- (e) CAL site evaluation.
- (f) Low reconnaissance.
- (g) Approach (Approaches from SCAL-142).
- (h) Vertical and no hover landings.
- (i) Takeoff (Methods from SCAL-142).
- (j) Waveoff.
- (k) W/C/As (those associated with the emergencies of this flight).

Performance Standards

- (1) Execute proper NVD CAL approach and departure procedures IAW MV-22B Stan Manual.
- (2) Recognize normal and steep approach glide slopes.
- (3) Execute 5 NVD CALs.

Prerequisites. CAL-131, NS-171, SNS-172.

Ordinance. None.

External Syllabus Support. N/A.

SNS-1742.0S NS

Goal. Introduce low level navigation (no lower than 300 feet AGL) using time, distance and heading to an objective, then navigate using aircraft's navigational equipment to return to base utilizing NVDs.

Requirement

(1) Discuss

- (a) NVD briefing guide.
- (b) Cockpit/aircraft configuration and lighting.
- (c) Cockpit displays.
- (d) NVD HUD operations.
- (e) WYPT/IP selection with night considerations.
- (f) Map preparation/map study with night considerations.
- (g) Low level NAV techniques utilizing NVDs.
- (h) GPS/LWINS operations.
- (i) CMS operations as it applies to navigation.
- (j) Digital map functions.
- (k) Integration of FLIR during navigation.
- (l) CRM.

(2) Introduce. PUI will prepare a NAV route 40 to 45 minutes in duration with a minimum of 6 intermediate check points to an objective (landing optional) flying the first 3 check points in conversion mode and last 3 in airplane mode. The ingress route (paper product) will exercise basic navigational skills without the use of the CMS. Egress will use an equivalent route (VMPS derived) using all CMS functions. Intent is to exercise both conversion and airplane modes of flight during the ingress and egress.

- (a) Aircraft lighting use/configuration.
- (b) Time/distance checks, TOT and fuel management.
- (c) Use of various maps/charts (e.g. 1:1,000,000, 1:500,000, 1:250,000, 1:50,000 etc.).
- (d) CMS operations as it applies to navigation.
- (e) Digital map functions.
- (f) Integration of FLIR during navigation.

Performance Standards. Execute an NVD navigation route maintaining orientation +/- 1 nautical mile enroute, +/- 500 meters in the objective area, and arrive at the final checkpoint within 1 minute of the planned time.

Prerequisites. SNAV-140, SNS-170, IMI 8.184 series, SNS-172 if a CAL is planned at the objective.

Ordinance. None.

External Syllabus Support. N/A.

NS-175

2.0

R M A (MV-22) N NS

NSI

Goal. Introduce low level navigation (no lower than 300 feet AGL) using time, distance and heading to an objective, then navigate using aircraft's navigational equipment to return to base utilizing NVDs. Navigate in both conversion and airplane modes. Focus should be on the use of charts, pilotage, and dead reckoning with an introduction to FLIR and aircraft NAV systems.

Requirement

(1) Discuss

- (a) NVD briefing guide.
- (b) Cockpit/aircraft configuration and lighting.
- (c) Cockpit displays.
- (d) NVD HUD operations.
- (e) WYPT/IP selection with night considerations.
- (f) Map preparation/map study with night considerations.
- (g) Low level NAV techniques utilizing NVDs.
- (h) GPS/LWINS operations.
- (i) CMS operations as it applies to navigation.
- (j) Digital map functions.
- (k) Integration of FLIR during navigation.
- (l) CRM.

(2) Introduce. PUI will prepare a NAV route 25 to 30 minutes in duration with a minimum of 5 intermediate check points, flown in conversion and airplane modes, to an objective (landing optional). The ingress route (paper product) will exercise basic navigational skills without the use of the CMS. Egress in airplane mode using an equivalent route (VMPS derived) with the use of all CMS functions. Intent is to introduce NVD navigation using a paper chart, HUD, and FLIR.

- (a) Aircraft lighting use/configuration.
- (b) Time/distance checks, TOT and fuel management.
- (c) Use of various maps/charts (e.g. 1:1,000,000, 1:500,000, 1:250,000, 1:50,000 etc.).
- (d) CMS operations as it applies to navigation.
- (e) Digital map functions.
- (f) Integration of FLIR during navigation.

Performance Standards

(1) Execute an NVD navigation route maintaining orientation +/- 1 nautical mile enroute, +/- 200 meters in the objective area, and arrive at the final checkpoint within 1 minute of the planned time.

(2) Demonstrate knowledge of FLIR integration during NVD navigation.

Prerequisites. NAV-141, NS-171, SNS-174, NS-173 if a CAL is planned at the objective.

Ordnance. None.

External Syllabus Support. N/A.

SNS-176

2.0                      R S NS

Goal. Introduce night formation utilizing NVDs (HLL).

Requirement

(1) Discuss

- (a) NVD briefing guide.
- (b) Aircraft lighting and use.
- (c) Position/visual reference points at night.
- (d) Night scan/fixation tendencies.
- (e) Depth perception/relative motion at night.
- (f) Night formation hazards.
- (g) Use of NVD HUD.
- (h) Previous formation discussion items pertinent to this flight.
- (i) CRM.

(2) Demonstrate. Use of FLIR.

(3) Introduce

- (a) Section takeoff.
- (b) Running/Carrier rendezvous.
- (c) Formation position.
- (d) Cross-over/cross-under (per mode of flight).
- (e) Turns/turn patterns.
- (f) Over-run/under-run (per mode of flight).
- (g) Breakup and rendezvous.
- (h) Transition to airplane mode/conversion from airplane mode.
- (i) Lead changes.
- (j) Formation landings to a prepared surface.

Performance Standards

- (1) Execute NVD formation procedures IAW MV-22B Stan Manual.
- (2) Conduct 3 formation landings.

Prerequisites. SFORM-161, SNS-172, IMI 8.186 series.

Ordinance. None.

External Syllabus Support. N/A.

NS-177

2.0 R M A (2 MV-22) N NS

NSI

Goal. Review night formation utilizing NVDs (HLL).

Requirement(1) Discuss

- (a) NVD briefing guide.
- (b) Aircraft lighting and use.
- (c) Position/visual reference points at night.
- (d) Night scan/fixation tendencies.
- (e) Depth perception/relative motion at night.
- (f) Night formation hazards.
- (g) Use of NVD HUD.
- (h) Moon position in reference to lead aircraft.

(i) Previous formation discussion items pertinent to this flight.

(j) CRM.

(2) Demonstrate. Use of FLIR.

(3) Review

(a) Section takeoff.

(b) Running/Carrier rendezvous.

(c) Formation position.

(d) Cross-over/cross-under (per mode of flight).

(e) Turns/turn patterns.

(f) Over-run/under-run (per mode of flight).

(g) Breakup and rendezvous.

(h) Transition to airplane mode/conversion.

(i) Lead changes.

(j) Formation landings to a prepared surface.

Performance Standards

(1) Execute NVD formation procedures IAW MV-22B Stan Manual.

(2) Conduct 3 formation landings maintaining proper position throughout the landing pattern.

Prerequisites. FORM-162, NS-173, SNS-176.

Ordinance. None.

External Syllabus Support. N/A.

9. Combat Capable Check (REV & CCX)

a. Purpose. To review all areas of instruction and demonstrate proficiency and knowledge of all maneuvers to certify the PUI as a Combat Capable Tiltrotor Second Pilot (T2P).

b. General. The PUI will demonstrate proficiency through the Combat Capable phase. Upon completion of CCX-183, the PUI will be designated a T2P. CCX-183 meets the requirements for the 7532 MOS and will serve as the initial NATOPS evaluation (RQD-600).

c. Crew Requirement. IP/PUI/CC.

d. Prerequisites. All previous Combat Capable stages complete.

e. Ground Training. IMI 9.190.

f. Simulator Training. (2 Events, 3.0 Hours).

g. Flight Training. (2 Flights, 3.5 Hours).

<u>SREV-180</u>	<u>1.0</u>	<u>R M S</u>
	<u>Goal</u> . Review emergency procedures.	
	<u>Requirement</u> . PUI will be prepared to describe and conduct any previously introduced normal or emergency procedure.	
	<u>Performance Standards</u> . Execute EPs and CRM in accordance with the NATOPS and the APCL.	
	<u>Prerequisite</u> . IMI 9.190 series complete.	
	<u>Ordnance</u> . None.	
	<u>External Syllabus Support</u> . N/A.	
<u>SREV-181</u>	<u>2.0</u>	<u>S NS</u>
	<u>Goal</u> . Review previous flight maneuvers, day and night.	
	<u>Requirement</u>	
	(1) <u>Review/Evaluate</u> . The PUI will be prepared to describe and conduct maneuvers from the following stages of training.	
	(a) Familiarization.	
	(b) Instruments.	
	(c) Confined Area Landings.	
	(d) Night Systems.	
	(e) Formation.	
	(f) External Operations.	
	<u>Performance Standards</u> . Demonstrate proper procedures and execution of all previously introduced maneuvers.	
	<u>Prerequisites</u> . SREV-180, Open and Closed Book NATOPS Exams complete.	
	<u>Ordnance</u> . None.	
	<u>External Syllabus Support</u> . N/A.	
<u>REV-182</u>	<u>1.5</u>	<u>R A (MV-22) (NS)</u>
	<u>Goal</u> . Review Combat Capable maneuvers. Fly with or simulate a 4,000-pound payload.	

Requirement

(1) Brief/discuss all previously introduced flight maneuvers, emergency procedures, aircraft limitations, and aircraft systems.

(2) PUI must be able to safely demonstrate flight proficiency and knowledge of all maneuvers and procedures covered in the Combat Capable stage. The IP will set the itinerary for the conduct of the event.

Performance Standards. Demonstrate the capability to perform all functions of a T2P.

Prerequisite. SREV-181.

Ordnance. None.

External Syllabus Support. N/A.

CCX-183

2.0

R M A (MV-22)NATOPS Evaluator

Goal. Certify the PUI as T2P.

Requirement

(1) Brief/discuss all previously introduced flight maneuvers, emergency procedures, aircraft limitations, and aircraft systems.

(2) PUI must be prepared to safely demonstrate flight proficiency and knowledge of all maneuvers and procedures covered in the Combat Capable phase of training. The IP may or may not require the PUI to perform maneuvers from each area of the Combat Capable syllabus. The IP will set the itinerary for the conduct of the event.

Performance Standards

(1) Demonstrate proficiency in all maneuvers performed in previous flight stages as selected by the IP.

(2) Perform all functions of a T2P.

Prerequisite. REV-182.

Ordnance. None.

External Syllabus Support. N/A.

134. COMBAT READY PHASE1. General

- a. This phase of instruction introduces the T2P to core skills.
- b. ROC will be per the T&R Manual, Administrative.

c. Pilots shall fly Night Systems (NS) flights in this level under ambient light conditions of .0022 LUX or greater.

d. Prior to beginning a stage of training the PUI will complete the appropriate academic requirements (to include VMPS/JMPS) associated with that stage of training.

## 2. Familiarization (FAM)

a. Purpose. To review aircraft flight characteristics, limitations, emergency procedures, and day/night familiarization maneuvers.

b. General. Flights will terminate with an instrument approach when practicable.

c. Crew Requirements. P/P/CC.

d. Ground Training. IMI 9.200 series.

e. Prerequisite. T2P.

f. Simulator Training. (2 Events, 3.0 Hours).

g. Flight Training. (1 Flight, 1.5 Hours).

SFAM-200

2.0

S (N)

Goal. Review day and night unaided familiarization maneuvers and basic instrument procedures.

### Requirement

#### (1) Discuss

- (a) Familiarization maneuvers.
- (b) Aircraft lighting and use.
- (c) CRM.
- (d) Basic Instrument procedures.
- (e) Night scan.
- (f) Night fixation.

#### (2) Review

- (a) Familiarization maneuvers.
- (b) Operations at lighted and un-lighted fields.
- (c) Emergency procedures with emphasis on emergencies that cannot be flown in the aircraft; i.e., dual engine failure, compressor stalls, ICDS, etc.

Performance Standards. Conduct FAM maneuvers IAW MV-22B Stan Manual.

Prerequisite. IMI 9.200 series.

Ordinance. None.

External Syllabus Support. N/A.

FAM-201

1.5                      A (MV-22) (N)

Goal. Review familiarization maneuvers.

Requirement

(1) Discuss

(a) Familiarization maneuvers.

(b) Local course rules.

(c) CRM.

(2) Review

(a) Familiarization maneuvers.

(b) Emergency procedures.

Performance Standards

(1) Demonstrate an accurate knowledge of course rules procedures.

(2) Conduct FAM maneuvers IAW MV-22B Stan Manual.

Prerequisite. SFAM-200.

Ordinance. None.

External Syllabus Support. N/A.

SFAM-202

1.0                      S (N) (NS)

Goal. Review emergency procedures. This event fulfills the monthly requirement for emergency procedures training per T&R Manual, Administrative.

Requirement

(1) Review emergency procedures.

(2) The emphasis of particular EPs will be generated by the squadron and relayed to IP or Simulator Instructor.

Performance Standards. Execute EPs and CRM IAW NATOPS and APCL.

Prerequisite. Appropriate EP IMI.

Ordinance. None.

External Syllabus Support. N/A.3. Confined Area Landings (CAL)

- a. Purpose. To develop proficiency in single aircraft and section takeoffs and landings in a confined area.
- b. General. Pilots will find maneuver descriptions in the NATOPS Flight Manual and MV-22 Tactics Manual.
- c. Crew Requirement. P/P/CC.
- d. Prerequisite. T2P.
- e. Ground Training. IMI 10.210 series.
- f. Simulator Training. (1 Event, 2.0 Hours).
- g. Flight Training. (2 Flights, 3.5 Hours).

SCAL-2102.0S TEN+

Goal. Review single aircraft and section CALs. Introduce tactical approaches and departures. Simulate a 4,000-pound load.

Requirement(1) Discuss

- (a) Low/medium threat tactical approaches.
- (b) Landings and departures to a confined area.
- (c) Mountainous area operation considerations.
- (d) Glide slope.
- (e) Visual cues.
- (f) Wind effects.

(2) Introduce

- (a) Wind effects.
- (b) Landing on slopes.
- (c) Crosswind, up-slope, and down-slope landings with respect to tail clearance. Use of various nacelle positions depending on the terrain.
- (d) Low/medium threat tactical approaches, landings and departures to a confined area.

(3) Review. SCAL-130 and SFORM-160.

Performance Standards

(1) Demonstrate proper procedures for tactical CAL approaches IAW MV-22B Stan Manual and the MV-22 TACMAN.

(2) Recognize proper glide slope for normal and steep approaches.

(3) Recognize proper formation position for section CALs.

(4) Execute 5 single aircraft and 5 section CALs.

Prerequisite. IMI 10.210 series.

Ordinance. None.

External Syllabus Support. N/A.

CAL-211

1.5                      R A (MV-22)

Goal. Review tactical approaches, landings and departures to a confined area. Fly with or simulate a 4,000-pound load.

Requirement

(1) Discuss

(a) Tactical approaches, landings and departures to a confined area in low/medium threat environments.

(b) Definition of low/medium/high threat environments per T&R Manual, Administrative, Appendix B.

(c) CALs and departures at maximum VTOL gross weight.

(2) Introduce. Tactical approaches, landings and departures to a confined area in low/medium threat environments.

Performance Standards

(1) Execute proper procedures for tactical low/medium threat CALs IAW MV-22B Stan Manual and the MV-22 TACMAN.

(2) Maintain proper glide slope for normal and steep approaches.

(3) Execute 5 single aircraft and 5 section CALs.

Prerequisite. SCAL-210.

Ordinance. None.

External Syllabus Support. N/A.

CAL-212

2.0                      R A (2 MV-22)

Goal. Introduce section CALs.

Requirement(1) Discuss

- (a) Cruise formation/radius of turn principles.
- (b) Use of nacelles as an airspeed controller.
- (c) Closure rates.
- (d) Section takeoff.
- (e) Running/Carrier rendezvous.
- (f) Cross-over/cross-under (per mode of flight).
- (g) Over-run/under-run (per mode of flight).
- (h) Transition/conversion between modes.
  - 1 Nr settings (84-100%).
  - 2 Nacelle rotation coordination/timing between aircraft.
  - 3 Nacelle rotation rates.
- (i) Lead changes.
- (j) Section landings.
  - 1 Wind effects.
  - 2 Visual cues.
  - 3 Glide slope.
- (k) Wingman responsibility for flight separation.
- (l) Loss of visual contact/rejoining of flight.
- (m) Use of FLIR.
- (n) CRM within flight/aircraft.

(2) Demonstrate. Use of FLIR.(3) Introduce

- (a) Section takeoff.
- (b) Running/Carrier rendezvous.
- (c) Cruise position/principles.
- (d) Cross-over/cross-under (per mode of flight).
- (e) Over-run/under-run (per mode of flight).
- (f) Transition to airplane mode/conversion from airplane mode.

(g) Lead changes.

(h) Section CALs.

Performance Standards

(1) Maintain proper formation position during section CALs.

(2) Execute 5 section CALs.

Prerequisite. CAL-211.

Ordinance. None.

External Syllabus Support. N/A.

4. Formation (FORM)

a. Purpose. To review cruise and parade formation and introduce tactical formations and maneuvering.

b. Crew Requirement. P/P/CC.

c. Academic Training

(1) Review tactical formation flight IAW MV-22 Tactics Manual.

(2) MAWTS-1 Academic Support Package Lecture, Tactical Formation Maneuvering, shall be completed prior to SFORM-220.

d. Ground Training. IMI 11.220 series.

e. Simulator Training. (1 Event, 2.0 Hours).

f. Flight Training. (2 Flights, 3.0 Hours).

SFORM-220

2.0

S TEN+

Goal. Review formation and section CALS. Introduce tactical formation maneuvering and division formation.

Requirement

(1) Discuss

(a) CRM.

(b) Crew comfort level.

(c) Lead changes.

(d) Common terminology.

(e) Tactical formation maneuvering.

(f) Nacelle angle.

(g) Inter/intra-plane coordination.

(h) Lead/wingman responsibilities.

(2) Introduce

(a) Break turns, center turns, pinch/dig, TAC turns, in-place turns, split turns, and cross turns.

(b) Combat spread and combat cruise.

(3) Review

(a) Section takeoffs/landings.

(b) Cruise principles, Cross-over, break-up and rendezvous, and lead changes.

(c) Section approaches and departures from various CAL sites.

Performance Standards

(1) Demonstrate proper procedural knowledge of tactical formation maneuvers IAW MV-22 TACMAN.

(2) Recognize proper tactical formations IAW MV-22 TACMAN.

Prerequisites. SCAL-210, IMI 11.220 series.

Ordinance. None.

External Syllabus Support. N/A.

FORM-221

1.5

R A (2 MV-22)

Goal. Introduce section tactical formation maneuvering.  
Review formation and section CALs.

Requirement

(1) Discuss

(a) CRM.

(b) Crew comfort level.

(c) Inter/intra-cockpit communications.

(d) Situational awareness.

(e) Flight lead/tactical lead.

(f) Closure rate, radius of turn, and energy state.

(g) Tactical formation maneuvering.

1 Center turns.

2 In-place turns.

- 3 Cross turns.
- 4 Dig/pinch.
- 5 TAC turns right/left.
- 6 Cover position.
- 7 Break turns.

(2) Introduce

(a) Break turns, center turns, pinch/dig, TAC turns, in-place turns, split turns, cross turns.

(b) Combat spread and combat cruise.

(3) Review

(a) Section takeoffs/landings.

(b) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

(c) Section approaches and departures from various CAL sites.

Performance Standards

(1) Properly execute TAC Form maneuvers IAW MV-22 TACMAN.

(2) Maintain proper tactical formation positions IAW MV-22 TACMAN.

Prerequisites. CAL-212, FORM-220.

Ordinance. None.

External Syllabus Support. N/A.

FORM-222

1.5 A (3 or more MV-22)

Goal. Introduce division formation and division CALs.

Requirement(1) Discuss

(a) CRM.

(b) Crew comfort level.

(c) Division lead changes.

(d) Common terminology.

(e) Tactical formation maneuvering.

(f) Nacelle angle cueing.

(g) Inadvertent IMC.

(2) Introduce

(a) Division lead changes.

(b) Division approaches and departures from various CAL sites.

(c) Division takeoffs/landings.

(d) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

Performance Standards

(1) Maintain proper formation position during division formation maneuvers.

(2) Maintain proper formation position during division formation CALs.

Prerequisite. FORM-221.

Ordinance. None.

External Syllabus Support. N/A.

5. Tiltrotor Low Altitude Tactics (VLAT)

a. Purpose. To qualify the PUI in VLAT operations.

b. General

(1) A VLAT instructor is required for initial sorties, Refresher sorties, and when a qualified aircrew loses proficiency in a particular syllabus flight (IAW T&R Manual, Administrative, Chapter 5).

(2) At the completion of VLAT-233 the PUI is considered to be VLAT qualified and may be granted a qualification letter by the squadron commanding officer.

(3) VLAT altitude restrictions and currency requirements are IAW T&R Manual, Administrative.

(4) Intent is to utilize VMPS to the maximum extent possible during VLAT training.

c. Prerequisite. T2P.

d. Crew Requirement. P/P/CC.

e. Academic Training

(1) The VLAT lectures listed in the MAWTS-1 Academic Support Package shall be completed prior to being designated VLAT qualified.

(2) Review appropriate paragraphs of the MV-22 Tactics Manual.

- f. Ground Training. IMI 12.230 series.
- g. Simulator Training. (2 Events, 4.0 Hours).
- h. Flight Training. (2 Flights, 3.0 Hours).

SVLAT-230            2.0                    S TEN+                    VLATI

Goal. Demonstrate the ability to perform VLAT maneuvers and navigate a VLAT route in the contour profile.

Requirement

(1) Discuss

- (a) CRM during VLAT navigation.
- (b) Common terminology used during VLAT navigation.
- (c) Hazard maps.
- (d) Tactical map preparation (1:50,000 & 1:250,000).

(2) Introduce. Navigate a VLAT route with a minimum of 5 checkpoints in the contour profile and remain oriented within 1,000 meters of course line.

Performance Standards

- (1) Execute all VLAT maneuvers IAW MV-22B Stan Manual.
- (2) Execute a VLAT navigation route maintaining orientation +/- 1,000 meters and arrive at the last checkpoint +/- 100 meters and +/- 30 seconds.

Prerequisite. IMI 12.230 series.

Ordinance. None.

External Syllabus Support. N/A.

VLAT-231            1.5                    R A (MV-22)                    VLATI

Goal. Demonstrate the ability to navigate a VLAT route in the contour profile.

Requirement

(1) Discuss. Time/distance checks.

(2) Introduce. Navigate a VLAT route with a minimum of 5 check points in the contour profile and remain oriented within 1,000 meters of course line. Arrive at the final checkpoint +/- 30 seconds of planned time.

(3) Review. SVLAT-230.

Performance Standards

- (1) Execute all VLAT maneuvers IAW MV-22B Stan Manual.
- (2) Execute a VLAT navigation route maintaining orientation +/- 1,000 meters and arrive at the last checkpoint +/- 100 meters and +/- 30 seconds.

Prerequisite. SVLAT-230.

Ordinance. None.

External Syllabus Support. N/A.

SVLAT-2322.0R S TEN+VLATI

Goal. Introduce section VLAT navigation flight.

Requirement

- (1) Discuss
  - (a) CRM in the VLAT environment.
  - (b) VLAT techniques.
  - (c) Optical flow or speed rush baseline.
- (2) Introduce. VLAT formation flight.
- (3) Review. VLAT-231 and SFORM-220.

Performance Standards

- (1) Maintain proper formation position IAW MV-22 TACMAN during VLAT flight.
- (2) Maintain proper situational and terrain awareness.

Prerequisites. SFORM-220, SVLAT-230.

Ordinance. None.

External Syllabus Support. N/A.

VLAT-2331.5R A (2 MV-22)VLATI

Goal. Review section VLAT navigation flight.

Requirement

- (1) Discuss
  - (a) CRM during formation flight in the VLAT environment.
  - (b) Common terminology used during formation flight in the VLAT environment.
  - (c) Altitude awareness.

(2) Introduce. Tactical formations in the VLAT profiles while flying a VLAT route with a minimum of 5 checkpoints in the contour profile and remain oriented within 1,000 meters of course line. Arrive at the final checkpoint +/- 30 seconds of planned time.

(3) Review. VLAT-232.

Performance Standards

(1) Maintain proper formation position IAW MV-22 TACMAN during VLAT flight.

(2) Maintain proper situational and terrain awareness.

(3) Execute a VLAT navigation route maintaining orientation +/- 1,000 meters and arrive at the last checkpoint +/- 100 meters and +/- 30 seconds.

Prerequisites. FORM-221, VLAT-231, VLAT-232.

Ordnance. None.

External Syllabus Support. N/A.

6. Night Systems (NS) High Light Level (HLL)

a. Purpose. To develop proficiency while using night vision goggles under light levels greater than .0022 lux HLL as predicted by the SLAP module. Certify the PUI Night Systems Qualified (NSQ) HLL.

b. General

(1) All initial events require a Night Systems Instructor (NSI).

(2) Successful completion of NS-247 constitutes NSQ (HLL). A qualification letter signed by the commanding officer stating the pilot is NSQ (HLL) is to be placed in the pilot's NATOPS jacket prior to the pilot carrying troops using NVDs.

c. Crew Requirement. P/P/CC.

d. Academic Training. The following shall be complete prior to beginning this stage of training:

(1) Complete the NITE Lab Course "Night Vision Goggle Training Program."

(2) Be familiar with the appropriate chapters of the NWP 3-22.5 MV-22B, the MAWTS-1 Helicopter NVD Manual and the SLAP module.

e. Ground Training. IMI 13.240 series.

f. Simulator Training. (3 Events, 6.0 Hours).

g. Flight Training. (5 Events, 8.5 Hours).

SNS-2402.0R S TEN+ NSNSI

Goal. Review single aircraft and section CALs using NVDs in HLL. Simulate a 4,000-pound load.

Requirement

(1) Discuss

- (a) CRM during NVD CAL operations.
- (b) Crew comfort level during NVD CAL operations.
- (c) FLIR utilization.

(2) Introduce. Single aircraft and section CALs in HLL.

Performance Standards

- (1) Demonstrate proper procedural knowledge for NVD CALs IAW MV-22 TACMAN and MAWTS-1 NVD Manual.
- (2) Demonstrate proper NVD scanning techniques IAW MAWTS-1 NVD Manual.
- (3) Recognize proper formation positions for NVD section CALs.
- (4) Conduct a minimum of 5 single aircraft NVD CALs and 5 NVD section CALs (2 as lead and 3 as wingman).

Prerequisites. SCAL-210, SFORM-220, IMI 13.240 series.

Ordinance. None.

External Syllabus Support. N/A.

NS-2411.5R A (MV-22) N NSNSI

Goal. Review FAM maneuvers and single aircraft NVD CALs in HLL. Fly with or simulate a 4,000-pound load.

Requirement

(1) Discuss

- (a) CRM during NVD CAL operations.
- (b) Crew comfort level during NVD CAL operations.
- (c) FLIR utilization.

(2) Review. FAM maneuvers and single aircraft CALs in HLL.

Performance Standards

- (1) Execute proper procedures for NVD CALs IAW MV-22 TACMAN and the MAWTS-1 NVD Manual.
- (2) Execute landings without lateral or rearward drift.

(3) Conduct a minimum of 5 NVD CALs.

Prerequisites. CAL-211, SNS-240.

Ordinance. None.

External Syllabus Support. N/A.

NS-242

2.0

R A (2 MV-22) N NS

NSI

Goal. Introduce night tactical formation maneuvering and section CALs using NVDs in HLL.

Requirement

(1) Discuss

- (a) CRM during NVD formation operations.
- (b) NVD formation techniques.
- (c) Aircraft lighting during NVD formation.
- (d) Inadvertent IMC.
- (e) Night tactical formation maneuvering.
- (f) NVD section tactical approach, departure, takeoff and landing considerations.

(2) Introduce. NVD HLL formation and section CALs.

(3) Review

- (a) Section takeoffs/landings.
- (b) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

Performance Standards

- (1) Maintain proper position during NVD formation maneuvers IAW MV-22 TACMAN.
- (2) Maintain proper formation position during NVD section CALs.
- (3) Maintain awareness of wingman's position and provide adequate landing area.
- (4) Conduct a minimum of 6 NVD section CALs (2 as lead and 4 as wingman).

Prerequisites. FORM 221, NS-241.

Ordinance. None.

External Syllabus Support. N/A.

SNS-2432.0S TEN+ NSNSI

Goal. Introduce single aircraft and section NVD VLAT navigation flight.

Requirement

(1) Discuss

- (a) CRM in the VLAT environment.
- (b) NVD VLAT techniques.
- (c) Section/formation considerations.
- (d) Optical flow or speed rush baseline.

(2) Introduce

- (a) NVD VLAT formation flight.
- (b) NVD VLAT navigation.

(3) Review. SFORM-223, SVLAT-232.

Performance Standards

- (1) Maintain proper formation position during NVD VLAT navigation.
- (2) Maintain terrain awareness and avoidance during NVD VLAT maneuvers.
- (3) Execute an NVD VLAT navigation route maintaining orientation +/- 1 nautical mile enroute.

Prerequisites. SVLAT-232, SNS-240.

Ordinance. None.

External Syllabus Support. N/A.

NS-2441.5A (MV-22) N NSNSI

Goal. Review aircraft maneuver performance, characteristics, and navigation in the VLAT environment using NVDs.

Requirement

(1) Discuss

- (a) NVD briefing guide.
- (b) Cockpit display configurations.
- (c) NVD HUD operations.
- (d) T/O, enroute, approaches and landing procedures.

(e) RADALT settings and altitude changes.

(f) Airspeed/hazard avoidance.

(g) CRM.

(2) Introduce. Navigate an NVD VLAT route with a minimum of 5 check points in the contour profile and remain oriented within 1,000 meters of course line. Arrive at the final checkpoint +/- 1 minute of planned time.

(3) Review

(a) VLAT performance checks.

(b) Low level flight/Contour profiles in both airplane and conversion modes.

(c) FLIR, digital map and INAV operations (by PNAC).

(d) Review SNS-184.

#### Performance Standards

(1) Maintain terrain awareness and avoidance during NVD VLAT maneuvers.

(2) Execute an NVD VLAT navigation route maintaining orientation +/- 1,000 meters enroute and arrive at the last checkpoint +/- 200 meters and within 1 minute of planned time.

Prerequisites. VLAT Qualified, NS-241, SNS-243.

Ordinance. None.

External Syllabus Support. N/A.

NS-245

2.0

R A (2 MV-22) N NS

NSI

Goal. Introduce section NVD VLAT navigation flight and review section CALs using NVDs under HLL conditions.

#### Requirement

(1) Discuss

(a) CRM during formation flight in the VLAT environment.

(b) Common terminology used during formation flight in the VLAT environment.

(c) Altitude awareness.

(2) Introduce. Tactical formations in the VLAT profiles while flying a VLAT route with a minimum of 5 checkpoints.

(3) Review

(a) Section takeoffs/landings.

(b) NS-242.

Performance Standards

- (1) Maintain proper formation position during NVD VLAT navigation.
- (2) Execute an NVD VLAT navigation route maintaining orientation +/- 1,000 meters enroute and arrive at the final checkpoint +/- 100 meters and +/- 30 seconds.
- (3) Maintain proper formation position during NVD section CALs.
- (4) Execute a minimum of 3 NVD section CALs as wingman.

Prerequisites. NS-242, NS-244.

Ordinance. None.

External Syllabus Support. N/A.

SNS-246

2.0

S TEN+ NS

NSI

Goal. Introduce division formation and division CALs using NVDS under HLL conditions.

Requirement

- (1) Discuss
  - (a) CRM.
  - (b) Crew comfort level.
  - (c) Division lead changes.
  - (d) Common terminology.
  - (e) Tactical formation maneuvering.
  - (f) NVD division tactical approach, departure, takeoff, and landing considerations.
  - (g) Nacelle angle cueing.
- (2) Introduce
  - (a) Division lead changes.
  - (b) NVD division tactical approaches, departures, takeoffs and landings at various CAL sites.
  - (c) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

Performance Standards

- (1) Maintain proper position during NVD division formation maneuvers and landings.
- (2) Maintain awareness of both wingmen and provide adequate landing area during NVD CALs.
- (3) Conduct a minimum of 4 NVD division CALs as dash three.

Prerequisite. NS-242.

Ordinance. None.

External Syllabus Support. N/A.

NS-247

1.5 R A (3 or more MV-22) N NS

NSI

Goal. Introduce division formation and division CALs using NVDs under HLL conditions.

Requirement(1) Discuss

- (a) CRM.
- (b) Crew comfort level.
- (c) Division lead changes.
- (d) Common terminology.
- (e) Formation maneuvering.
- (f) NVD division tactical approach, departure, takeoff and landing considerations.
- (g) Nacelle angle cueing.

(2) Introduce

- (a) Division lead changes.
- (b) NVD division tactical approaches, departures, takeoffs and landings at various CAL sites.
- (c) Cruise principles, formation maneuvering.

Performance Standards

- (1) Maintain proper position during NVD division formation maneuvers and landings.
- (2) Maintain awareness of both wingmen and provide adequate landing area during NVD CALs.
- (3) Conduct a minimum of 6 NVD division CALs (2 as lead and 3 as dash three).

Prerequisites. FORM-222, NS-245, SNS-246.

Ordinance. None.

External Syllabus Support. N/A.

7. Aerial Refueling (AR)

a. Purpose. To develop proficiency in day and NVD AR.

b. General

(1) A minimum of 5 contacts and movement to the refueling position are required to successfully complete each initial flight. A minimum of 2 contacts and movement to the refueling position are required to complete subsequent flights.

(2) An ARI is required for all initial and Refresher sorties.

c. Crew Requirement. SAR-250/252 - P/P.  
AR-251/253 - P/P/CC.

d. External Syllabus Support. KC-130 or KC-135 tanker.

e. Ground Training

(1) AR stage lectures.

(2) Consult the MAWTS-1 Course Catalog for the recommended lectures in the Academic Support Package applicable to this stage of flight.

(3) The MAWTS-1 NVD Manual also provides a description of NVD AR. Discuss and become thoroughly familiar with all aspects of CRM applicable to AR as described in the MV-22 NATOPS Manual and the NATOPS Air-to-Air Refueling Manual.

(4) IMI 14.250 series.

f. Simulator Training. (2 Events, 3.0 Hours).

g. Flight Training. (2 Flights, 3.0 Hours).

SAR-250

1.0

S

ARI

Goal. Demonstrate/introduce day AR.

Requirement

(1) Discuss

(a) CRM, comfort level.

(b) Rendezvous procedures, both VMC and IMC.

(c) Join-up procedures.

(d) Airspeeds/altitudes.

- (e) Cross-overs.
- (f) Reel response.
- (g) Inadvertent disconnects.
- (h) Emergency breakaway.
- (i) Fuel siphoning.
- (j) Emergency disconnect.
- (k) EMCON refueling.

(2) Demonstrate/Introduce

- (a) Introduce basic scan and flight techniques required to refuel from the KC-130.
- (b) Rendezvous.
- (c) Join-up.
- (d) Contact/fuel transfer.
- (e) Post AR procedures.
- (f) Emergency breakaway.

Performance Standards

- (1) Demonstrate proper knowledge of AR procedures IAW MV-22 TACMAN and Air-to-Air Refueling Manual.
  - (2) Recognize proper visual reference points IAW MV-22 TACMAN.
- Prerequisites. SFORM-220, IMI 14.250 series.

Ordinance. None.

External Syllabus Support. N/A.

AR-251

1.5                      R A (MV-22)

ARI

Goal. Introduce day AR.

Requirement

- (1) Discuss
  - (a) CRM, comfort level.
  - (b) Rendezvous procedures VMC conditions.
  - (c) Join-up procedures.
  - (d) Airspeeds/altitudes.
  - (e) Cross-under.

- (f) Reel response.
  - (g) Inadvertent disconnects.
  - (h) Emergency breakaway.
  - (i) Fuel siphoning.
  - (j) Emergency disconnect.
- (2) Introduce
- (a) Rendezvous.
  - (b) Join-up.
  - (c) Contact/fuel transfer.
  - (d) Post AR procedures.
  - (e) Emergency breakaway.

Performance Standards

- (1) Execute proper AR procedures IAW MV-22 TACMAN and Air-to-Air Refueling Manual.
- (2) Maintain proper visual reference points IAW MV-22 TACMAN.
- (3) Execute 5 successful contacts for initial flights and 2 for subsequent flights.

Prerequisites. FORM-221, SAR-250.

Ordinance. None.

External Syllabus Support. KC-130/135 configured with high and low speed drogues as applicable.

SAR-252

2.0

S N NS

ARI

Goal. Introduce night unaided and aided AR.

Requirement

- (1) Discuss
  - (a) CRM.
  - (b) Comfort level.
  - (c) Closure rates.
  - (d) Depth perception.
  - (e) Receiver/tanker lighting.
  - (f) Visual illusions.

- (g) Inadvertent IMC.
- (h) Emergency procedures.
- (i) Visual signals.
- (j) Tanker sequence.

(2) Demonstrate/Introduce. For the first 1.0 hour of the event, the PUI will conduct night unaided AR. NVD AR will be conducted during the second 1.0 hour.

Performance Standards

(1) Demonstrate proper knowledge of night/NVD AR procedures IAW MV-22 TACMAN and Air-to-Air Refueling Manual.

(2) Recognize proper night/NVD visual reference points IAW MV-22 TACMAN.

Prerequisites. SNS-240, SAR-250.

Ordinance. None.

External Syllabus Support. N/A.

AR-253

1.5                      R A (MV-22) N NS

ARI

Goal. Review NVD AR.

Requirement. Review SAR-252 while using NVDs.

(1) Discuss. Same as SAR-252 plus the following:

- (a) NVD failures.
- (b) NVD rendezvous.
- (c) A/C lighting.
- (d) Visual signals.

Performance Standards

(1) Execute proper NVD AR procedures IAW MV-22 TACMAN and Air-to-Air Refueling Manual.

(2) Execute 5 successful NVD contacts for initial flights and 2 for subsequent flights.

Prerequisites. AR-251, SAR-252, NSQ for the appropriate light level.

Ordinance. None.

External Syllabus Support. KC-130 or KC-135 configured with low and high speed drogues as applicable.

8. Aerial Gunnery (AG)

a. Purpose. To develop the ability to deliver air-to-ground fire employing the .50 cal. turret system. IP will stress error analysis during employment of the gun.

b. General

(1) At the completion of this stage, the PUI will demonstrate the ability to deliver effective defensive fire from a hover, approaching the landing zone, departing the landing zone and suppression fire enroute to the landing zone.

(2) VMPS will be the primary method used to complete weight and balance sheets, with paper products as the alternative, per NATOPS guidelines and SOP. The PUI will utilize VMPS to calculate the weight and balance for each event.

c. Crew Requirement. P/P/CC.

d. Academics

(1) AG lectures conducted by a Weapons and Tactics Instructor (WTI).

(2) MV-22 Pilot Aerial Gunnery Course, using the MAWTS-1 Course Catalog.

e. Ground Training. IMI 15.260 series.

f. Simulator Training. (2 Events, 4.0 Hours).

g. Flight Training. (2 Flights, 3.0 Hours).

SAG-260

2.0

R S

Goal. To introduce the PUI to AG.

Requirement(1) Discuss

(a) CRM.

(b) ICS procedures.

(c) Safety.

(d) Arm/dearm procedures and checklists.

(e) Fire control procedures (weapons condition).

(f) Weapon malfunctions/emergencies.

(2) Introduce

(a) Preparation of weapons and aircraft.

(b) Air-to-ground weapons employment.

(c) Firing on prebriefed targets.

Performance Standards. Execute proper procedures for ordnance delivery IAW NATOPS and the MV-22 TACMAN.

Prerequisites. SFORM-220, IMI 15.260 series.

Ordnance. None.

External Syllabus Support. N/A.

AG-261

1.5                      A (2 MV-22)

Goal. To introduce aircraft weapons employment considerations.

Requirement

(1) Discuss

- (a) CRM, ICS procedures.
- (b) Safety.
- (c) Fire control procedures (weapons conditions).
- (d) Weapon malfunctions/stoppages.
- (e) Emergencies (aircraft & weapons).
- (f) Arm/dearm checklists.
- (g) Fields of Fire and Sectors of Fire.

(2) Introduce

- (a) Fields of Fire and Sectors of Fire.
- (b) Firing on prebriefed targets while aircraft is maneuvering to include running and hover fires.

(3) Review

- (a) Preparation of weapons and aircraft.
- (b) Air-to-ground gunnery.

Performance Standards. Execute proper procedures for ordnance delivery IAW NATOPS and the MV-22 TACMAN.

Prerequisites. FORM-221, VLAT Qualified, SAG-260.

Ordnance. 1,000 rounds .50 cal.

External Syllabus Support. N/A.

SAG-2622.0R S NS

Goal. To introduce the PUI to AG at night employing NVDs on the MV-22.

Requirement

(1) Discuss

- (a) CRM.
- (b) ICS procedures.
- (c) Safety.
- (d) Fire control procedures (weapons condition).
- (e) Weapon malfunctions/emergencies.
- (f) NVD procedures/failures.

(2) Introduce

- (a) Preparation of weapons and aircraft for a night air-to-ground gunnery mission.
- (b) Air-to-ground night weapons employment.
- (c) Firing on prebriefed targets.

Performance Standards. Execute proper procedures for NVD ordnance delivery IAW NATOPS and the MV-22 TACMAN.

Prerequisites. SNS-243, SAG-260.

Ordnance. None.

External Syllabus Support. N/A.

AG-2631.5R A (2 MV-22) N NS

Goal. To introduce multiple aircraft weapons employment utilizing the Night Vision Systems onboard the MV-22 (NVD and FLIR).

Requirement

(1) Discuss

- (a) CRM.
- (b) ICS procedures.
- (c) Safety.
- (d) Fire control procedures (weapons conditions).
- (e) Weapons malfunctions/stoppages.

(f) Fields of Fire and Sectors of Fire.

(g) Emergencies (aircraft & weapons).

(h) NVD procedures/failures.

(2) Introduce

(a) Multiple aircraft operations at night.

(b) Fields of Fire and Sectors of Fire.

(c) Firing on prebriefed targets while aircraft is maneuvering, to include running and hovering fires.

(3) Review

(a) Preparation of weapons and aircraft for night gunnery operations.

(b) Night air-to-ground gunnery.

Performance Standards. Execute proper procedures for NVD ordnance delivery IAW NATOPS and the MV-22 TACMAN.

Prerequisites. NS-247, AG-261, SAG-262, NS-316 (if LLL).

Ordnance. 1,000 rounds .50 cal.

External Syllabus Support. N/A.

9. Defensive Combat Maneuvers (DCM)

a. Purpose. To develop proficiency in the use of Electronic Warfare Principles, Aircraft Survivability Equipment (ASE), and DCM versus threat emitters.

b. General

(1) A DCMI is required for initial sorties.

(2) An EW range scenario with threat emitters should be used for these events.

c. Crew Requirement. P/P/CC.

d. Academic Training

(1) Review appropriate paragraphs of the MV-22 Tactics Manual.

(2) Review appropriate paragraphs in NATOPS.

(3) Review the MAWTS-1 Defensive Combat Maneuvers Guide for ground and inflight training.

(4) Review basic RADAR, Tiltrotor ASE, and the MV-22 ALE program lectures from MAWTS-1 ASP.

(5) Review APR-39, ALE-47, AAR-47, and AVR-2 operating procedures.

(6) Review types of ordnance that can be used in the ALE-47.

(7) Review various threat signatures with emphasis on threat recognition.

e. Ground Training. IMI 16.270 series.

f. Simulator Training. (1 Event, 2.0 Hours).

SDCM-270                      2.0                      R S/A TEN                      DCMI

Goal. Introduce operation of onboard ASE to include strengths and weaknesses of ASE vs AAA, IR SAMs, and RADAR SAMs. Introduce defensive tactics vs AAA, IR SAMs, and RADAR SAMs.

Requirement

(1) Discuss

(a) Operation of the ALE-47, APR-39, AAR-47, and AVR-2.

(b) Strengths and weaknesses of each ASE system vs AAA, IR SAMs, and RADAR SAMs.

(c) CRM as it applies to the use of onboard ASE.

(d) Defensive tactics against AAA, IR SAMs, and RADAR SAMs.

(e) The different tactical countermeasures (RR-129/RR-144 chaff and MK-46/MJU-27/MJU-32/MJU-49 flares).

(f) DCM ROC per T&R Manual, Administrative.

(2) Introduce

(a) Use of all onboard ASE.

(b) Defensive tactics against AAA, IR SAMs, and RADAR SAMs.

Performance Standards

(1) Properly operate all ASE IAW NATOPS and the MV-22 TACMAN.

(2) Recognize proper defensive tactics vs AAA, IR SAMs, and Radar SAMs.

Prerequisites. SVLAT-230, SAG-260, IMI 16.270 series.

Ordnance. None.

External Syllabus Support. N/A.

10. Tactics (TAC)

a. Purpose. To introduce day and NVD tactical mission procedures.

b. General. All tactical and non-tactical applications of the VMPS will be discussed in detail for each event. Aircrew will use fragmentary orders when available.

c. Crew Requirement. P/P/CC.

d. Academic Training

(1) Review appropriate chapters of the MV-22 Tactics Manual.

(2) The following classes from the MAWTS-1 ASP should be completed prior to flying the STAC-270:

(a) Assault Support Mission Planning.

(b) Tactical Briefing and Debriefing.

(c) MAWTS-1 ASP - Command and Control lecture on TACC and DASC.

(3) Wing/Group/Squadron Tactical SOPs.

e. Ground Training. IMI 17.280 series.

f. Simulator Training. (2 Events, 4.0 Hours).

g. Flight Training. (2 Flights, 4.0 Hours).

STAC-280

2.0

S TEN+

Goal. To introduce section tactical flight in a low threat environment.

Requirement

(1) Discuss

(a) Tactical planning, briefing, and execution.

(b) Use of onboard ASE during the mission.

(c) CRM during the ingress, objective area, and egress phases of the mission.

(d) Rules of engagement as they apply to the mission.

(e) Tactics used in a low threat environment.

(f) Use of onboard navigation systems.

(g) Definition of low threat environment per T&R Manual, Administrative.

(2) Introduce

(a) Tactical planning, briefing, execution, and use of onboard navigation systems.

(b) T2P will assist in planning and conducting the tactical brief.

(c) Tactical missions of assigned tasks from the mission statement, emphasizing tactical formations and approaches

as contained in the MV-22 Tactics Manual; radio procedures and discipline consistent with EMCON conditions, DASC control, approach and retirement routes, air control points, and escort tactics.

Performance Standards

- (1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress.
- (2) Properly execute the penetration checklist and employ all ASE.
- (3) Accomplish the assigned mission.

Prerequisites. FORM-221, SVLAT-232, SAG-260, SDCM-270, IMI 17.280 series.

Ordinance. None.

External Syllabus Support. N/A.

TAC-281

2.0                      R A (2 MV-22)

Goal. Review section tactical flight in a low threat environment.

Requirement

- (1) Discuss
  - (a) Tactical planning, briefing, and execution.
  - (b) Use of onboard ASE during the mission.
  - (c) CRM during the ingress, objective area, and egress phases of the mission.
  - (d) Rules of engagement as they apply to the mission.
  - (e) Tactics used in a low threat environment.
  - (f) Use of onboard navigation systems.
- (2) Introduce
  - (a) Tactical planning, briefing, execution, and use of onboard navigation systems.
  - (b) T2P will assist in planning and conducting the tactical brief.
  - (c) Tactical missions of assigned tasks from the mission statement, emphasizing tactical formations and approaches as contained in the MV-22 Tactics Manual; radio procedures and discipline consistent with EMCON conditions, DASC control, approach and retirement routes, air control points and escort tactics.

Performance Standards

- (1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress.
- (2) Properly execute the penetration checklist and employ all ASE.
- (3) Accomplish the assigned mission.

Prerequisites. VLAT Qualified, AG-261, TAC-280.

Ordinance. 20 chaff and 40 flares, 300 rds .50 cal.

External Syllabus Support. N/A.

STAC-282

2.0                      S NS

Goal. Introduce night section tactical flight in a low threat environment.

Requirement

- (1) Discuss
  - (a) CRM during NVD section CALs.
  - (b) Tactical planning, briefing, and execution.
  - (c) Use of onboard ASE during the mission.
  - (d) CRM during the ingress, objective area, and egress phase of the mission.
  - (e) Rules of engagement as they apply to the mission.
  - (f) Tactics used in a low threat environment.
  - (g) Use of onboard navigation systems.
- (2) Introduce
  - (a) Section tactical approach, landing and departure to a confined area while using NVDs in HLL.
  - (b) Tactical planning, briefing, execution, and use of onboard navigation systems.
  - (c) T2P will assist in planning and conducting the tactical brief.
  - (d) Tactical missions of assigned tasks from the mission statement, emphasizing tactical formations and approaches as contained in the MV-22 Tactics Manual; radio procedures and discipline consistent with EMCON conditions, DASC control, approach and retirement routes, air control points and escort tactics.
- (3) Review. SNS-240, SNS-243.

Performance Standards

- (1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress during an NVD tactical mission.
- (2) Properly execute the penetration checklist and employ all ASE.
- (3) Accomplish the assigned mission.

Prerequisites. NS-245, SAG-262, STAC-280.

Ordinance. None.

External Syllabus Support. N/A.

TAC-283

2.0                      R A (2 MV-22) N NS

Goal. Review night section tactical flight in a low threat environment.

Requirement(1) Discuss

- (a) CRM during NVD section CALs.
- (b) Tactical planning, briefing, and execution.
- (c) Use of onboard ASE during the mission.
- (d) CRM during the ingress, objective area, and egress phase of the mission.
- (e) Rules of engagement as they apply to the mission.
- (f) Tactics used in a low threat environment.
- (g) Use of onboard navigation systems.

(2) Introduce

- (a) Section tactical approach, landing and departure to a confined area while using NVDs in HLL.
- (b) Tactical planning, briefing, execution, and use of onboard navigation systems.
- (c) T2P will assist in planning and conducting the tactical brief.
- (d) Tactical missions of assigned tasks from the mission statement, emphasizing tactical formations and approaches as contained in the MV-22 Tactics Manual; radio procedures and discipline consistent with EMCON conditions, DASC control, approach and retirement routes, air control points and escort tactics.

(3) Review. NS-242, NS-245.

Performance Standards

(1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress during an NVD tactical mission.

(2) Properly execute the penetration checklist and employ all ASE.

(3) Accomplish the assigned mission.

Prerequisites. NSQ (HLL), AG-263, TAC-281, STAC-282.

Ordinance. 40 chaff and 20 flares, 300 rds .50 cal.

External Syllabus Support. N/A.

135. COMBAT QUALIFICATION PHASE

1. General

a. This phase of training is designed to enable pilots to obtain proficiency in core capabilities.

b. Prior to entering any stage of training, PUI must complete the MAWTS-1 Course Catalog ASP lectures applicable to that stage of training.

c. Pilots shall fly all Night Systems (NS) events in this phase under ambient light conditions of .0022 LUX or less (LLL). All initial NS events require an NSI.

2. Carrier Qualification (CQ)

a. Purpose. To qualify the PUI in flight operations from a carrier deck or ship platform under day and NVD conditions.

b. General

(1) Refer to MV-22 NATOPS and LHA/LHD/MCS NATOPS Manuals for carrier operations. Refer to NWP-42 for air capable ship operations.

(2) Minimum of 5 landings for each CQ/FCLP event.

(3) CQ-302 and CQ-304 shall be flown under HLL conditions for initial qualification. NSI required for initial NVD CQ flights.

(4) IAW NATOPS and MCO P3500.14, a pilot is Day Carrier Qualified upon completion of CQ-303 and Night Carrier Qualified upon completion of CQ-304.

(5) IP will emphasize proper communication procedures, patterns, and aviation operations in the shipboard environment per aircraft and ship NATOPS, and MCO P3500.14.

c. Crew Requirement. SCQ-300 - P/P.  
CQ-301/302/303/304 - P/P/CC.

d. Ground Training. FCLP and carrier qualification stage lectures, IMI 18.300 series.

e. Simulator Training. (1 Event, 2.0 Hours).

f. Flight Training. (4 Flights, 5.5 Hours).

SCQ-300

2.0

R S

NSI

Goal. Introduce day and NVD CQ pattern and procedures.

Requirement. Demonstrate/introduce day and NVD CQ patterns, approaches, and landings.

(1) Discuss

(a) Carrier operation.

- 1 Takeoff/landing patterns.
- 2 Communication procedures.
- 3 Lights and light signals.
- 4 LSE signals and procedures.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

(e) Steady heading approach (port winds).

(f) 45° slide approach (starboard winds).

(g) Shipboard INS alignment procedures.

(2) Demonstrate/Introduce

(a) Carrier operation.

- 1 Arrival.
- 2 Takeoff/landing patterns.
- 3 Communication procedures.
- 4 Lights and light signals.
- 5 LSE signals and procedures.
- 6 Departure.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

- (e) Steady heading approach (port winds).
- (f) 45° slide approach (starboard winds).
- (g) Shipboard INS alignment procedures.

Performance Standards

- (1) Demonstrate proper knowledge of day and NVD shipboard procedures IAW NATOPS, LHA/LHD/MCS NATOPS, and NWP-42.
- (2) Execute 5 day and 5 NVD shipboard landings.
- (3) Recognize proper glide slope for steady heading and 45 degree slide approaches.
- (4) Recognize proper closure rate during approaches.

Prerequisites. SCAL-210, SNS-240, IMI 18.300 series.

Ordinance. None.

External Syllabus Support. N/A.

CQ-301

1.0                      R A (MV-22)

Goal. Introduce day CQ patterns and procedures in a Field Carrier Landing Practice (FCLP) scenario.

Requirement. Demonstrate/introduce FCLP patterns, approaches, and landings.

- (1) Discuss. Review all SCQ-300 discussion items.
- (2) Introduce
  - (a) Carrier operation.
    - 1 Takeoff/landing patterns.
    - 2 Communication procedures.
    - 3 Lights and light signals.
    - 4 LSE signals and procedures.
  - (b) Self-taxi procedures.
  - (c) STOs.
  - (d) Pitch-up side slip characteristics.
  - (e) Steady heading approach (port winds).
  - (f) 45° slide approach (starboard winds).
  - (g) Shipboard INS alignment procedures.

Performance Standards

- (1) Properly execute the CQ pattern IAW LHA/LHD/MCS NATOPS.
- (2) Execute 5 day FCLP landings.
- (3) Achieve proper glide slope for steady heading and 45° slide approaches.
- (4) Achieve proper closure rate during approaches.

Prerequisites. CAL-211, SCQ-300.

Ordinance. None.

External Syllabus Support. FCLP site.

CQ-302

1.5

R A (MV-22) N NS

NSI

Goal. Introduce night aided CQ patterns and procedures in a FCLP scenario.

Requirement. Introduce night aided patterns, approaches, and landings.

(1) Discuss

- (a) Differences and similarities of day/night landing and takeoff techniques.
- (b) Review CQ-301 discussion items.

(2) Introduce

- (a) Carrier operation.
  - 1 Night takeoff/landing patterns.
  - 2 Communication procedures.
  - 3 Lights and light signals peculiar to night operations.
  - 4 LSE signals and procedures.
  - 5 Carrier aided and unaided lighting configurations.
- (b) Self-taxi procedures.
- (c) STOs.
- (d) Pitch-up side slip characteristics.
- (e) Steady heading approach (port winds).
- (f) 45° slide approach (starboard winds).
- (g) Shipboard INS alignment procedures.

Performance Standards

- (1) Properly execute the NVD CQ pattern IAW LHA/LHD/MCS NATOPS.
- (2) Execute 5 NVD FCLP landings.
- (3) Achieve proper glide slope for steady heading and 45° slide NVD approaches.
- (4) Achieve proper closure rate during NVD approaches.

Prerequisites. NS-241, CQ-301.

Ordinance. None.

External Syllabus Support. FCLP site.

CQ-303

1.5                      R A (MV-22)

Goal. Day qualification flight.

Requirement. Day shipboard qualifications.

(1) Discuss

(a) Carrier operation.

- 1 Takeoff/landing patterns.
- 2 Communication procedures.
- 3 Lights and light signals.
- 4 LSE signals and procedures.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

(e) Steady heading approach (port winds).

(f) 45° slide approach (starboard winds).

(2) Introduce

(a) Carrier operation.

- 1 Takeoff/landing patterns.
- 2 Communication procedures.
- 3 Lights and light signals.
- 4 LSE signals and procedures.

(b) Self-taxi procedures.

(c) STOs.

- (d) Pitch-up side slip characteristics.
- (e) Steady heading approach (port winds).
- (f) 45° slide approach (starboard winds).

Performance Standards

- (1) Properly execute CQ pattern IAW LHA/LHD/MCS NATOPS.
- (2) Execute 5 day deck landings.
- (3) Achieve proper glide slope for steady heading and 45° slide approaches.
- (4) Achieve proper closure rate during approaches.

Prerequisite. CQ-301.

Ordinance. None.

External Syllabus Support. Landing platform afloat.

CQ-304

1.5

R A (MV-22) N NS

NSI

Goal. NVD qualification flight.

Requirement. Shipboard qualification during night operations.

(1) Discuss

- (a) Aircraft lighting configurations.
- (b) Deck lighting configurations.
- (c) LSE signals and NVD requirements.
- (d) Voice procedures at night.
- (e) Closure rates and depth perception over water at night.
- (f) Night waveoff signals and procedures.

(2) Introduce. Procedures for carrier landings and takeoffs using NVDs.

(3) Review

- (a) Emergency procedures.
- (b) Egress peculiar to shipboard operations at night utilizing NVDs.
- (c) CRM.

Performance Standards

- (1) Properly execute NVD CQ pattern IAW LHA/LHD/MCS NATOPS.

(2) Execute 5 NVD deck landings.

(3) Achieve proper glide slope for steady heading and 45° slide NVD approaches.

(4) Achieve proper closure rate during NVD approaches.

Prerequisites. NSQ (HLL), CQ-302, CQ-303.

Ordinance. None.

External Syllabus Support. Landing platform afloat.

### 3. Night Systems (NS)

a. Purpose. To develop proficiency while using NVGs under light levels less than .0022 lux (LLL) as predicted by the SLAP module. Certify the PUI Night Systems Qualified [NSQ (LLL)].

#### b. General

(1) An NSI is required for all initial events.

(2) Successful completion of NS-316 constitutes NSQ (LLL). A qualification letter signed by the commanding officer stating the pilot is NSQ (LLL) is to be placed in the pilot's NATOPS jacket prior to the pilot carrying troops using NVDs in LLL conditions.

c. Crew Requirement. P/P/CC.

#### d. Academic Training

(1) Appropriate chapters of the MAWTS-1 NVD Manual.

(2) Appropriate chapters of the NATOPS Manual.

(3) Appropriate chapters of the NWP 3-22.5 MV-22B.

(4) Refer to the appropriate section in the MV-22 NATOPS Flight Manual, Tactics Manual and MAWTS-1 NVD Manual for various LZ lighting configurations.

e. Prerequisite. PUI must be NSQ (HLL) prior to flights in the aircraft.

f. Ground Training. IMI 19.310 series, appropriate sections of the MAWTS-1 NVD Manual and MV-22 Tactics Manual.

g. Simulator Training. (3 Events, 6.0 Hours).

h. Flight Training. (4 Flights, 6.5 Hours).

SNS-310

2.0

R S TEN+ NS

NSI

Goal. Introduce single aircraft and section CALs using NVDs in LLL. Simulate a 4,000-pound payload.

Requirement(1) Discuss

- (a) Crew comfort level during NVD (LLL) operations.
- (b) NVD (LLL) considerations.
- (c) NVD (LLL) CAL techniques.
- (d) Aircraft lighting considerations during NVD (LLL) operations.
- (e) Low altitude emergencies.

(2) Introduce. Single aircraft and section CALs in LLL.

(3) Review. SNS-240.

Performance Standards

(1) Demonstrate proper procedural knowledge for NVD (LLL) CALs IAW MV-22 TACMAN and MAWTS-1 NVD Manual.

(2) Demonstrate proper NVD (LLL) scanning techniques IAW MAWTS-1 NVD Manual.

(3) Recognize proper formation positions for NVD (LLL) section CALs.

(4) Conduct a minimum of 5 single aircraft NVD (LLL) CALs and 5 NVD (LLL) section CALs (2 as lead and 3 as wingman).

Prerequisites. NS-242, SNS-243, SNS-246, IMI 19.310 series.

Ordinance. None.

External Syllabus Support. N/A.

NS-311

1.5

R A (MV-22) N NS

NSI

Goal. Review FAM maneuvers and single aircraft NVD CALs in LLL. Fly with or simulate a 4,000-pound payload.

Requirement(1) Discuss

- (a) Crew comfort level during NVD (LLL) operations.
- (b) NVD (LLL) considerations.
- (c) NVD (LLL) CAL techniques.
- (d) Aircraft lighting considerations during NVD (LLL) operations.
- (e) Low altitude emergencies.

(2) Introduce. NVD (LLL) FAM maneuvers and CALs.

(3) Review. NS-247, NS-241.

Performance Standards

(1) Execute proper procedures for NVD (LLL) CALs IAW MV-22 TACMAN and MAWTS-1 NVD Manual.

(2) Execute landings without lateral or rearward drift.

(3) Conduct a minimum of 5 NVD (LLL) CALs.

Prerequisites. NS-247, SNS-310.

Ordinance. None.

External Syllabus Support. N/A.

NS-312

2.0

A (MV-22) N NS

NSI

Goal. Introduce night tactical formation maneuvering and section CALs using NVDs in LLL.

Requirement

(1) Discuss

(a) CRM during NVD formation operations.

(b) NVD formation techniques.

(c) Aircraft lighting during NVD formation.

(d) Inadvertent IMC.

(e) Night tactical formation maneuvering.

(2) Introduce. NVD (LLL) formation and section CALs.

(3) Review

(a) Section takeoffs/landings.

(b) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

Performance Standards

(1) Maintain proper position during NVD (LLL) formation maneuvers IAW MV-22 TACMAN.

(2) Maintain proper formation position during NVD (LLL) section CALs.

(3) Maintain awareness of wingman's position and provide adequate landing area.

(4) Conduct a minimum of 6 NVD (LLL) section CALs (2 as lead and 4 as wingman).

Prerequisite. NS-311.

Ordinance. None.

External Syllabus Support. N/A.

SNS-313

2.0                      S TEN+ NS

Goal. Introduce NVD section VLAT navigation flight and review section CALs using NVDs under LLL conditions.

Requirement

(1) Discuss

(a) CRM during NVD formation and CALs.

(b) NVD section CAL techniques.

(c) NVD section formation techniques.

(d) Inadvertent IMC on NVDs.

(e) Whiteout/brownout in a section CAL.

(2) Demonstrate. White-out/brown-out in section CALs.

(3) Introduce. NVD section VLAT navigation.

(4) Review. NVD (LLL) formation and section CALs.

Performance Standards

(1) Maintain proper formation position during NVD (LLL) VLAT navigation.

(2) Maintain terrain awareness and avoidance during NVD (LLL) VLAT maneuvers.

(3) Execute an NVD (LLL) VLAT navigation route with a minimum of 5 checkpoints in the contour profile maintaining orientation +/- 1 nautical mile enroute and arrive at the final checkpoint +/- 1 minute of planned time.

Prerequisites. NS-245, SNS-310.

Ordinance. None.

External Syllabus Support. N/A.

NS-314

1.5                      R A (2 MV-22) N NS

NSI

Goal. Introduce NVD section VLAT navigation flight and review section CALs using NVDs under LLL conditions.

Requirement(1) Discuss

- (a) CRM during NVD formation and CALs.
- (b) NVD section CAL techniques.
- (c) NVD section formation techniques.
- (d) Inadvertent IMC on NVDs.

(2) Introduce. NVD section VLAT navigation. Navigate an NVD VLAT route with a minimum of 5 check points in the contour profile and remain oriented within 1,000 meters of course line. Arrive at the final checkpoint +/- 30 seconds of planned time.

(3) Review. NVD (LLL) formation and section CALs.

Performance Standards

(1) Maintain proper formation position during NVD (LLL) VLAT navigation.

(2) Execute an NVD (LLL) VLAT navigation route maintaining orientation +/- 1,000 meters enroute and arrive at the final checkpoint +/- 100 meters and +/- 30 seconds.

(3) Maintain proper formation position during NVD (LLL) section CALs.

(4) Execute a minimum of 3 NVD (LLL) section CALs as wingman.

Prerequisites. NS-312, SNS-313.

Ordnance. None.

External Syllabus Support. N/A.

SNS-3152.0S TEN+ NSNSI

Goal. Introduce division formation and division CALs using NVDs under LLL conditions.

Requirement(1) Discuss

- (a) CRM.
- (b) Crew comfort Level.
- (c) Division lead changes.
- (d) Common terminology.
- (e) Tactical formation maneuvering.

(f) Nacelle Angle cueing.

(2) Introduce

(a) Division lead changes.

(b) Division approaches and departures from various CAL sites.

(c) Division takeoffs/landings.

(d) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

(3) Review. SNS-246.

Performance Standards

(1) Maintain proper position during NVD (LLL) division formation maneuvers and landings.

(2) Maintain awareness of both wingmen and provide adequate landing area during NVD (LLL) CALs.

(3) Conduct a minimum of 4 NVD (LLL) division CALs as dash three.

Prerequisites. NS-247, SNS-313.

Ordinance. None.

External Syllabus Support. N/A.

NS-316

1.5

R A (3 or more MV-22) N NS

NSI

Goal. Introduce division formation and division CALs using NVDS under LLL conditions.

Requirement

(1) Discuss

(a) CRM.

(b) Crew comfort level.

(c) Division lead changes.

(d) Common terminology.

(e) Formation maneuvering.

(f) Nacelle Angle cueing.

(2) Introduce

(a) Division lead changes.

(b) Division approaches and departures from various CAL sites.

(c) Division takeoffs/landings.

(d) Cruise principles, formation maneuvering.

Performance Standards

(1) Maintain proper position during NVD (LLL) division formation maneuvers and landings.

(2) Maintain awareness of both wingmen and provide adequate landing area during NVD (LLL) CALs.

(3) Conduct a minimum of 6 NVD (LLL) division CALs (2 as lead and 3 as dash three).

Prerequisites. NS-314, SNS-315.

Ordinance. None.

External Syllabus Support. N/A.

4. External Operations (EXT)

a. Purpose. To develop proficiency in day and NVD external load operations from confined areas.

b. General

(1) All external cargo operations shall utilize HST support. A minimum of 5 hook-ups and deliveries will be required for successful completion of each flight event.

(2) EXT-322 requires an NSI for initial sorties.

c. Crew Requirement. SEXT-320 - P/P.  
EXT-321/322 - P/P/CC/AO.

d. Academic Training

(1) Read appropriate chapters of the NATOPS Manual.

(2) Read appropriate paragraphs of the MV-22 Tactics Manual.

e. Ground Training. IMI 20.320 series.

f. Simulator Training. (1 Event, 2.0 Hours).

g. Flight Training. (2 Flights, 4.0 Hours).

SEXT-320            2.0                    S NS

Goal. Introduce day and NVD single and dual point external load hook-ups and drops to a confined area (conversion and airplane modes).

Requirement(1) Discuss

- (a) Tactical considerations during external lift operations.
- (b) Converting to, and flying in airplane mode with external.
- (c) Single and dual point operations.
- (d) Weight and power calculations and VMPS use.
- (e) Transition to forward flight (deactivation of interim power).
- (f) Pattern work, negative Gs, load swing, and CMS monitoring during flight.
- (g) Approach with load and cargo release procedures.
- (h) Waveoff with external load.
- (i) Aircraft emergencies with external load.

(2) Review

- (a) External load hook-ups and drops to a confined area.
- (b) Single and dual point operations.
- (c) Convert to airplane mode at least once with external.

Performance Standards

- (1) Demonstrate knowledge of proper external procedures IAW NATOPS and MV-22 TACMAN.
- (2) Successfully conduct 3 single point and 2 dual point hook-ups for initial flights and demonstrate proficiency for subsequent flights.

Prerequisites. NS-241, IMI 20.320 series.

Ordinance. None.

External Syllabus Support. N/A.

EXT-321

2.0                      R A (MV-22)

Goal. Review single point and dual point external load hook-ups and drops to a confined area (conversion mode only).

Requirement(1) Discuss

- (a) Crew coordination during external operations.

(b) Aircraft hook release systems. Hook preflight and checks.

(c) Approach to LZ. Downwash, static electricity, FOD, and precision hover.

(d) Cargo hook-up procedures and heading control.

(e) Power checks, switchology, and HST brief.

(f) HST composition, functions, and signals.

(g) Aircraft emergencies with external load.

(h) Tactical considerations during external lift operations.

(i) Single and dual point operations.

(2) Review. External load hook-ups and drops to a confined area. Complete a minimum of 5 hook-ups/drops (minimum 2 dual point).

External Syllabus Support. External load, HST team.

Performance Standards

(1) Execute proper external procedures IAW NATOPS and MV-22 TACMAN.

(2) Successfully conduct 3 single point and 2 dual point hook-ups for initial flights and demonstrate proficiency for subsequent flights.

(3) Demonstrate proper ICS terminology during external operations.

(4) Place the load within 10 meters of desired location.

Prerequisites. CAL-211, SEXT-320.

Ordinance. None.

External Syllabus Support. N/A.

EXT-322

2.0

R A (MV-22) N NS

NSI

Goal. Introduce single and dual point external cargo operations at night using NVDs.

Requirement

(1) Discuss

(a) Review all discussion items from SEXT-180.

(b) Review performance charts and VMPS considerations.

(c) NVD briefing guide.

- (d) Aircraft and landing zone lighting.
- (2) Demonstrate/Introduce
  - (a) Approach to pickup zone on NVDs.
  - (b) Single and dual point cargo hook-up.
  - (c) En route procedures with external loads.
  - (d) Approach and cargo release procedures.
  - (e) Waveoff with external load.
  - (f) Departure from pickup zone.
  - (g) Simulated hoist operations.
  - (h) Use of FLIR (demonstrate only).
- (3) Review. Power checks.
- (4) Emergencies
  - (a) Discuss EPs from SEXT-180.
  - (b) EPs when utilizing NVDs.

Performance Standards

- (1) Execute proper NVD external procedures IAW NATOPS and MV-22 TACMAN.
- (2) Successfully conduct 3 single point and 2 dual point hook-ups for initial flights and demonstrate proficiency for subsequent flights.
- (3) Place load within 10 meters of desired location.

Prerequisites. NS-241, NS-311 (if LLL), EXT-321.

Ordinance. None.

External Syllabus Support. N/A.

5. Defensive Combat Maneuvers (DCM)

a. Purpose. To develop proficiency in DCM tactics and aerial defensive measures used to counter enemy ground-to-air threats.

b. General

- (1) A DCMI is required for all initial sorties.
- (2) Flights shall be conducted against a threat emitter; e.g. SA-6, ZSU-23-4, etc. and IAW the MAWTS-1 DCM Guide.
- (3) The flight lead shall be DCM qualified and specifically brief all applicable DCM training rules per the MAWTS-1 DCM Guide.
- (4) After completion of DCM-330, DCM-331, DCM-404, and DCM-405, the PUI is Defensive Combat Maneuvers Qualified (DCMQ).

c. Prerequisites

- (1) VLAT qualified.
- (2) SDCM-270.

d. Crew Requirement. P/P/CC.e. Academic Training

(1) Complete the DCM academic classes listed in the MAWTS-1 Course Catalog and review the MAWTS-1 DCM Guide.

(2) Review applicable chapters of the MV-22 Tactics Manual for EW and ASE.

(3) Review appropriate chapters in the MV-22 NATOPS.

(4) Complete Basic RADAR Principles, Soviet Radio-electronics Combat (REC), Countering the Surface-to-Air Threat, and Helo ESM/ECM Equipment prior to SDCM-330.

f. Ground Training. IMI 21.330 series.g. Simulator Training. (1 Event, 2.0 Hours).h. Flight Training. (1 Flight, 1.5 Hours).SDCM-3302.0S TEN+DCMI

Goal. Develop and refine procedures to counter a surface-to-air threat with a multi-aircraft flight.

Requirement(1) Discuss

- (a) CRM/crew comfort level in a multi-plane flight.
- (b) ASE.
- (c) Multi-aircraft tactics.
- (d) Use of RADAR horizons and RADAR masking techniques to defeat threat RADAR systems.

(2) Introduce

- (a) Section/division maneuvering against surface-to-air missile and RADAR threat systems on an EW range.
- (b) Perform threat avoidance maneuvers and/or tactics to defeat threat systems.

(3) Review. FORM-220, SDCM-270.

Performance Standards

- (1) Execute proper TAC Form maneuvers vs a ground threat IAW MV-22 TACMAN and the MAWTS-1 DCM Guide.
- (2) Properly employ all ASE IAW MV-22 TACMAN.
- (3) Demonstrate knowledge of basic RADAR principles.

Prerequisites. STAC-280, IMI 21.330 series.

Ordinance. None.

External Syllabus Support. N/A.

DCM-331

1.5

R A (2 MV-22)

DCMI

Goal. Review procedures to counter a surface-to-air threat with a multi-aircraft flight.

Requirement(1) Discuss

- (a) CRM/crew comfort level in a multi-plane flight.
- (b) ASE.
- (c) Multi-aircraft tactics.
- (d) Use of RADAR horizons and RADAR masking techniques to defeat threat RADAR systems.

(2) Introduce

- (a) Section/division maneuvering against surface-to-air missile and RADAR threat systems on an EW range.
- (b) Perform threat avoidance maneuvers and/or tactics to defeat threat systems.
- (c) Use expendables as a section to defeat threat systems.

(3) Review. FORM-221, SDCM-270.Performance Standards

- (1) Execute DCM vs a ground threat IAW MAWTS-1 DCM Guide.
- (2) Properly maneuver the section in response to a threat IAW MV-22 TACMAN and the MAWTS-1 DCM Guide.
- (3) Properly employ all ASE IAW MV-22 TACMAN.
- (4) Demonstrate knowledge of IR SAMs and countermeasures.

Prerequisites. TAC-281, SDCM-330.

Ordinance. 40 chaff and 20 flares.

External Syllabus Support. EW/Threat Range.6. Tactics (TAC)

a. Purpose. To develop proficiency in day and NVD tactical planning, briefing and execution of an assault support mission in a medium threat environment, using MCCRES standards.

b. General

(1) All mission briefs require an intelligence brief. To the greatest extent possible incorporate the employment of escort aircraft (fixed or rotary wing), ASE (ALE-47, APR-39, etc.) and use of the defensive gun. These events shall be conducted IAW the applicable MCCRES Volume.

(2) Specific responsibilities should be delegated to pilots in order to obtain a broad exposure to mission planning.

c. Crew Requirement. P/P/CC.d. Academic Training

(1) Tactical Recovery of Aircraft and Personnel (TRAP), Opposing Forces Ground Tactics, Soviet IADS, Tiltrotor Escort Tactics I and II, Assault Support Mission Planning, Tactical Briefing and Debriefing, Fire Support Coordination Measures, Tiltrotor Weaponing and Countering the Surface-to-Air Threat from the MAWTS-1 ASP.

(2) Review appropriate chapters of the MV-22 Tactics Manual.

e. Ground Training. IMI 22.340 series.f. Simulator Training. (2 Events, 4.0 Hours).g. Flight Training. (2 Flights, 5.0 Hours).STAC-3402.0S TEN+

Goal. Introduce assault missions in a medium threat environment using a section.

Requirement(1) Discuss

(a) CRM during an assault support mission.

(b) Medium and high threat tactical approaches.

(c) Flight countertactics for air and ground threats.

(d) ASE utilization.

(e) Escort considerations.

(f) Fire support considerations and control measures.

(g) Control and terminology for onboard defensive weapons.

(h) EMCON procedures.

(i) NBC considerations.

(j) VLAT considerations.

(2) Introduce

(a) Mission planning using a preplanned scenario and mission.

(b) Medium threat tactical approaches.

(c) Tactical formations and maneuvers.

(d) EMCON conditions.

(e) Navigation time and distance checks to meet a planned L-Hour.

(f) Multi-plane gun shoot in an objective area/LZ, if possible.

Performance Standards

(1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress.

(2) Demonstrate proper use and knowledge of the DIGMAP including RMU loading and threat management.

(3) Accomplish the assigned mission.

Prerequisites. TAC-281, SDCM-330, IMI 22.340 series.

Ordinance. None.

External Syllabus Support. N/A.

TAC-341

2.0

R A (2 or more MV-22)

Goal. Review section tactics for an assault support mission in a medium threat environment.

Requirement

(1) Discuss

(a) CRM conducting tactical missions.

(b) Medium and high threat tactical approaches.

(c) Escort considerations.

(d) Fire support considerations.

(e) Mission briefing.

(f) Precision navigation systems.

(g) ASE utilization.

(h) Definition of medium threat per T&R Manual, Administrative.

(i) NBC considerations.

(2) Introduce

(a) Multi-aircraft tactical assault support mission.

(b) Medium threat tactical approaches.

(c) EMCON control techniques.

(d) Escort aircraft utilization, if available.

(e) Multi-aircraft gun shoot in an objective area, if possible.

Performance Standards

(1) Maintain situational awareness with respect to friendly and enemy situation and mission progress.

(2) Employ all ASE IAW MV-22 TACMAN.

(3) Demonstrate proper use and knowledge of SERE information.

(4) Properly employ escorts versus the threat.

(5) Execute proper weapons employment procedures IAW MV-22 TACMAN.

Prerequisites. TAC-281, DM-331, STAC-340.

Ordinance. 20 chaff and 40 flares, 500 rds .50 cal.

External Syllabus Support. Escort aircraft.

STAC-342

2.0

R S TEN+ NS

Goal. Introduce division tactics assault support missions in a medium threat environment at night.

Requirement

(1) Discuss

(a) CRM during an assault support mission.

(b) Flight countertactics for air and ground threats.

(c) ASE utilization.

(d) Escort considerations.

(e) Fire support considerations and control measures.

- (f) Control and terminology for onboard defensive weapons.
- (g) EMCON procedures.
- (h) NBC considerations.
- (i) VLAT considerations.

(2) Introduce

- (a) Mission planning using a preplanned scenario and mission.
- (b) Tactical formations and maneuvers.
- (c) EMCON conditions.
- (d) Navigation time/distance checks to meet L-Hour.
- (e) Multi-plane gun shoot in an objective area/LZ, if possible.

Performance Standards

- (1) Maintain situational awareness with respect to friendly and enemy situation and mission progress.
- (2) Demonstrate proper knowledge of NVD tactical considerations IAW MV-22 TACMAN and MAWTS-1 NVD Manual.
- (3) Arrive in the objective area +/- 30 seconds of planned time.
- (4) Maintain standards IAW applicable volume of MCCRES.

Prerequisite. TAC-283, SNS-315, STAC-340.

Ordinance. None.

External Syllabus Support. N/A.

TAC-343

3.0 R A (3 or more MV-22) N NS

Goal. Review division tactics for an NVD assault support mission in a medium threat environment.

Requirement

(1) Discuss

- (a) CRM conducting an NVD mission.
- (b) Escort considerations at night.
- (c) Fire support considerations at night.
- (d) NVD mission briefing.
- (e) NVD considerations during tactical missions.

- (f) Precision navigation systems.
- (g) ASE utilization for night missions.
- (h) NBC considerations.

(2) Introduce

- (a) Tactical assault support mission at night using NVDs.
- (b) EMCON control techniques.
- (c) Escort aircraft utilization, if available.
- (d) Multi-aircraft NVD gun shoot in an objective area, if possible.

Performance Standards

- (1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress.
- (2) Demonstrate proper knowledge of NVD tactical considerations IAW MV-22 TACMAN and MAWTS-1 NVD Manual.
- (3) Arrive in the objective area +/- 30 seconds of planned time.
- (4) Execute proper weapons employment procedures IAW MV-22 TACMAN.
- (5) Demonstrate proper use of Fire Support Coordination Measures.
- (6) Properly employ escort aircraft versus the threat.
- (7) Maintain standards IAW applicable volume of MCCRES.

Prerequisites. NS-247, TAC-283, NS-316, TAC-341, STAC-342.

Ordnance. 40 chaff and 20 flares, 500 rds .50 cal.

External Syllabus Support. Escort Aircraft.

7. Alternate Insertion/Extraction Techniques (AIE)

a. Purpose. To develop proficiency in Tiltrotor insertion and extraction techniques and procedures.

b. Crew Requirement. P/P/CC.

c. External Syllabus Support. Rope Suspension Training Master and Safety Observer.

d. Academic Training. Review the MV-22 Tactics Manual and FM 7-40.

e. Ground Training. IMI 23.350 series.

f. Flight Training. (3 Flights, 5.0 Hours).

AIE-3502.0A (MV-22)

Goal. Introduce insertion procedures via fast rope, rappel or hoisting.

Requirement

(1) Discuss

- (a) HIGE/HOGE requirements.
- (b) CRM. Pilots, Crew Chief, RST Master and RST Safety Observer brief together.
- (c) Voice communication/standard terminology.
- (d) ICS failure/hand and arm signals.
- (e) Current Force Order/Wing SOP.
- (f) Obstacle clearance/wave-off.
- (g) Hoist system operation.
- (h) Emergency procedures.

(2) Introduce

- (a) Preflight of fast rope frame/rappel rigging.
- (b) Skills involved for holding an extended hover.
- (c) Troop insertion via fast rope/rappelling.

Performance Standards

- (1) Maintain stable hover when deploying troops.
- (2) Execute proper AIE procedures IAW MV-22 TACMAN.
- (3) Maintain obstacle clearance.

Prerequisites. EXT-321, IMI 23.350 series.

Ordinance. None.

External Syllabus Support. RST Master, qualified Marines.

AIE-3511.0A (MV-22)

Goal. Introduce conduct of SPIE Rig.

Requirement

(1) Discuss

- (a) HIGE/HOGE requirements.

(b) CRM. Pilots, Crew Chief, RST Master and RST Safety Observer brief together.

(c) Voice communication/standard terminology.

(d) ICS failures/hand and arm signals.

(e) Current Force Order/Wing SOP.

(f) Obstacle clearance.

(g) Emergency procedures.

(2) Introduce

(a) Inspection of SPIE Rig.

(b) Skills involved for holding extended hover.

(c) Troop insertion/extraction via SPIE Rig.

Performance Standards

(1) Maintain stable hover when extracting/inserting troops.

(2) Execute proper SPIE procedures IAW MV-22 TACMAN.

(3) Maintain obstacle clearance.

Prerequisites. EXT-321, IMI 23.350 series.

Ordinance. None.

External Syllabus Support. N/A.

AIE-352

2.0

R A (MV-22) N NS

NSI

Goal. Introduce NVD AIE procedures.

Requirements

(1) Discuss

(a) CRM during NVD AIE operations.

(b) NVD considerations during NVD AIE operations.

(c) Emergency procedures during NVD AIE operations.

(2) Review

(a) Preflight of appropriate AIE equipment.

(b) Troop insertion via AIE.

Performance Standards

(1) Maintain stable hover when deploying troops.

- (2) Execute proper NVD AIE procedures IAW MV-22 TACMAN.
- (3) Maintain obstacle clearance.

Prerequisites. EXT-322, AIE-350 or AIE-351, NSQ for appropriate light level

Ordinance. None.

External Syllabus Support. N/A.

#### 8. Mountain Area Training (MAT)

- a. Purpose. To develop proficiency in day and NVD mountainous terrain operations.
- b. Crew Requirement. SMAT-360 - P/P.  
MAT-361/362 - P/P/CC.
- c. Academic Training. Review the MV-22 Tactics Manual.
- d. Ground Training. IMI 24.360 series.
- e. Simulator Training. (1 Event, 2.0 Hours).
- f. Flight Training. (2 Flights, 3.0 Hours).

SMAT-360            2.0                    S NS

Goal. Introduce CALs in mountainous terrain in day conditions and in night conditions using NVDs.

#### Requirement

##### (1) Discuss

- (a) CRM in mountainous terrain flight.
- (b) High altitude physiology emergencies.
- (c) Wind and weather effects.
- (d) High altitude operations. Power available vs power required.
- (e) Slope landings.
- (f) Pinnacle landings.
- (g) CRM during mountainous terrain NVD operations.
- (h) Visual illusions on NVDs in mountainous terrain.

##### (2) Introduce

- (a) Mountainous area operations.
- (b) Pinnacle landings.

- (c) Slope landings.
- (d) Landings and operations in valleys and canyons.
- (e) Crosswind landings.
- (f) NVD mountainous terrain operations.
- (g) NVD CALs in mountainous areas.

(3) Review. SCAL-210, SNS 240.

Performance Standards

- (1) Demonstrate knowledge of proper MAT procedures IAW MV-22 TACMAN.
- (2) Execute up-slope/down-slope and cross-slope landings.
- (3) Properly calculate power available and power required for high altitude LZs.

Prerequisites. NS-241, IMI 24.360 series.

Ordinance. None.

External Syllabus Support. N/A.

MAT-361

1.5                      R A (MV-22)

Goal. Introduce CALs in mountainous terrain.

Requirement

- (1) Discuss
  - (a) CRM in mountainous terrain flight.
  - (b) High altitude physiology emergencies.
  - (c) Wind and weather effects.
  - (d) High altitude operations. Power available vs power required.
  - (e) Slope landings.
  - (f) Pinnacle landings.
- (2) Introduce
  - (a) Mountainous area operations.
  - (b) Pinnacle landings.
  - (c) Slope landings.
  - (d) Landings and operations in valleys and canyons.

(e) Crosswind landings.

(3) Review. SCAL-210.

Performance Standards

(1) Execute proper MAT procedures IAW MV-22 TACMAN.

(2) Execute up-slope/down-slope and cross-slope landings.

(3) Properly calculate power available and power required for high altitude LZs.

Prerequisites. CAL-211, SMAT-360.

Ordinance. None.

External Syllabus Support. N/A.

MAT-362

1.5 R A (MV-22) N NS

Goal. Introduce NVD CALs in mountainous terrain.

Requirement

(1) Discuss

(a) CRM in mountainous terrain flight.

(b) High altitude physiology emergencies.

(c) Wind and weather effects.

(d) High altitude operations. Power available vs power required.

(e) Slope landings.

(f) Pinnacle landings.

(g) CRM during mountainous terrain NVD operations.

(h) Visual illusions on NVDs in mountainous terrain.

(2) Introduce

(a) Mountainous area operations.

(b) Pinnacle landings.

(c) Slope landings.

(d) Landings and operations in valleys and canyons.

(e) Crosswind landings.

(f) NVD mountainous terrain operations.

(g) NVD CALs in mountainous areas.

(3) Review. NS-241, SMAT-360, MAT-361.

Performance Standards

(1) Execute proper NVD MAT procedures IAW MV-22 TACMAN.

(2) Execute up-slope/down-slope and cross-slope NVD landings.

(3) Properly calculate power available and power required for high altitude LZs.

Prerequisites. MAT-361, NSQ for the appropriate light level.

Ordinance. None.

External Syllabus Support. N/A.

136. FULL COMBAT QUALIFICATION PHASE

1. General

a. This phase addresses training in core plus skill events. Prior to training in this phase a pilot should be complete with core skills training.

b. Prior to the conduct of any stage of training in this phase, PUIs must complete the appropriate MAWTS-1 Course Catalog ASP lecture(s) associated with that stage of training.

c. Pilots may fly night flights using NVDs in this level under HLL or LLL conditions provided they are NSQ for that light level.

2. Defensive Combat Maneuvers (DCM)

a. Purpose. To introduce and develop proficiency in tactics and aerial defensive measures used to evade enemy air-to-air threats.

b. General

(1) PUIs in this stage must be VLAT qualified, proficient, and current.

(2) A DCMI is required for all initial sorties.

(3) The flight lead must be DCM qualified and specifically brief all applicable DCM training rules per the MAWTS-1 DM Guide and T&R Manual, Administrative.

(4) After completion of DCM-331, DCM-404, and DCM-405, the PUI is DCM Qualified (DCMQ).

(5) The flight lead shall brief aggressor aircrew per T&R Manual, Administrative and brief training rules prior to each flight.

(6) When executing DCM versus a RW threat, the aggressor aircraft shall be a non-assault helicopter.

(7) Sequences for all DCM flights shall be flown as outlined in the MAWTS-1 DCM Guide.

- c. External Syllabus Support. FW and RW adversaries.
- d. Prerequisite. VLAT qualified.
- e. Crew Requirement. P/P/CC/AO.
- f. Academics

(1) Complete Tactical CRM Considerations, Countering the Fixed-wing Threat, Introduction to Air Combat Maneuvering, Introduction to Helicopter Air Combat Maneuvering, Helo ESM/ECM Equipment and countering the Rotary-wing Threat in the MAWTS-1 ASP prior to the first DCM flight.

(2) Read the MV-22 Tiltrotor DCM Guide.

(3) Read appropriate chapters in the MV-22 TACMAN.

(4) Discuss information in the MV-22 TACMAN pertaining to MV-22 energy and maneuverability vs a threat aircraft.

(5) Review the MAWTS-1 Defensive Combat Maneuvers Guide for ground and inflight training.

- g. Ground Training. IMI 26.400 series.
- h. Simulator Training. (2 Events, 4.0 Hours).
- i. Flight Training. (4 Flights, 6.0 Hours).

SDCM-400            2.0                    R S TEN+ 2 vs 1 RW Aggressor                    DCMI

Goal. Introduce section DCM against a RW aggressor.

Requirement

(1) Discuss

- (a) CRM.
- (b) Crew comfort level.
- (c) Lookout doctrine.
- (d) Common terminology.
- (e) Situational awareness.
- (f) DCM Training rules.
- (g) Closure rate, radius of turn, and energy state.
- (h) Use of ALE-47, APR-39, AVR-2, and AAR-47.
- (i) Use of .50 cal turret system.
- (j) Tactical formation maneuvers vs a RW aggressor.

(2) Introduce. Tiltrotor versus helicopter DCM with an aggressor helicopter per MAWTS-1 Tiltrotor DCM Guide.

(3) Review. Tiltrotor performance characteristics and NATOPS limitations.

Performance Standards

(1) Execute proper TAC Form maneuvers vs a RW threat IAW MV-22 TACMAN and MAWTS-1 DCM guide.

(2) Maintain DCM ROC IAW T&R Manual, Administrative.

Prerequisites. FORM-221, SDCM-270, SDCM-330, IMI 26.400 series.

Ordinance. None.

External Syllabus Support. N/A.

SDCM-401

1.5 R S TEN+ 2 vs 1 FW Aggressor

DCMI

Goal. Introduce DCM against a FW aggressor.

Requirement

(1) Discuss

(a) CRM.

(b) Crew comfort level.

(c) Lookout doctrine.

(d) Common terminology.

(e) Situational awareness.

(f) Closure rate, radius of turn and energy state.

(g) FW weapons parameters and considerations.

(h) ACM training rules.

(i) Tactical formation maneuvering versus a FW aggressor.

(2) Introduce. Tiltrotor vs a single FW aggressor per MAWTS-1 Tiltrotor DCM Guide.

Performance Standards

(1) Execute proper TAC Form maneuvers vs a FW threat IAW MV-22 TACMAN and MAWTS-1 DCM guide.

(2) Maintain DCM ROC IAW T&R Manual, Administrative.

Prerequisites. FORM-221, SDCM-270, SDCM-330, IMI 26.400 series.

Ordinance. None.

External Syllabus Support. N/A.

DCM-4021.5A (2 MV-22) 2 vs 1 RW AggressorDCMI

Goal. Introduce DCM against a RW aggressor.

Requirement

(1) Discuss

- (a) CRM.
- (b) Crew comfort level.
- (c) Lookout doctrine.
- (d) Common terminology.
- (e) Situational awareness.
- (f) Optical flow or speed rush baseline.
- (g) Closure rate, radius of turn and energy state.
- (h) RW weapons parameters, envelopes, and considerations.
- (i) DCM training rules.

(2) Introduce

- (a) Tiltrotor section vs a single RW aggressor per MAWTS-1 Tiltrotor DCM Guide.
- (b) Tiltrotor section shall conduct one TAC Form turn vs the aggressor per each line number. This turn shall include no vertical maneuvering vs the aggressor. However, the friendly section may break plane.

Performance Standards

- (1) Execute proper TAC Form maneuvers vs a RW threat IAW MV-22 TACMAN and the MAWTS-1 DCM guide.
- (2) Maintain DCM ROC IAW T&R Manual, Administrative.

Prerequisites. DCM-331, SDCM-400.

Ordinance. 20 chaff and 40 flares.

External Syllabus Support. RW adversary.

DCM-4031.5R A (2 MV-22) 2 vs 1 F/WDCMI

Goal. Introduce section DCM against a FW aggressor.

Requirement

(1) Discuss

- (a) CRM.

- (b) Lookout doctrine.
- (c) Situational awareness.
- (d) Adversary aircraft parameters.
- (e) Adversary weapons parameters, envelopes, and considerations.
- (f) Mutual support.
- (g) Tactical formation maneuvers vs a FW aggressor.

(2) Introduce

- (a) Tiltrotor section vs a single FW aggressor per MAWTS-1 Tiltrotor DCM Guide.
- (b) Tiltrotor section shall conduct one TAC Form turn vs the aggressor per each line number. This turn shall include no vertical maneuvering versus the aggressor. However, the friendly section may break plane.

Performance Standards

- (1) Execute proper TAC Form maneuvers vs a FW threat IAW MV-22 TACMAN and MAWTS-1 DCM guide.
- (2) Maintain DCM ROC IAW T&R Manual, Administrative.

Prerequisites. DCM-331, SDCM-401.

Ordinance. 20 chaff and 40 flares.

External Syllabus Support. FW adversary.

DCM-404

1.5 R A (2 MV-22) 2 vs 1 RW

DCMI

Goal. Continue section DCM against a RW aggressor.

Requirement

(1) Discuss

- (a) CRM.
- (b) Lookout doctrine.
- (c) Situational awareness.
- (d) Adversary aircraft parameters.
- (e) Adversary weapons parameters, envelopes, and considerations.
- (f) Mutual support.
- (g) Tactical formation maneuvers vs a RW aggressor.

(2) Demonstrate/Introduce

(a) Tiltrotor section vs a single RW aggressor per MAWTS-1 Tiltrotor DCM Guide.

(b) Multiple TAC Form turns versus the aggressor per each line number. These turns may include vertical maneuvering vs the aggressor.

(3) Review. DCM-402.Performance Standards

(1) Execute proper TAC Form maneuvers vs a RW threat IAW MV-22 TACMAN and MAWTS-1 DCM guide.

(2) Maintain DCM ROC IAW T&R Manual, Administrative.

Prerequisite. DCM-402.

Ordinance. 20 chaff and 40 flares.

External Syllabus Support. RW adversary.

DCM-405

1.5 A (2 MV-22) 2 vs 1 FW aggressorDCMI

Goal. Continue section DCM against a FW aggressor.

Requirement(1) Discuss

(a) CRM.

(b) Lookout doctrine.

(c) Situational awareness.

(d) Adversary aircraft parameters.

(e) Adversary weapons parameters, envelopes, and considerations.

(f) Mutual support.

(g) Tactical formation maneuvers vs a FW aggressor.

(2) Demonstrate/Introduce

(a) Tiltrotor section vs a single FW aggressor per MAWTS-1 Tiltrotor DCM Guide.

(b) Multiple TAC Form turns vs the aggressor per each line number. These turns may include vertical maneuvering vs the aggressor.

(c) Aggressor attacks at various altitudes.

(3) Review. DCM-403.

Performance Standards

(1) Execute proper TAC Form maneuvers vs a FW threat IAW MV-22 TACMAN and MAWTS-1 DCM guide.

(2) Maintain DCM ROC IAW T&R Manual, Administrative.

Prerequisite. DCM-403.

Ordinance. 20 chaff and 40 flares.

External Syllabus Support. FW adversary.

3. External Operations (EXT)

a. Purpose. To introduce external load operations in the day and NVD VLAT environment.

b. General

(1) All external cargo operations flown in the aircraft shall utilize HST support.

(2) VMPS will be used to the maximum extent possible to support external load planning.

(3) A day SEXT-410 shall be flown in the aircraft prior to flying a night SEXT-410 in the aircraft.

(4) SEXT-410 requires an NSI if flown at night in the aircraft.

c. Crew Requirement. P/P/CC. AO for dual point externals.

d. Academic Training

(1) Read appropriate chapters of the NATOPS Manual.

(2) Read appropriate paragraphs of the MV-22 Tactics Manual.

e. Ground Training. IMI 27.410 series.

f. Simulator Training. (1 Event, 2.0 Hours)

SEXT-410            2.0            R S/A (NS)            VLATI

Goal. Introduce day and NVD VLAT external operations.

Requirement

(1) Discuss

(a) CRM.

(b) Comfort level.

(c) Preflight planning, including power computations, weight and balance considerations, and operational power checks.

- (d) Power settling.
- (e) Low altitude emergencies.
- (f) Cargo jettison procedures.
- (g) Pilot induced oscillations.
- (h) HST operation/safety brief.
- (i) Waveoff.
- (j) Reduced visibility conditions.
- (j) Terrain/obstacle clearance.
- (k) NVD failures.
- (l) Inadvertent IMC procedures.
- (m) LZ lighting with chemlites.
- (n) Night external operation considerations.

(2) Review

- (a) Single and/or dual point procedures.
- (b) VLAT maneuvers.

(3) Demonstrate/Introduce. VLAT externals in the low level and contour profiles during day and NVD conditions.

(4) Conduct. Emphasis will be on VLAT flight with an external load vice pickup and delivery techniques. Minimum of 2 pickups and deliveries required.

Performance Standards

- (1) Maintain control of the external load while maneuvering in the VLAT environment in airplane and conversion modes.
- (2) Maintain obstacle clearance and recognize the requirement for early control/power inputs.

Prerequisites. SVLAT-232, SEXT-320, NSQ for appropriate light level, IMI 27.410 series.

Ordinance. None.

External Syllabus Support. HST and an external load if flown in the aircraft.

4. Nuclear, Biological and Chemical (NBC)

a. Purpose. To introduce the AR-5 NBC protective mask and associated NBC equipment.

b. General. For safe execution of all flights, one pilot shall remain unmasked during flights in the aircraft.

c. Crew Requirement. SNBC-420 - P/P.  
NBC-421 - P/P/CC.

d. Academics

(1) Complete NBC Threat in the MAWTS-1 ASP prior to completion of NBC-421.

(2) Read appropriate chapters of the MV-22 TACMAN.

(3) Read the appropriate section in MV-22 NATOPS.

e. Ground Training. IMI 28.420 series.

f. Simulator Training. (2 Events, 2.0 Hours).

g. Flight Training. (1 Event, 1.0 Hour).

SNBC-420                      2.0                      R S NS

Goal. Demonstrate the ability to conduct flight in an NBC environment with mask and gear donned during day and NVD conditions.

Requirement

(1) Discuss

(a) CRM while masked, to include emergency procedures and ground handling signals.

(b) Mask limitations pertaining to vision and scan.

(c) NVD limitations pertaining to vision and scan.

(d) Physiological limitations and fatigue factors imposed by NBC protective equipment.

(e) Mask maintenance and factors that render the mask unserviceable.

(2) Demonstrate. Proper mask use (donning and doffing).

(3) Introduce. (Day and NVD)

(a) NBC defensive suit.

(b) Start while masked.

(c) Taxi while masked.

(d) Takeoff and landings while masked.

(e) Normal flight operations while masked.

(f) Formation considerations.

(g) Employment of ASE and onboard weapons.

Performance Standards

(1) Properly don NBC protective equipment and conduct flight maneuvers.

(2) Demonstrate knowledge of NBC operations IAW MV-22 TACMAN.

Prerequisites. SCAL-210, SNS-240, IMI 28.420 series.

Ordinance. None.

External Syllabus Support. N/A.

NBC-421

1.0                      A (MV-22)

Goal. Review flight operations wearing NBC equipment.

Requirement

(1) Discuss

(a) CRM while masked, to include emergency procedures and ground handling signals.

(b) Mask limitations pertaining to vision and scan.

(c) Physiological limitations and fatigue factors imposed by NBC protective equipment.

(d) Mask maintenance and factors that render the mask unserviceable.

(2) Demonstrate. Proper mask use (donning and doffing).

(3) Introduce

(a) NBC defensive suit.

(b) Start while masked.

(c) Taxi while masked.

(d) Takeoff and landings while masked.

(e) Normal flight operations while masked.

Performance Standards

(1) Properly don NBC protective equipment and conduct flight maneuvers.

(2) Demonstrate knowledge of NBC operations IAW MV-22 TACMAN.

Prerequisites. CAL-211, SNBC-420.

Ordinance. None.

External Syllabus Support. N/A.5. Alternate Insertion/Extraction Techniques (AIE)

- a. Purpose. To develop proficiency in AIE procedures.
- b. General. Initial AIE-430 shall be conducted during the day. Pilots shall be NSQ for the appropriate light level if conducting AIE-430 using NVDs. AIE-431 shall not be conducted at night.
- c. Crew Requirement. P/P/CC.
- d. External Syllabus Support. RST Master and Safety Observer.
- e. Prerequisite. Read Helo Cast Operations in the MAWTS-1 ASP.
- f. Academic Training. Review the MV-22 TACMAN and FM 7-40.
- g. Ground Training. IMI 29.430 series.
- h. Flight Training. (2 Flights, 3.0 Hours).

AIE-430                    1.5                    A (MV-22) (NS)

Goal. Introduce aerial delivery procedures.

Requirement(1) Discuss

(a) CRM during aerial deliveries.

(b) Voice communication/standard terminology during aerial deliveries.

(c) Tactical considerations for aerial delivery of troops/cargo.

(d) Proper rigging and preflight of equipment to be inserted by aerial delivery.

(2) Introduce. Insertion of troops/cargo by aerial delivery.

Performance Standards

(1) Execute airdrop procedures IAW MV-22 TACMAN.

(2) Demonstrate proper crew coordination during airdrop operations.

Prerequisites. CAL-211, IMI 29.430 series.

Ordinance. None.

External Syllabus Support. Jumpmaster, qualified troops.

AIE-4311.5A (MV-22)

Goal. Introduce aerial insertion of troops and equipment via helo cast and/or soft duck (deflated rubber boat) and introduce SAR operations.

Requirement

(1) Discuss

- (a) CRM while performing helo cast or soft duck over water.
- (b) Proper rigging and preflight of equipment to be inserted via helo cast and soft duck.
- (c) Low altitude aircraft emergencies over water.
- (d) Ditching/water landing.
- (e) Salt encrustation/compressor stall.
- (f) Helo cast/soft duck aerial delivery altitudes and airspeeds.
- (g) Voice communications/standard terminology.
- (h) Flight Director search patterns.

(2) Introduce

- (a) Insertion of troops and equipment by helo cast or soft duck.
- (b) Preflight of aircraft, troops and equipment for helo cast or soft duck.
- (c) SAR patterns and over-water hoisting operations.

Performance Standards

- (1) Execute helo cast or soft duck procedures IAW MV-22 TACMAN.
- (2) Demonstrate proper crew coordination during helo cast or soft duck operations.

Prerequisite. CAL-211.

Ordinance. None.

External Syllabus Support. N/A.

6. Tactics (TAC)

a. Purpose. To develop proficiency in tactical planning, briefing and execution of assault support missions in a high threat environment.

b. General

(1) All mission briefs require an intelligence brief.

(2) Incorporate the employment of escort aircraft (FW or RW), ALE-47, and the APR-39.

(3) Aircrew shall conduct these flights IAW MCCRES standards.

c. Crew Requirement. P/P/CC.

d. Academic Training. Supporting Arms Coordination, FARP, Opposing Forces Concept of Operations, and Opposing Forces Organization and Equipment lectures in the MAWTS-1 ASP.

e. Ground Training. IMI 30.440 series.

f. Simulator Training. (2 Events, 4.0 Hours).

g. Flight Training. (2 Flights, 6.0 Hours).

STAC-440

2.0

S TEN+ NS

Goal. Introduce multi-aircraft assault support missions in a high threat environment at night.

Requirement

(1) Discuss

(a) ACE and GCE coordination during mission planning.

(b) Tactical Aircraft Mission Planning System (TAMPS).

(c) Immediate re-embarkation/emergency extract.

(d) NVD mission planning.

(e) Onboard navigation systems.

(f) ASE use at night.

(g) NBC considerations.

(h) Definition of high threat per T&R Manual, Administrative.

(2) Introduce

(a) A mission scenario using pre-determined ingress to an LZ and an egress route.

(b) Considerations for alternate routes and LZs.

Performance Standards

(1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress.

(2) Employ all ASE IAW MV-22 TACMAN.

- (3) Properly employ escorts versus the threat.
- (4) Execute proper weapons employment procedures IAW MV-22 TACMAN.
- (5) Execute proper threat countermeasures IAW MV-22 TACMAN.

Prerequisites. TAC-283, STAC-342.

Ordinance. None.

External Syllabus Support. N/A.

TAC-441

3.0 R A (3 OR MORE MV-22) N NS

Goal. Review multi-aircraft assault support missions in a high threat environment at night.

Requirement

(1) Discuss

- (a) ACE and GCE coordination during mission planning.
- (b) TAMPS.
- (c) Immediate re-embarkation/emergency extract.
- (d) NVD mission planning.
- (e) Onboard navigation systems.
- (f) ASE use at night.
- (g) NBC considerations.
- (h) Definition of high threat per T&R Manual, Administrative.

(2) Introduce

- (a) A mission scenario using pre-determined ingress to an LZ and an egress route.
- (b) Considerations for alternate routes and LZs.

Performance Standards

- (1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress.
- (2) Employ all ASE IAW MV-22 TACMAN.
- (3) Properly employ escorts versus the threat.
- (4) Execute proper NVD weapons employment procedures IAW MV-22 TACMAN.
- (5) Execute proper threat countermeasures IAW MV-22 TACMAN.

(6) Arrive in the objective area +/- 30 seconds of planned time.

(7) Maintain MCCRES standards.

Prerequisites. NS-316, TAC-343, STAC-440.

Ordnance. 40 chaff and 20 flares, 1,000 rds .50 cal.

External Syllabus Support. N/A.

TAC-442

3.0                      R A (4 MV-22) N NS

Goal. To develop proficiency in NVD tactical flight leadership in a high threat environment per MCCRES standards. PUI will plan, brief, and lead this flight.

Requirement

(1) Discuss. NVD operational considerations.

(2) Introduce

(a) Execute a NVD mission similar to TAC-441. Mission shall be flown at VLAT altitudes with aerial refueling included during the flight.

(b) Emphasis on navigation (both high and low altitude), timing, formation, communication discipline, authentication procedures, escort utilization, and weapons control procedures.

Performance Standards

(1) Maintain situational awareness with respect to the friendly and enemy situation and mission progress.

(2) Develop, brief, and lead a plan that effectively accomplishes the assigned mission and counters the threat.

(3) Maintain MCCRES standards.

(4) Provide timely and correct direction to subordinate element leaders in response to mission events.

(5) Properly employ escorts vs the threat.

(6) Execute proper weapons employment procedures IAW MV-22 TACMAN.

(7) Execute proper threat countermeasures IAW MV-22 TACMAN.

(8) Arrive in the objective area +/- 30 seconds of planned time.

Prerequisites. AR-253, TAC-441, DCM-404, DCM-405.

Ordnance. 40 chaff, 20 flares, 1,000 rds .50 cal.

External Syllabus Support. N/A.

STAC-443

2.0

S/A (2+ MV-22) (NS)

Goal. Introduce flight operations in various geographic locations.

Requirement. Demonstrate mountain area training, arctic operations, and other geographic-peculiar operation areas as required to familiarize aircrews with forward based operations. Incorporate FARP procedures into the training.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance; recommend 1,000 rds .50 cal. and 40 chaff, 20 flares.

Performance Standards

(1) Recognize environmental considerations associated with various geographic locations.

(2) Employ the MV-22 in various geographic locations.

Prerequisite. SCAL-210.

Ordnance. None.

External Syllabus Support. N/A.

#### 7. Carrier Qualification (CQ)

a. Purpose. Qualify the PUI in flight operations from a carrier deck or ship platform under night unaided conditions.

##### b. General

(1) Refer to MV-22 NATOPS and LHA/LHD/MCS NATOPS Manuals for carrier operations. Refer to NWP-42 for air capable ship operations.

(2) Minimum of 5 landings for each CQ/FCLP event.

(3) IP will emphasize proper communication procedures, patterns, and aviation operations in the shipboard environment per aircraft and ship NATOPS, and T&R Manual, Administrative..

c. Crew Requirement. SCQ-450 - P/P.  
CQ-451/452 - P/P/CC.

d. Ground Training. IMI 31.450 series, FCLP and carrier qualification stage lectures.

e. Simulator Training. (1 Event, 1.0 Hour).

f. Flight Training. (2 Flights, 2.5 Hours).

SCQ-450

1.0

R S

Goal. Introduce night unaided CQ pattern and procedures.

Requirement. Demonstrate/introduce night unaided patterns, approaches and landings.

(1) Discuss

(a) Carrier operation.

- 1 Takeoff/landing patterns.
- 2 Communication procedures.
- 3 Lights and light signals.
- 4 LSE signals and procedures.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

(e) Steady heading approach (port winds).

(f) 45° slide approach (starboard winds).

(g) Shipboard INS alignment procedures.

(2) Introduce

(a) Carrier operation.

- 1 Takeoff/landing patterns.
- 2 Communication procedures.
- 3 Lights and light signals.
- 4 LSE signals and procedures.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

(e) Steady heading approach (port winds).

(f) 45° slide approach (starboard winds).

Performance Standards

(1) Demonstrate proper knowledge of night unaided shipboard procedures IAW NATOPS, LHA/LHD/MCS NATOPS, and NWP-42.

(2) Execute 5 unaided shipboard landings.

(3) Recognize proper glide slope for steady heading and 45° slide night unaided approaches.

(4) Recognize proper closure rate during approaches.

Prerequisites. SCQ-300, IMI 31.450 series.

Ordinance. None.

External Syllabus Support. N/A.

CQ-451

1.0 R A (MV-22) N

Goal. Introduce night unaided CQ patterns and procedures in a FCLP scenario.

Requirement. Introduce night unaided patterns, approaches, and landings.

(1) Discuss

(a) Differences and similarities of day and night landing and takeoff techniques.

(b) Review CQ-291 discussion items.

(2) Review

(a) Carrier operation.

1 Night takeoff/landing patterns.

2 Communication procedures.

3 Lights and light signals peculiar to night operations.

4 LSE signals and procedures.

5 Carrier aided and unaided lighting configurations.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

(e) Steady heading approach (port winds).

(f) 45° slide approach (starboard winds).

(g) Shipboard INS alignment procedures.

Performance Standards

(1) Properly execute the night unaided CQ pattern IAW LHA/LHD/MCS NATOPS.

(2) Execute 5 night unaided FCLP landings.

(3) Achieve proper glide slope for steady heading and 45° slide night unaided approaches.

(4) Achieve proper closure rate during night unaided approaches.

Prerequisites. CQ-301, SCQ-450.

Ordinance. None.

External Syllabus Support. FCLP area.

CQ-452

1.5 R A (MV-22) N

Goal. Night unaided qualification flight.

Requirement. Shipboard qualification during night operations.

(1) Discuss

- (a) Night unaided patterns.
- (b) Unaided approaches and landings.
- (c) Aircraft lighting configuration.
- (d) Deck lighting configuration.
- (e) LSE signals.
- (f) Voice procedures.
- (g) Closure rates.
- (h) Aircraft ditching.
- (i) Emergency egress procedures.

(2) Introduce

- (a) Procedures for unaided landings and takeoffs.
- (b) Night unaided patterns.
- (c) Unaided approaches and landings.
- (d) Aircraft lighting configuration.
- (e) Deck lighting configuration.
- (f) Unaided closure rates.

(3) Review

- (a) CRM.
- (b) Emergency Egress Lighting System (EELS).
- (c) LSE signals.
- (d) Voice procedures.

Performance Standards

- (1) Properly execute the night unaided CQ pattern IAW LHA/LHD/MCS NATOPS.
- (2) Execute 5 night unaided deck landings.
- (3) Achieve proper glide slope for steady heading and 45° slide night unaided approaches.
- (4) Achieve proper closure rate during night unaided approaches.

Prerequisites. CQ-303, CQ-451.

Ordinance. None.

External Syllabus Support. Landing platform afloat.

140. INSTRUCTOR TRAINING1. FRS Instructor/Contract Simulator Instructor Training

a. Purpose. To develop qualified FRS Instructor Pilots (IPs) and Contract Simulator Instructors (CSIs) using a standardized instructor training program. This syllabus is designed to prepare FRS IPs to instruct Combat Capable events in the simulator and aircraft and CSIs to instruct Combat Capable events in the simulator. This portion of the syllabus may also be used by VMM squadrons to assist in instructor standardization. Although there are no External sorties in the Combat Capable phase, EXT-506 appears in this syllabus to assist in VMM squadron instructor standardization.

b. General

(1) Conduct Instructor Under Training (IUT) events with a designated Stan Pilot.

(2) IUTs should fly in the right seat.

(3) CSIs will complete all events in the simulator.

(4) Completion of an IUT event will qualify an instructor to instruct that phase of training.

(5) Completion of SVLAT-507 qualifies FRS IPs and CSIs to instruct Combat Capable simulator VLAT events. Instructors shall be designated a VLATI prior to instructing Combat Capable aircraft VLAT events or any Combat Ready VLAT event.

(6) Completion of SNS-508, SNS-509, SNS-510, and SNS-511 qualifies FRS IPs and CSIs to instruct Combat Capable simulator NS events. Instructors shall be designated an NSI prior to instructing Combat Capable NS events in the aircraft and prior to instructing any Combat Ready or Combat Qualified NS event.

(7) Prerequisites listed with each event apply to the IP syllabus.

c. Training Objectives. All IUT flights emphasize instructional techniques, briefing, and debriefing. The IUT will be capable of demonstrating all training objectives listed for the referenced syllabus flight. Emphasis on all flights is on training objectives, method of instruction, and student problem areas. At the completion of this stage of training, the FRS IP will be qualified to instruct Combat Capable events in the aircraft and simulator and CSIs will be qualified to instruct Combat Capable events in the simulator.

- d. Crew Requirement. Stan Pilot/IUT/CC.
- e. Prerequisites. Designated TAC or Candidate CSI.
- f. Ground Training. IMI 32.500 series.
- g. Simulator Training. (7 Events, 12.0 Hours).
- h. Flight Training. (6 Flights, 9.5 Hours).

FAM-500                    2.0                    A/S (MV-22)

Goal. Introduce the IP brief and demonstrate standardized procedures for flight planning, preflight, and all day FAM stage maneuvers.

Requirement. IP and IUT will discuss preflight and postflight pilot briefings. IUT will observe preflight, cockpit procedures, techniques of instruction, and local course rules. Instructors shall emphasize the ability to teach, evaluate problems, and apply corrective instruction.

Performance Standards

(1) Successfully describe all FAM maneuvers IAW MV-22B Stan Manual.

(2) Successfully execute all FAM maneuvers IAW MV-22B Stan Manual with accompanying inflight description.

Prerequisites. RQD-604.

Ordnance. None.

External Syllabus Support. N/A.

FAM-501                    1.0                    A/S (MV-22) N

Goal. Review familiarization stage maneuvers at night.

Requirement. IUT will perform all night familiarization stage maneuvers with emphasis on IUT instructional technique.

Performance Standards

(1) Successfully describe all FAM maneuvers and night considerations IAW MV-22B Stan Manual.

(2) Successfully execute all night FAM maneuvers IAW MV-22B Stan Manual with accompanying inflight description.

Prerequisites. FAM-500.

Ordinance. None.

External Syllabus Support. N/A.

SINST-502

2.0                      S/A (N)

Goal. Review basic instrument, IFR planning, filing, airway navigation, and instrument approach procedures.

Requirement

(1) Discuss

- (a) IFR planning.
- (b) Filing a DD-175.
- (c) Airway procedures.
- (d) Precision/non-precision approaches.

(2) Review

- (a) Instrument checklist.
- (b) Attitude instrument flight.
- (c) Standard rate climbing and descending turns.
- (d) Recovery from unusual attitudes.
- (e) Vertical S-1 pattern.
- (f) Oscar pattern.

(3) Conduct. Fly a minimum of one precision and one non-precision approach.

Performance Standards

(1) Successfully describe BI maneuvers, IFR Planning, filing, airways navigation, and instrument approach procedures IAW MV-22B Stan Manual and NATOPS Instrument Flight Manual.

(2) Execute BI maneuvers, airways navigation, and instrument approaches IAW MV-22B Stan Manual and NATOPS Instrument Flight Manual with accompanying inflight description.

Prerequisites. RQD-604.

Ordinance. None.

External Syllabus Support. N/A.

CAL-503

1.5                      A/S (MV-22)

Goal. Review CAL instruction techniques.

Requirement(1) Discuss

(a) CRM.

(b) Comfort level.

(2) Review. All CAL stage maneuvers.Performance Standards

(1) Execute proper CAL approaches IAW MV-22B Stan Manual and provide accompanying inflight description.

(2) Provide accurate instruction on glide slope correction to achieve proper normal and steep approach glide slope.

Prerequisites. CAL-212, RQD-604.Ordnance. None.External Syllabus Support. N/A.SNAV-5041.5S/AGoal. Review navigational instructional techniques.Requirement. Brief and fly a navigational flight introducing all onboard navigational equipment.Performance Standards. Provide accurate flight instruction on navigation procedures.Prerequisites. VLAT-233, RQD-604.Ordnance. None.External Syllabus Support. N/A.FORM-5051.5A/S (MV-22)Goal. Review formation instructional techniques, formation stage maneuvers and emphasize closure rates and radius of turn.Requirement. Brief and fly a formation flight introducing all formation maneuvers. Emphasize parade and cruise turns and section CALs.Performance Standards

(1) Successfully brief a formation flight to accomplish all formation maneuvers.

(2) Conduct formation maneuvers and section CALs IAW MV-22B Stan Manual and MV-22 TACMAN.

Prerequisites. FORM-221, RQD-605.

Ordnance. None.

External Syllabus Support. N/A.

EXT-506

1.5 A/S (MV-22)

Goal. Review external operation instructional techniques.

Requirement Demonstrate the ability to instruct, brief, and fly an external flight reviewing all external procedures.

(1) Discuss

(a) CRM.

(b) Single and dual point operations, as appropriate.

(c) Load computations, preflight and inflight.

(d) Emergency procedures.

(e) Aircraft limitations.

(2) Review. Single and dual point operations as appropriate.

(3) Conduct. Perform a minimum of 2 single point and 1 dual point hook-ups and releases.

Performance Standards

(1) Successfully describe external procedures IAW MV-22B Stan Manual, NATOPS, and MV-22 TACMAN.

(2) Conduct external operations IAW MV-22B Stan Manual, NATOPS, and MV-22 TACMAN with accompanying inflight description.

Prerequisites. EXT-321, RQD-604.

Ordnance. None.

External Syllabus Support. HST and external load.

SVLAT-507

2.0 S

Goal. Demonstrate the ability to instruct VLAT maneuvers in conversion and airplane modes and VLAT navigation.

Requirement

(1) Discuss

(a) VLAT "stair step" to lower altitudes (currency/comfort level).

(b) Power settling.

(c) Altitude effects with nacelle rotation.

- (d) CRM.
- (e) VLAT turns vs stall speeds.
- (f) Control laws.
- (g) Use of FLIR/digital map (by PNAC).
- (h) Crew comfort levels/climb to cope.
- (i) Flight safety/emergencies/pilot's reduced reaction times at low altitudes.
- (j) Standard terminology.
- (k) CRM.

(2) Review

- (a) All VLAT maneuvers in conversion and airplane mode.
- (b) VLAT navigation.

Performance Standards

- (1) Successfully describe VLAT maneuvers IAW MV-22B Stan Manual and MV-22 TACMAN.
- (2) Conduct VLAT Maneuvers IAW MV-22B Stan Manual and MV-22 TACMAN with accompanying inflight description.
- (3) Navigate a VLAT route of a minimum of 5 checkpoints instructing proper terminology, crew coordination, use of the digital map, use of the Flight Director, tactical flight considerations, and timing. Maintain planned course +/- 1,000 meters and arrive at the final checkpoint within 30 seconds of the planned time.

Prerequisites. VLAT-233, SNAV-504, RQD-604.

Ordinance. None.

External Syllabus Support. N/A.

SNS-508

1.5

S N NS

Goal. Review FAM stage maneuvers at night using NVDs.

Requirement. IUT will perform all night NVD FAM stage maneuvers with emphasis on IUT instructional technique.

Performance Standards

- (1) Successfully describe all NVD FAM maneuvers IAW MV-22B Stan Manual.
- (2) Successfully execute all FAM maneuvers using NVDs IAW MV-22B Stan Manual with accompanying inflight description.

Prerequisites. NSQ (HLL), FAM-501, RQD-604.

Ordinance. None.

External Syllabus Support. N/A.

SNS-509

1.5                      S N NS

Goal. Review NVD CAL instruction techniques.

Requirement

(1) Discuss

(a) CRM.

(b) Comfort level.

(2) Review. All CAL stage maneuvers.

Performance Standards

(1) Execute proper NVD CAL approaches IAW MV-22B Stan Manual and provide accompanying inflight description.

(2) Provide accurate instruction on glide slope correction to achieve proper normal and steep approach glide slope using NVDs.

Prerequisites. CAL-503, SNS-508.

Ordinance. None.

External Syllabus Support. N/A.

SNS-510

1.5                      S N NS

Goal. Review NVD navigational instructional techniques.

Requirement. Brief and fly an NVD navigational flight introducing all onboard navigational equipment.

Performance Standards. Provide accurate flight instruction on NVD navigation procedures.

Prerequisites. SNAV-504, SNS-508.

Ordinance. None.

External Syllabus Support. N/A.

SNS-511

1.5                      S (TEN+) N NS

Goal. Review formation instructional techniques using NVDs in HLL conditions.

Requirement. Brief and fly an NVD formation flight reviewing all formation maneuvers. Emphasize cruise turns and section landings.

Performance Standards

(1) Successfully brief an NVD formation flight to accomplish all formation maneuvers.

(2) Conduct NVD formation maneuvers and NVD landings IAW MV-22B Stan Manual and MV-22 TACMAN.

Prerequisites. FORM-505, SNS-508.

Ordinance. None.

External Syllabus Support. N/A.

STANX-512

2.0

E A (MV-22) (N)

Goal. Stan Pilot check flight.

Requirement. Instructors shall evaluate the prospective Stan Pilot in all previously introduced stages of instruction for standardized flight procedures and instrument flight techniques.

Performance Standards

(1) The prospective Stan Pilot shall demonstrate knowledge of all chapters of the MV-22B Stan Manual.

(2) Demonstrate a high level of instructional capability to certify IPs capable of instructing all stages of the Combat Capable phase of training IAW MV-22B Stan Manual and NATOPS.

Prerequisites. INST-502, EXT-506, SVLAT-507 or VLATI, SNS-509 or NSI, SNS-510 or NSI, SNS-311 or NSI.

Ordinance. None.

External Syllabus Support. N/A.

2. VLAT Instructor (VLATI)

a. Purpose. To certify the MV-22 pilot as a VLATI capable of safely conducting ground and airborne instruction of the MV-22 VLAT syllabus.

b. General

(1) The VLAT IUT syllabus shall be flown with a proficient VLATI.

(2) Successful completion of the VLAT-522 flight will certify the pilot as a VLATI. The designation will be made at the discretion of the commanding officer.

(3) Prior to the certification flight, the PUI shall present an appropriate VLAT class.

(4) Prior to the certification flight, the PUI shall pass a written VLAT exam administered by a WTI.

(5) Previously designated MV-22 VLATIs returning to the MV-22 requiring Refresher or Modified Refresher training as defined in T&R Manual, Administrative, must be recertified by a current and proficient VLATI. Recertification shall consist of the academic syllabus, class presentation, SVLAT-520, and VLAT-522.

c. Prerequisites

- (1) Designated section leader.
- (2) VLAT qualified and proficient IAW T&R Manual, Administrative.
- (3) EXT-411.

d. Academic Training. The IUT will review and be capable of presenting the following classes:

- (1) VLAT Part I: Philosophy and Concepts (U)
- (2) VLAT Part II: Considerations (U)
- (3) VLAT Part III: Basic and Section Maneuvering (U)
- (4) VLAT Part IV: Instructional Techniques (U)
- (5) MV-22 Performance Limitations/Stress (U)
- (6) Tactical CRM Considerations (U)
- (7) IR SAM Threat to Assault Support (C)
- (8) RADAR SAM Threat to Assault Support (C)
- (9) AAA Threat to Assault Support (C)

e. Simulator Training. (1 Event, 2.0 Hours)

f. Flight Training. (2 Flights, 3.5 Hours)

<u>SVLAT-520</u>	<u>2.0</u>	<u>R S TEN+</u>	<u>VLATI</u>
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Goal. Demonstrate the ability to instruct VLAT maneuvers in conversion and airplane modes, VLAT navigation, and VLAT formation flight.

Requirement

(1) Discuss

- (a) VLAT "stair step" to lower altitudes (currency/comfort level).
- (b) Pitch-up side slip characteristics.
- (c) Power settling.
- (d) Altitude effects with nacelle rotation.

- (e) CRM.
- (f) VLAT turns vs stall speeds.
- (g) Control laws.
- (h) Use of FLIR/digital map (by PNAC).
- (i) Crew comfort levels/climb to cope.
- (j) Flight safety/emergencies/pilot's reduced reaction times at low altitudes.
- (k) Standard terminology.
- (l) CRM.

(2) Review

- (a) All VLAT maneuvers in conversion and airplane mode.
- (b) VLAT navigation.
- (c) VLAT formation.

Performance Standards

- (1) Successfully describe VLAT maneuvers IAW MV-22B Stan Manual and MV-22 TACMAN.
- (2) Conduct VLAT maneuvers IAW MV-22B Stan Manual and MV-22 TACMAN with accompanying inflight description.
- (3) Demonstrate and describe proper VLAT formation positions and maneuvers IAW MV-22 TACMAN.
- (4) Navigate a VLAT route of a minimum of 5 checkpoints instructing proper terminology, crew coordination, use of the digital map, use of the Flight Director, tactical flight considerations, and timing. Maintain planned course +/- 1,000 meters and arrive at the final checkpoint within 30 seconds of the planned time.

Prerequisite. Section Leader, VLAT Qualified, SEXT-410.

Ordinance. None.

External Syllabus Support. N/A.

VLAT-521

2.0

A (MV-22)

VLATI

Goal. Demonstrate the ability to instruct VLAT maneuvers in conversion and airplane modes, VLAT navigation, and VLAT externals.

Requirement(1) Discuss

- (a) T&R Manual, Administrative, MV-22 Tactics Manual information concerning VLAT ROC.
- (b) Aircraft performance charts, energy maneuverability charts, aircraft capabilities and limitations.
- (c) Aircraft dimensions, blade walk-around, aircraft lowest point vs AOB.
- (d) VLAT "stair step" to lower altitudes (currency/comfort level).
- (e) Pitch-up side slip characteristics.
- (f) Power settling.
- (g) Altitude effects with nacelle rotation.
- (h) CRM.
- (i) VLAT turns vs stall speeds.
- (j) Control laws.
- (k) Radar altimeter setting.
- (l) Use of FLIR/digital map (by PNAC).
- (m) Crew comfort levels/climb to cope.
- (n) Limitations on power available, speed, maneuverability and altitude during VLAT external operations.
- (o) Weather conditions/sun position and shadowing effects.
- (p) Flight safety/emergencies/pilot's reduced reaction times at low altitudes.
- (q) Standard terminology.
- (r) CRM.

(2) Review

- (a) Blade walk-around.
- (b) VLAT performance checks.
- (c) Low level flight/Contour profiles.
- (d) High AOB turns.
- (e) Terrain masking/unmasking.
- (f) Bunt.

- (g) Roll.
- (h) Slow speed flight.
- (i) FLIR, digital map and INAV operations (by PNAC).
- (j) All VLAT maneuvers in conversion and airplane mode.
- (k) VLAT navigation.
- (l) VLAT externals.

Performance Standards

- (1) Successfully describe VLAT maneuvers IAW MV-22B Stan Manual and MV-22 TACMAN.
- (2) Conduct VLAT Maneuvers IAW MV-22B Stan Manual and MV-22 TACMAN with accompanying inflight description.
- (3) Navigate a VLAT route of a minimum of 5 checkpoints instructing proper terminology, crew coordination, use of the digital map, use of the Flight Director, tactical flight considerations, and timing. Maintain planned course +/- 1,000 meters and arrive at the final checkpoint within 30 seconds of the planned time.
- (4) Conduct a minimum of 2 hook-ups and deliveries navigating a route with a load for a minimum number of checkpoints determined by the VLATI.
- (5) Instruct methods of maintaining control of the external load while maneuvering in the VLAT environment in airplane and conversion modes.

Prerequisite. SVLAT-520.

Ordinance. None.

External Syllabus Support. HST, External load.

VLAT-522

1.5

R A (2 MV-22)

VLATI

Goal. Demonstrate the ability to plan, brief, lead and instruct VLAT formation navigation in conversion and airplane modes.

Requirement

- (1) Discuss
  - (a) Tactical formation maneuvering.
  - (b) VLAT turns vs stall speeds.
  - (c) Use of VMPS.
  - (d) Basic RADAR principles.

- (e) ASE.
- (f) Expendable usage.
- (g) IR weapons systems and countermeasures.
- (h) Mission fuel planning.
- (i) Standard terminology.
- (j) CRM.

(2) Review

- (a) Low level flight/Contour profiles.
- (b) Instructional techniques.
- (c) FLIR, Digital map and INAV operations (by PNAC).
- (d) Formation VLAT navigation.

Performance Standards

- (1) Demonstrate and describe proper VLAT formation positions and maneuvers IAW MV-22 TACMAN.
- (2) Navigate a formation VLAT route of a minimum of 8 checkpoints (4 as lead, 4 as wingman, and any 2 in conversion mode) instructing proper terminology, crew coordination, use of the digital map, use of the Flight Director, tactical flight considerations, and timing. Maintain planned course +/- 1,000 meters and arrive at the final checkpoint within 30 seconds of the planned time.

Prerequisite. VLAT-521.

Ordinance. None.

External Syllabus Support. N/A.

3. AR Instructor (AR)

a. Purpose. To certify the MV-22 pilot as an instructor capable of safely conducting ground and airborne instruction of the MV-22 AR syllabus.

b. General

- (1) The AR IUT syllabus shall be flown with a proficient ARI.
- (2) Successful completion of the AR-531 flight will certify the pilot as an ARI. The designation will then be made at the discretion of the commanding officer.
- (3) Prior to the certification flight, the PUI shall present an appropriate AR class.
- (4) Prior to the certification flight, the PUI shall pass a written AR exam administered by a WTI.

(5) Previously designated MV-22 ARIs returning to the MV-22 requiring Refresher or Modified Refresher training as defined in T&R Manual, Administrative, must be recertified by a current and proficient ARI. Recertification shall consist of the academic syllabus, class presentation, and AR-531.

c. Prerequisites

- (1) Designated section leader.
- (2) NSQ.
- (3) AR-253 proficient.
- (4) A minimum of 10 previous NVD contacts.

d. Simulator Training. (1 Event, 2.0 Hours)

e. Flight Training. (1 Flight, 2.0 Hours).

<u>SAR-530</u>	<u>2.0</u>	<u>R S/A N NS</u>	<u>ARI</u>
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Goal. Demonstrate day, night, and NVD AR proficiency and instructional technique.

Requirement

(1) Discuss

- (a) CRM.
- (b) Comfort level.
- (c) Rendezvous procedures, both VMC and IMC.
- (d) Join-up procedures.
- (e) Airspeeds/altitudes.
- (f) Cross-overs.
- (g) Closure rates.
- (h) Depth perception.
- (i) Receiver/tanker lighting.
- (j) Inadvertent IMC.
- (k) Reel response.
- (l) Inadvertent disconnects.
- (m) Emergency breakaway.
- (n) Fuel siphoning.
- (o) Emergency disconnect.

(2) Demonstrate

- (a) Basic scan and flight techniques required to refuel from the KC-130.
- (b) Rendezvous.
- (c) Join-up.
- (d) Contact/fuel transfer.
- (e) Post AR procedures.
- (f) Emergency breakaway.

Performance Standards

(1) Provide academic instruction on day, night, and NVD AR procedures including voice procedures, rendezvous procedures, visual checkpoints, lighting, and EPs IAW MV-22 TACMAN, Air-to-Air Refueling Manual, and NVD Manual.

(2) Execute 3 successful day, night, and NVD contacts with accompanying inflight description.

Prerequisites. Section Leader, NSQ, AR-253, 10 NVD contacts.

Ordinance. None.

External Syllabus Support. N/A.

AR-531

2.0

A (MV-22)

ARI

Goal. Demonstrate the ability to plan, brief, and instruct NVD AR.

Requirement(1) Discuss

- (a) CRM.
- (b) Comfort level.
- (c) Rendezvous procedures, both VMC and IMC.
- (d) Join-up procedures.
- (e) Airspeeds/altitudes.
- (f) Cross-overs.
- (g) Reel response.
- (h) Refueling emergencies.
- (i) Closure rates.
- (j) Depth perception.

(k) Receiver/tanker Lighting.

(l) Inadvertent IMC.

(m) EMCON refueling.

(2) Demonstrate

(a) Scan and flight techniques required to refuel from the KC-130 using NVDs.

(b) Rendezvous.

(c) Join-up.

(d) Contact/fuel transfer.

(e) Post AR procedures.

(f) EMCON refueling.

Performance Standards

(1) Provide section and cockpit briefing on NVD AR procedures and EMCON refueling procedures.

(2) Conduct 5 successful NVD contacts with accompanying inflight description.

Prerequisite. SAR-530.

Ordinance. None.

External Syllabus Support. N/A.

150. REQUIREMENTS, QUALIFICATIONS, AND DESIGNATIONS (RQD)

1. Purpose. To determine qualification for designation in specific flight skills, systems knowledge, and flight leadership abilities. In addition, to provide a vehicle for tracking codes associated with qualifications and designations.

2. General

a. Squadrons should use this phase of training for check flights and designations. The PUI will demonstrate sound levels of aircraft/flight leadership and judgment required in a combat environment.

b. Tracking codes in the 600-level phase may be logged in conjunction with any sortie that completes its stage. For example, RQD-615 may be flown in conjunction with 341 or 343. CRP is not awarded for these 600-level sorties. However, CRP credit may be obtained by logging the appropriate training code(s) in the 200-400 level syllabus. Once the flight to attain the qualification/designation is complete, a letter from the squadron commanding officer awarding the qualification or designation shall be placed in the NATOPS and APR before that qualification or designation can be utilized.

c. After the commanding officer has designated the PUI in writing as gaining a designation, Operations shall log the required qualification and designation tracking codes. For example, for a section lead or a division lead, Operations shall log RQD-615 (section lead) and RQD-620 (division lead) respectively.

3. Crew Requirement. P/P/CC.
4. Ground Training. IMI 33.600-601 series, 25.390 series.
5. Flight Training. (11 Flights, 16.5 Hours).

RQD-600                    1.5                    E A/S (MV-22) (N)(NS)

Goal. Conduct annual NATOPS evaluation.

Requirement. The proficiency expected by the evaluator in this flight shall be commensurate with the experience level and highest flight leadership designation of the pilot under evaluation.

Performance Standards. Complete annual NATOPS check IAW OPNAVINST 3710, NATOPS, and MV-22B Stan Manual.

Prerequisites. The open and closed book NATOPS examinations shall be completed prior to the commencement of the check flight, including the IMI 33.600 series.

Ordinance. None.

External Syllabus Support. N/A.

RQD-601                    2.0                    E A/S (MV-22) (N)(NS)

Goal. Conduct annual instrument evaluation.

Requirement

(1) Evaluate all phases of instrument flight to include precision and non-precision approaches, partial panel, and holding.

(2) Demonstrate proficiency in handling instrument related emergencies to include unusual attitude recoveries.

Performance Standards. Complete annual instrument evaluation IAW OPNAVINST 3710, NATOPS, and NATOPS Instrument Flight Manual.

Prerequisites. Completion of Instrument Ground School and all instrument requirements per OPNAVINST 3710 prior to the commencement of the check flight, including the IMI 33-601 series.

Ordinance. None.

External Syllabus Support. N/A.

RQD-602E A (MV-22)

Goal. Tracking code for VLAT qualification.

Requirement. Completion of VLAT-233 meets the requirements for the PUI to be VLAT qualified. At the discretion of the squadron commanding officer a letter assigning the PUI as VLAT qualified shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-602 shall be logged.

Prerequisites. VLAT 230, 231, 232.

RQD-603E A (MV-22) N NS

Goal. Tracking code for NSQ (HLL).

Requirement. Completion of NS-247 meets the requirements for the PUI to be NSQ (HLL). At the discretion of the squadron commanding officer a letter assigning the PUI as NSQ (HLL) qualified shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-603 shall be logged.

Prerequisites. NS-240, 241, 242, 243, 244, 245, 246.

RQD-604E A (MV-22) N NS

Goal. Tracking code for NSQ (LLL).

Requirement. Completion NS-316 meets the requirements for the PUI to be NSQ (LLL). At the discretion of the squadron commanding officer a letter assigning the PUI as NSQ (LLL) qualified shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-604 shall be logged.

Prerequisites. NS-310, 311, 312, 313, 314, 315.

RQD-605E A (MV-22)

Goal. Tracking code for AR qualification.

Requirement. Completion of AR-253 meets the requirements for the PUI to be AR qualified. At the discretion of the squadron commanding officer a letter assigning the PUI as AR qualified shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-605 shall be logged.

Prerequisites. AR-250, 251, 252.

RQD-606E A (MV-22)

Goal. Tracking code for CQ qualification.

Requirement. Completion of CQ-451 meets the requirements for the PUI to be CQ Qualified. At the discretion of the squadron commanding officer a letter assigning the PUI as CQ Qualified shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-606 shall be logged.

Prerequisites. CQ-300, 301, 302, 303, 304, 450.

RQD-6071.5                    A (MV-22)Goal. Conduct a Tiltrotor Aircraft Commander (TAC) review.Requirement. This flight will review all practicable day operations and procedures contained in the T&R syllabus in preparation for the TAC check.Performance Standards

(1) Conduct day Combat Ready and Combat Qualification stage events IAW applicable manuals.

(2) Demonstrate sound knowledge of NATOPS limits, EPs, and aircraft systems.

Prerequisite. IMI 25.390 series.Ordnance. None.External Syllabus Support. N/A.RQD-6081.5                    A (MV-22) N (NS)Goal. Conduct a TAC review.Requirement. Continuation of review flight to include night operations and procedures.Performance Standards

(1) Conduct night/NVD Combat Ready and Combat Qualification stage events IAW applicable manuals.

(2) Demonstrate sound knowledge of SOPs, T&amp;R Manual, Administrative regulations, and OPNAV regulations.

Prerequisites. RQD-607.Ordnance. None.External Syllabus Support. N/A.RQD-6091.5                    E A (MV-22) (N)(NS)                    NATOPS EvaluatorGoal. Conduct a TAC check.Requirement. Squadrons shall evaluate pilots for TAC designation at the discretion of the commanding officer per the criteria in the MV-22 NATOPS Flight Manual, OPNAVINST 3710.7, and local SOPs. This flight will cover all practicable operations and procedures contained in the T&R syllabus.Performance Standards

(1) Conduct day, night, or NVD Combat Ready and Combat Qualification stage events IAW applicable manuals.

(2) Demonstrate situational awareness, CRM, and operational knowledge necessary to be a TAC.

(3) Demonstrate sound knowledge of the MV-22 TACMAN and MV-22 tactical employment.

Prerequisites. RQD-607, 608.

Ordnance. None.

External Syllabus Support. N/A.

RQD-610

E A (MV-22)

Goal. Tracking code for DCM qualification.

Requirement. Completion of DCM-405 meets the requirements for the PUI to be DCM qualified. At the discretion of the squadron commanding officer a letter assigning the PUI as VLAT qualified shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-602 shall be logged.

Prerequisites. DCM-270, 330, 331, 400, 401, 402, 403, 404.

RQD-613

1.5

A (2 MV-22)

Goal. Conduct a section leader review.

Requirement. Satisfy the prerequisites defined in the applicable NATOPS Flight Manual, OPNAVINST 3710.7 and local directives for designation as a section leader. Demonstrate the leadership necessary for effective mission accomplishment. Conduct this flight IAW MCCRES standards. Moreover, pilots may use MV-22 Tactics Manual as a source document for planning.

Performance Standards

(1) Plan, brief, and lead a successful 2 aircraft mission in a low or medium threat scenario.

(2) Maintain wingman awareness during approaches, departures, and during en route evasive maneuvers.

Prerequisite. STAC-340, TAC-341, RQD-604.

Ordnance. None.

External Syllabus Support. N/A.

RQD-614

1.5

E A (2 MV-22) N (NS)

Goal. Conduct a section leader review.

Requirement. Satisfy the prerequisites defined in the applicable NATOPS Flight Manual, OPNAVINST 3710.7 and local directives for designation as a section leader. Demonstrate the leadership necessary for effective mission accomplishment. Conduct this flight IAW MCCRES standards. Moreover, pilots

may use MV-22 Tactics Manual as a source document for planning.

Performance Standards

(1) Plan, brief, and lead a successful 2 aircraft mission in a low or medium threat scenario.

(2) Maintain wingman awareness during approaches, departures, and during en route evasive maneuvers.

Prerequisite. STAC-340, TAC-341, RQD-604.

Ordinance. None.

External Syllabus Support. N/A.

RQD-615

1.5 E A (2 MV-22) (N)(NS)

Goal. Conduct a section leader check.

Requirement. Satisfy the prerequisites defined in the applicable NATOPS Flight Manual, OPNAVINST 3710.7 and local directives for designation as a section leader. Demonstrate the leadership necessary for effective mission accomplishment. Conduct this flight IAW MCCRES standards. Moreover, pilots may use MV-22 Tactics Manual as a source document for planning.

Performance Standards

(1) Plan, brief, and lead a successful 2 aircraft mission in a low or medium threat scenario.

(2) Maintain wingman awareness during approaches, departures, and during en route evasive maneuvers.

Prerequisite. STAC-340, TAC-341, RQD-609, 613, 614.

Ordinance. None.

External Syllabus Support. N/A.

RQD-618

1.5 A (3+ ACFT)

Goal. Conduct a division leader review.

Requirement. Satisfy all prerequisites defined in the applicable NATOPS Flight Manual, OPNAVINST 3710.7 and local directives for designation as a division leader. Demonstrate the leadership necessary for effective mission accomplishment with a flight of three or more aircraft. Conduct this flight IAW MCCRES standards. Moreover, pilots may use the MV-22 Tactics Manual as a source document for planning.

Performance Standards

(1) Plan, brief, and lead a successful 3 or 4 aircraft mission in a low or medium threat scenario.

(2) Maintain wingman awareness during approaches, departures, and during en route evasive maneuvers.

Prerequisite. STAC-342, TAC-343, RQD-615.

Ordinance. None.

External Syllabus Support. N/A.

RQD-619

1.5 A (3+ ACFT) N (NS)

Goal. Conduct a division leader review.

Requirement. Satisfy all prerequisites defined in the applicable NATOPS Flight Manual, OPNAVINST 3710.7 and local directives for designation as a division leader. Demonstrate the leadership necessary for effective mission accomplishment with a flight of 3 or more aircraft. Conduct this flight IAW MCCRES standards. Moreover, pilots may use the MV-22 Tactics Manual as a source document for planning.

Performance Standards

(1) Plan, brief, and lead a successful 3 or 4 aircraft mission in a low or medium threat scenario.

(2) Maintain wingman awareness during approaches, departures, and during enroute evasive maneuvers.

Prerequisite. STAC-342, TAC-343, RQD-605.

Ordinance. None.

External Syllabus Support. N/A.

RQD-620

1.5 E A (3+ ACFT) (N)(NS)

Goal. Conduct a division leader check.

Requirement. Satisfy all prerequisites defined in the applicable NATOPS Flight Manual, OPNAVINST 3710.7 and local directives for designation as a division leader. Demonstrate the leadership necessary for effective mission accomplishment with a flight of 3 or more aircraft. Conduct this flight IAW MCCRES standards. Moreover, pilots may use the MV-22 Tactics Manual as a source document for planning.

Performance Standards

(1) Plan, brief, and lead a successful 3 or 4 aircraft mission in a low or medium threat scenario.

(2) Maintain wingman awareness during approaches, departures, and during enroute evasive maneuvers.

Prerequisite. STAC-342, TAC-343, RQD-605.

Ordinance. None.

External Syllabus Support. N/A.

RQD-625

1.5 E A (2 Div+) (N)(NS)

Goal. Conduct a flight leader check.

Requirement. Brief and lead a multi-division mission, emphasizing flight coordination, flight discipline, inadvertent IMC, rendezvous procedures, and inflight emergency coordination. At the completion of flight, perform an inadvertent IMC breakup maneuver in VMC conditions. Squadrons shall evaluate pilots for designation at the discretion of the commanding officer per the criteria in the MV-22 NATOPS Flight Manual, OPNAVINST 3710.7, and local SOPs. Conduct this flight IAW MCCRES standards. Moreover, pilots may use NWP 3-22.5-MV-22 Tactics Manual as a source document for planning.

Performance Standards

(1) Plan, brief, and lead a successful 5 or more aircraft mission in a low or medium threat scenario.

(2) Demonstrate sound knowledge of the tactical employment of an MV-22 Flight IAW MV-22 TACMAN.

Prerequisite. RQD-620.

Ordnance. None.

External Syllabus Support. N/A.

RQD-628

1.5 E A (2+Div) (N)(NS)

Goal. Conduct an Air Mission Commander (AMC) check.

Requirement. AMC is a function of flight leadership, maturity, and experience. The AMC should be evaluated on ability to integrate the 6 functions of Marine aviation. The AMC should lead the mission from a C&C aircraft, if available.

Conduct this flight IAW MCCRES standards. Moreover, pilots may use NWP 3-22.5-MV-22 Tactics Manual as a source document for planning.

Performance Standards

(1) Plan, brief, and lead a successful mission of multiple T/M/S aircraft in a low or medium threat scenario.

(2) Demonstrate the ability to integrate several functions of Marine Aviation in support of the MAGTF.

Prerequisite. RQD-625.

Ordnance. None.

External Syllabus Support. N/A.

RQD-630E A (MV-22)

Goal. Tracking code for VLATI designation.

Requirement. Completion of VLAT-522 meets the requirements for the PUI to be designated a VLATI. At the discretion of the squadron commanding officer a letter assigning the PUI as a designated VLATI shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-630 shall be logged.

Prerequisites. Previously qualified in VLAT, VLAT-520, 521.

RQD-635E A (MV-22)

Goal. Tracking code for ARI designation.

Requirement. Completion of AR-531 meets the requirements for the PUI to be designated an ARI. At the discretion of the squadron commanding officer a letter assigning the PUI as a designated ARI shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-635 shall be logged.

Prerequisites. Previously qualified in AR, AR-530.

RQD-6391.0A (MV-22)

Goal. Conduct an evaluation of Rotor Track and Balance (RT&B) procedures. After completion of this flight, the pilot will receive a partial Functional Check Pilot (FCP) designation and will be fully qualified to conduct MV-22 RT&B flights.

General. Squadrons shall evaluate pilots for designation at the discretion of the commanding officer per the criteria in the MV-22 NATOPS Flight Manual, OPNAVINST 3710.7, and local SOPs. Prospective FCPs shall complete the ground training syllabus prior to commencing flight training. Normally, pilots will receive a designation as an FCP for RT&B and later complete the designation as a fully qualified FCP. RQD-639 and RQD-640 represent the minimum requirements for designation.

Requirement(1) Ground Training

(a) A pilot in the FCP syllabus will receive a brief from a Quality Assurance Representative (QAR) or from Maintenance Control personnel on the following:

1 QA and Maintenance Control procedures related to FCFs.

2 Use of IETMS and other publications.

3 Phase Inspections.

4 Discussion of logbooks, ADBs, Test Cards and general paperwork related to FCFs.

5 Use of VSLED for track and balance procedures.

6 Use of the AMEGS for maintenance data downloads, Maintenance Control debriefs and vibration trend analysis.

(2) FCP Required Reading

(a) OPNAV 4790.2G Volume I, Ch 12.1.4 Functional Check Flights.

(b) OPNAVINST 3710.7R Paragraph 3.8.

(c) A1-V22AB-NFM-000.

(d) IETM rotor track and balance procedures.

(e) V-22 Periodic Maintenance Information Cards.

(3) Discuss

(a) OPNAV 4790 and 3710 FCF requirements.

(b) Level 1 and Level 2 vibration criteria.

(c) Use of optical sensors.

(d) Flight regimes, airspeed and vertical speed constraints.

(e) IETMS RT&B requirements.

(f) CMS RT&B functions (moves made, perf cal and config edited).

(g) AMEGS review of RT&B and trend analysis data.

(4) Evaluate

(a) Data collection in all RT&B regimes.

(b) Post flight data processing using the CMS.

(c) Post flight data processing using the AMEGS.

Squadrons shall base this evaluation on completion of a locally prepared syllabus.

Performance Standards. Perform RT&B IAW NATOPS.

Prerequisite. RQD-604.

Ordinance. None.

External Syllabus Support. N/A.

RQD-6401.5E A (MV-22)

Goal. Conduct an evaluation of FCF procedures. After the completion of this flight the pilot will receive the FCP designation.

(1) Discuss

- (a) OPNAV 4790 and 3710 FCF requirements.
- (b) Systems checks.
- (c) Engine performance checks, with and without VSLED.
- (d) Flight control checks.

(2) Evaluate

- (a) Systems checks.
- (b) Engine performance checks.
- (c) Flight control checks.
- (d) Stall check.
- (e) Fire toggle check.

Performance Standards. Perform a complete FCF IAW NATOPS.

Prerequisite. RQD-639.

Ordinance. None.

External Syllabus Support. N/A.

RQD-650E A (MV-22)

Goal. OS - Tracking code for DCMI designation.

Requirement. Successfully complete the requirements of DCMI. After successfully completing the appropriate MAWTS-1 Course Catalog syllabus and at the discretion of the squadron commanding officer, a letter designating the pilot as a DCMI shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-650 shall be logged.

Performance Standards. See MAWTS-1 Course Catalog.

Prerequisites. IAW MAWTS-1 Course Catalog requirements.

Ordinance. See MAWTS-1 Course Catalog.

External Syllabus Support. See MAWTS-1 Course Catalog.

RQD-654E A (MV-22)

Goal. OS - Tracking code for NSI designation.

Requirement. Successfully complete the requirements of NSI. After successfully completing the appropriate MAWTS-1 Course Catalog syllabus and at the discretion of the squadron commanding officer, a letter designating the pilot as a NSI shall be placed in the NATOPS jacket and APR, and a tracking code of RQD-654 shall be logged.

Performance Standards. See MAWTS-1 Course Catalog.

Prerequisites. IAW MAWTS-1 Course Catalog requirements.

Ordinance. See MAWTS-1 Course Catalog.

External Syllabus Support. See MAWTS-1 Course Catalog.

RQD-655

E A (MV-22)

Goal. OS - Tracking code for WTI designation.

Requirement. Successfully complete the requirements of WTI. After successfully completing the appropriate MAWTS-1 Course Catalog syllabus and at the discretion of the squadron commanding officer, a letter designating the pilot as a WTI shall be placed in the NATOPS jacket, APR and a tracking code of RQD-654 shall be logged.

Performance Standards. See MAWTS-1 Course Catalog.

Prerequisites. IAW MAWTS-1 Course Catalog requirements.

Ordinance. See MAWTS-1 Course Catalog.

External Syllabus Support. See MAWTS-1 Course Catalog.

151. GRADUATE LEVEL COURSES

1. There 4 graduate level courses that qualify instructors for specific portions of the T&R syllabus. These courses are as follows:

- a. Weapons and Tactics Instructor (WTI).
- b. Night Systems Instructor (NSI).
- c. Defensive Combat Maneuvers Instructor (DCMI).
- d. Tactical Simulation Instructor (TSI).

2. The MAWTS-1 Course Catalog contains the above courses and the appropriate training codes. Each particular stage of the T&R syllabus is sufficient to maintain proficiency as an instructor.

160. ORDNANCE REQUIREMENTS. These requirements are based on a "per crew" basis per OPNAVNOTE 8010.

<u>ORDNANCE</u>	<u>100</u> <u>SERIES</u>	<u>200</u> <u>SERIES</u>	<u>300</u> <u>SERIES</u>	<u>400</u> <u>SERIES</u>	<u>REFRESHER</u>	<u>IUT</u>	<u>*ANNUAL</u>
.50 Cal	0	2,600	2,000	1,000	3,600	0	4,000
Chaff	0	60	140	120	280	0	200
Flares	0	60	100	180	260	0	140

\* Annual Ordnance Requirements maintain core competency.

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

STAGE	EVENT TRNG CODE	HRS	REFLY INTERVAL	CRP	R	M	E	REMARKS
<b>COMBAT CAPABLE PHASE</b>								
SFAM	100	2.0	*	0.5				S
SFAM	101	2.0	*	0.6	X			S
SFAM	102	2.0	*	0.6				S
SFAM	103	2.0	*	0.6				S
SFAM	104	2.0	*	0.6				S
SFAM	105	2.0	*	0.6				S
SFAM	106	2.0	*	0.6				S
SFAM	107	2.0	*	0.6				S
SFAM	108	2.0	*	0.6	X			S
SFAM	109	2.0	*	0.6	X	X		S
SFAM	110	2.0	*	0.6	X	X		S
FAM	111	1.5	*	0.6				A
FAM	112	1.5	*	0.6	X			A
FAM	113	2.0	*	0.6				A
FAM	114	1.5	*	0.6				A
FAM	115	1.5	*	0.8	X			A
FAM	116	2.0	*	0.8	X			A
SFAM	117	2.0	*	0.7		X		S
FAM	118	1.5	*	0.8	X	X		A
SFAM	119	2.0	*	0.6				S N
FAM	120	1.5	*	0.6				A N
SINST	121	2.0	*	0.6				S (N)
SINST	122	2.0	*	0.6				S (N)
SINST	123	2.0	*	0.6	X			S (N)
SINST	124	2.0	*	0.6	X	X		S/A (N)
INST	125	2.0	*	0.6				A/S (N)
INST	126	2.0	*	0.6	X			A/S (N)
INST	127	2.0	*	0.8	X	X		A/S (N)
SCAL	130	2.0	*	0.7				S
CAL	131	1.5	*	0.8	X	X		A
SNAV	140	2.0	*	0.7				S
NAV	141	1.5	*	0.7	X			A/S
SVLAT	150	2.0	*	0.7				S
VLAT	151	2.0	*	0.9	X			A
VLAT	152	2.0	*	0.9	X	X		A

Figure 1-3.--MOS 7532 Refly Interval, Combat Readiness Percentage.



AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

STAGE	EVENT TRNG CODE	HRS	REFLY INTERVAL	CRP	R	E	REMARKS
<b>COMBAT READY PHASE</b>							
SFAM	200	2.0	12	0.3			S (N)
FAM	201	1.5	12	0.3			A (N)
SFAM	202	1.0	1	0.3			S (N)(NS)
SCAL	210	2.0	12	0.3			S
CAL	211	1.5	12	0.3	X		A
CAL	212	2.0	12	0.5	X		A 2-ACFT
SFORM	220	2.0	12	0.3			S
FORM	221	1.5	12	0.4	X		A 2-ACFT
FORM	222	1.5	8	0.5			A 3+ ACFT
SVLAT	230	2.0	12	0.3			S
VLAT	231	1.5	12	0.4	X		A
SVLAT	232	2.0	8	0.3	X		S
VLAT	233	1.5	8	0.6	X		A 2-ACFT
SNS	240	2.0	12	0.3	X		S NS
NS	241	1.5	6	0.5	X		A NS
NS	242	2.0	6	0.5	X		A 2-ACFT
SNS	243	2.0	12	0.4			S NS
NS	244	1.5	6	0.6			A NS
NS	245	2.0	6	0.7	X		A NS 2-ACFT
SNS	246	2.0	12	0.4			S NS
NS	247	1.5	6	0.9	X	X	A NS 3+ ACFT
SAR	250	1.0	6	0.3			S
AR	251	1.5	6	0.4	X		A TANKER
SAR	252	2.0	6	0.3			S NS
AR	253	1.5	4	0.6	X		A NS TANKER
SAG	260	2.0	8	0.3	X		S
AG	261	1.5	8	0.4			A 2-ACFT ORD
SAG	262	2.0	8	0.3	X		S NS
AG	263	1.5	8	0.4	X		A NS 2-ACFT ORD
SDCM	270	2.0	6	0.5	X		S/A
STAC	280	2.0	8	0.5			S
TAC	281	2.0	8	0.6	X		A 2-ACFT ORD
STAC	282	2.0	8	0.5			S NS
TAC	283	2.0	8	0.8	X		A NS 2-ACFT ORD

Figure 1-3.--MOS 7532 Refly Interval, Combat Readiness Percentage--Continued.

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

STAGE	EVENT TRNG CODE	HRS	REFLY INTERVAL	CRP	R	E	REMARKS
<b>COMBAT QUALIFICATION PHASE</b>							
SCQ	300	2.0	12	0.5	X		S NS
CQ	301	1.0	12	0.5	X		A FCLP
CQ	302	1.5	12	0.5	X		A NS FCLP
CQ	303	1.5	6	0.8	X		A SHIP
CQ	304	1.5	6	1.0	X		A NS SHIP
SNS	310	2.0	12	0.5	X		S NS
NS	311	1.5	6	0.5	X		A NS
NS	312	2.0	6	0.7			A NS 2-ACFT
SNS	313	2.0	12	0.5			S NS
NS	314	1.5	4	0.8	X		A NS 2-ACFT
SNS	315	2.0	12	0.5			S NS
NS	316	1.5	4	1.0	X	X	A NS 3+ ACFT
SEXT	320	2.0	12	0.5			S
EXT	321	2.0	12	0.5	X		A HST
EXT	322	2.0	6	0.6	X	X	A NS HST
SDCM	330	2.0	6	0.5			S
DCM	331	1.5	6	0.7	X		A 2-ACFT EMIT ORD
STAC	340	2.0	12	0.5			S
TAC	341	2.0	6	0.6	X		A 2-ACFT ORD ESC
STAC	342	2.0	12	0.5	X		S
TAC	343	3.0	4	0.8	X		A NS 3+ ACFT ORD ESCORTS
AIE	350	2.0	12	0.5			A RST MASTER
AIE	351	1.0	12	0.5			A RST MASTER
AIE	352	2.0	6	0.5	X	X	A NS RST MASTER
MAT	360	2.0	12	0.5			S
MAT	361	1.5	12	0.5	X		A
MAT	362	1.5	6	0.5	X	X	A NS

Figure 1-3.--MOS 7532 Refly Interval, Combat Readiness Percentage--Continued.

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

STAGE	EVENT TRNG CODE	HRS	REFLY INTERVAL	CRP	R	E	REMARKS
<b>FULL COMBAT QUALIFICATION PHASE</b>							
SDCM	400	2.0	12	0.25	X		S 2V1 RW AGGR
SDCM	401	2.0	12	0.25	X		S 2V1 FW AGGR
DCM	402	1.5	12	0.3			A 2V1 RW AGGR
DCM	403	1.5	12	0.3			A 2V1 FW AGGR
DCM	404	1.5	8	0.3	X		A 2V1 RW AGGR
DCM	405	1.5	8	0.3	X	X	A 2V1 FW AGGR
SEXT	410	2.0	12	0.25	X		S/A (NS)
SNBC	420	2.0	12	0.25	X		S NS AR-5
NBC	421	1.0	12	0.25			A AR-5
AIE	430	1.5	12	0.3			A JUMP MASTER
AIE	431	1.5	12	0.25		X	A CAST MASTER
STAC	440	2.0	12	0.3			S
TAC	441	3.0	6	0.35	X		A NS 3+ ACFT ORD
TAC	442	3.0	6	0.35	X		A NS 4+ ACFT
STAC	443	2.0	12	0.25			S/A (NS)
SCQ	450	1.0	12	0.25			S N
CQ	451	1.0	12	0.25	X		A N FCLP
CQ	452	1.5	6	0.25	X	X	A N SHIP

Figure 1-3.--MOS 7532 Refly Interval, Combat Readiness Percentage--Continued.

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

STAGE	EVENT TRNG CODE	HRS	REFLY INTERVAL	CRP	R	E	REMARKS
<b>INSTRUCTOR TRAINING</b>							
<b>1. <u>FRS INSTRUCTOR/CONTRACT SIMULATOR INSTRUCTOR</u></b>							
FAM	500	2.0	*	0.0			A/S
FAM	501	1.0	*	0.0			A/S N
SINST	502	2.0	*	0.0			S/A (N)
CAL	503	1.5	*	0.0			A/S
SNAV	504	1.5	*	0.0			S/A
FORM	505	1.5	*	0.0			A/S
EXT	506	1.5	*	0.0			A/S HST, LOAD
SVLAT	507	2.0	*	0.0			S
SNS	508	1.5	*	0.0			S NS
SNS	509	1.5	*	0.0			S NS
SNS	510	1.5	*	0.0			S NS
SNS	511	1.5	*	0.0			S NS
STANX	512	2.0	*	0.0		X	A
<b>2. <u>VLAT INSTRUCTOR</u></b>							
SVLAT	520	2.0	*	0.0			S
VLAT	521	2.0	*	0.0			A HST, LOAD
VLAT	522	1.5	*	0.0		X	A 2-ACFT
<b>3. <u>AR INSTRUCTOR</u></b>							
SAR	530	2.0	*	0.0			S/A N NS
AR	531	2.0	*	0.0		X	A NS Tanker

Figure 1-3.--MOS 7532 Refly Interval, Combat Readiness Percentage--Continued.

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

STAGE	EVENT		REFLY		R	E	REMARKS
	TRNG CODE	HRS	INTERVAL	CRP			
4. <u>REQUIREMENT, QUALIFICATIONS, DESIGNATIONS</u>							
RQD	600	1.5	12	0.0		X	A/S (N)(NS)
	601	2.0	12	0.0		X	A/S (N)(NS)
	602	1.5	*	0.5		X	A
	603	1.5	*	0.5		X	A N NS
	604	1.5	*	1.0		X	A N NS
	605	1.5	*	1.0		X	A
	606	1.5	*	1.0		X	A
	607	1.5	*	0.0		X	A
	608	1.5	*	0.0		X	A N (NS)
	609	1.5	*	0.0		X	A (N)(NS)
	610	1.5	*	0.0		X	A
	613	1.5	*	0.0		X	A
	614	1.5	*	0.0		X	A N (NS)
	615	1.5	*	0.0		X	A (N)(NS)
	618	1.5	*	0.0		X	A 3+ ACFT
	619	1.5	*	0.0		X	A 3+ ACFT N (NS)
	620	1.5	*	0.0		X	A 3+ ACFT (N)
	(NS)						
	625	1.5	*	0.0		X	A (N)(NS)
	628	1.5	*	0.0		X	A (N)(NS)
	630	1.5	*	0.0		X	A
	635	1.5	*	0.0		X	A
	639	1.5	*	0.0		X	A
	640	1.5	*	0.0		X	A
	650	1.5	*	0.0		X	A
	654	1.5	*	0.0		X	A
	655	1.5	*	0.0		X	A

Figure 1-3.--MOS 7532 Refly Interval, Combat Readiness Percentage--Continued.

MV-22 PILOT FLIGHT UPDATE CHAINING

<u>STAGE</u>	<u>FLIGHT</u>	<u>FLIGHTS UPDATED</u>
FAM	200	201
	201	200
	202	200, 201
CAL	210	200
	211	200, 210
	212	200, 210, 211
FORM	220	210
	221	210, 211, 212, 220
	222	210, 211, 212, 220, 221
VLAT	230	
	231	230
	232	220, 230
	233	220, 221, 230, 231, 232
NS	240	210, 220
	241	210, 211
	242	210, 211, 212, 220, 221, 240, 241
	243	220, 230, 232
	244	230, 231
	245	201, 211, 212, 220, 221, 230, 231, 232, 233, 240, 241, 242, 243, 244
	246	210, 220
247	210, 211, 212, 220, 221, 222, 240, 241, 242	
AR	250	
	251	250
	252	250
	253	250, 251, 252
AG	260	220
	261	220, 221, 260
	262	220, 260
	263	220, 221, 260, 261, 262, 263
DCM	270	
TAC	280	220, 230, 232, 270
	281	220, 221, 230, 231, 232, 233, 270, 280
	282	220, 230, 232, 243, 270, 280
	283	220, 221, 230, 231, 232, 233, 243, 244, 245, 270, 280, 281, 282

Figure 1-4.--MOS 7532 Pilot Flight Update Chaining.

MV-22 PILOT FLIGHT UPDATE CHAINING

<u>STAGE</u>	<u>FLIGHT</u>	<u>FLIGHTS UPDATED</u>
CQ	300	301, 302
	301	210, 211, 300
	302	210, 211, 240, 241, 300, 301
	303	300, 301
	304	300, 301, 302, 303
NS	310	210, 220, 240
	311	210, 211, 240, 241, 310
	312	210, 211, 212, 220, 221, 240, 241, 242, 310, 311
	313	210, 220, 230, 232, 240, 243, 310
	314	210, 211, 212, 220, 221, 230, 231, 232, 240, 241, 242, 243, 244, 245, 310, 311, 312, 313
	315	210, 220, 240, 246, 310
	316	210, 211, 212, 220, 221, 222, 240, 241, 242, 246, 247, 310, 311, 312, 315
EXT	320	210
	321	210, 211, 320
	322	210, 211, 240, 241, 320, 321
DCM	330	220, 270
	331	220, 221, 270, 330
TAC	340	220, 230, 232, 270, 280
	341	220, 221, 230, 231, 232, 233, 270, 280, 281, 340
	342	220, 230, 232, 243, 270, 280, 282, 340,
	343	220, 221, 230, 231, 232, 233, 243, 244, 270, 280, 281, 282, 283, 340, 341, 342
AIE	350	210, 211
	351	210, 211
	352	210, 211, 240, 241
MAT	360	210, 240
	361	210, 211, 360
	362	210, 211, 240, 241, 360, 361

Figure 1-4.--MOS 7532 Pilot Flight Update Chaining--Continued.

MV-22 PILOT FLIGHT UPDATE CHAINING

<u>STAGE</u>	<u>FLIGHT</u>	<u>FLIGHTS UPDATED</u>
DCM	400	220, 230, 231, 232
	401	220, 230, 231, 232
	402	220, 221, 232, 233, 400
	403	220, 221, 232, 233, 401
	404	220, 221, 232, 233, 400, 402
405	220, 221, 232, 233, 401, 403	
EXT	410	210, 230, 320
NBC	420	421
	421	420
AIE	430	
	431	
TAC	440	220, 230, 232, 243, 270, 280, 282, 340, 342
	441	220, 221, 230, 231, 232, 233, 243, 244, 270, 280, 281, 282, 283, 340, 341, 342, 343
	442	220, 221, 230, 231, 232, 233, 243, 244, 270, 280, 281, 282, 283, 340, 341, 342, 343, 440, 441
	443	
CQ	450	300
	451	210, 211, 300, 301, 450
	452	300, 301, 303, 450, 451

Figure 1-4.--MOS 7532 Pilot Flight Update Chaining--Continued.

170. IMI LESSON DESCRIPTIONS

<u>DESIGNATOR</u>	<u>TITLE</u>	<u>HRS</u>
<b>Pre-FAM</b>		
1.100.1	Squadron Indoctrination	LEC
1.100.2	Course Introduction	1
1.100.3	Manuals & Publications	1
1.100.4	Aircraft Overview	2
1.100.5	Airframes	2
1.100.6	Cockpit Introduction	3
1.100.7.1	CMS Introduction	1
1.100.7.2	CMS Basic Functions	2
1.100.8	T-406-AD-400 Engine & Subsystems	3
1.100.9	Proprotor Systems	3
1.100.10	Drive System	3
1.100.11	Auxiliary Power Unit	2
1.100.12	Aircraft Fuel Systems	3
1.100.13	Electrical & Lighting Systems	2
1.100.14	Hydraulic Systems Introduction	2
1.100.15	Hydraulic Actuators	2
1.100.16	Hydraulic System 1 & 2, Flight Controls	2
1.100.17	Hydraulic Sys 3 - Flt Cntls & Utility Sys	3
1.100.18	<<OPEN>>	
1.100.19	Hydraulic Modes of Operation	2
1.100.20	Flight Control Systems Introduction	1
1.100.21	Flight Control Systems Controls & Panels	2
1.100.22	Flight Control Reference Systems	1
1.100.23	Flight Control System Interaction	1
1.100.24	Basic IOS Operator	2
1.100.25	Flight Control Laws	3
1.100.26	Landing Gear Hydraulic System	2
1.100.27	Nose Wheel Steering & Wheel Brake System	1
1.100.28	Proprotor Blade Fold/Wing Stow System	2
1.100.29	ECS - Air Conditioning/Over Pressurization	2
1.100.30	ECS - Avionics Cooling & Wndshld/Wng De-ice	1
1.100.31	Environmental Control Sys - OBIGGS/OBOGS	1
1.100.32	CRM	LEC
1.100.33	V-22 Mission Planning System (VMPS)	4
1.100.34	VSLED & BIT	1
1.100.35	Acft Maint. Event Ground Station (AMEGS)	1
1.100.36	Communications Introduction	1
1.100.37	Radios Introduction	1
1.100.38	Radio Modes & Functions	2
1.100.39	Syllabus Event Preparation	1
1.100.40	Procedures 100	2
<b>FAM</b>		
1.101.1	Anti-Jam Communication Introduction	1
1.101.2	HAVEQUICK Introduction, Modes & Functions	2

<u>DESIGNATOR</u>	<u>TITLE</u>	<u>HRS</u>
1.101.3	SINGARS Introduction, Modes & Functions	2
1.101.4	AN/A.PX-100 IFF Sys Intro, Modes & Functions	1
1.101.5	Procedures & Emergency Procedures 101	2
1.102.1	Std Data & Engine Performance Computations	2
1.102.2	Takeoff and Climb Performance Data	2
1.102.3	Flight Planning & Performance Charts (Helo)	2
1.102.4	Flt Planning & Performance Charts (Conv.)	2
1.102.5	Flt Planning & Performance Charts (Airplane)	2
1.102.6	Weight & Balance Calculations	3
1.102.7	MCAS New River Course Rules	1
1.102.8	Procedures & Emergency Procedures 102	2
1.103.1	Navigation Systems Introduction	2
1.103.2	Navigation Systems Control & Status	3
1.103.3	Procedures & Emergency Procedures 103	2
1.104.1	Procedures & Emergency Procedures 104	2
1.105.1	Procedures & Emergency Procedures 105	2
1.106.1	Procedures & Emergency Procedures 106	2
1.107.1	Procedures & Emergency Procedures 107	2
1.108.1	Aircraft Safety & Personal Survival Equip	1
1.108.2	Procedures & Emergencies Procedures 108	2
1.109.1	Flight Line Hand Signals	1
1.109.2	Flight Director	3
1.109.3	Procedures & Emergency Procedures 109	2
1.110.1	DIGMAP System Introduction	1
1.110.2	DIGMAP System Modes and Functions	1
1.110.3	Mission Management	2
1.110.4	Procedures & Emergency Procedures 110	2
1.111.1	Aircraft Emergency Exits & Egress	1
1.111.2	Procedures & Emergency Procedures 111	2
1.112.1	Procedures & Emergency Procedures 112	2
1.113.1	Procedures & Emergency Procedures 113	2
1.114.1	Procedures & Emergency Procedures 114	2
1.115.1	Procedures & Emergency Procedures 115	2
1.116.1	Procedures & Emergency Procedures 116	2
1.119.1	FLIR Basic Theory	1
1.119.2	FLIR System	1
1.119.3	Procedures & Emergency Procedures 119	2
1.120.1	Procedures & Emergency Procedures 120	2
2.121.1	Procedures & Emergency Procedures 121	2
2.122.1	Procedures & Emergency Procedures 122	2
2.123.1	Procedures & Emergency Procedures 123-124	2
3.130.1	Procedures & Emergency Procedures 130	2
4.140.1	Procedures & Emergency Procedures 140	2
5.150.1	Electronic Countermeasures Systems	1
5.150.2	Acft Armament Systems	1
5.150.3	Procedures & Emergency Procedures 150	2

<u>DESIGNATOR</u>	<u>TITLE</u>	<u>HRS</u>
5.151.1	Procedures & Emergency Procedures 151	2
6.160.1	Procedures & Emergency Procedures 160-161	2
7.170.1	Procedures & Emergency Procedures 170	2
8.180.1	NVG Introduction	1
8.180.2	Procedures & Emergency Procedures 180	2
8.182.1	Procedures & Emergency Procedures 182	2
8.184.1	Procedures & Emergency Procedures 184	2
8.186.1	Procedures & Emergency Procedures 186	2
9.190.1	T2P Review	2
<b>200 Level</b>		
9.200	Day/Night FAM and EP Review	1
10.210	CAL/Section CAL	1
11.220	Section Division TAC Form	1
12.230	VLAT/Section VLAT	1
13.240	Night Systems (HLL)	3
14.250	D/N/NVD Aerial Refueling	2
15.260	Basic Aerial Gunnery	3
16.270	Basic DECM Principles	3
17.280	D/NVD Section Tactics (Low Threat)	4
<b>300 Level</b>		
18.300	Shipboard Operations/CQ	2
19.310	Night Systems (LLL)	2
20.320	D/NVD Externals	1
21.330	DCM versus Ground Threat	3
22.340	D/NVD Section and Division Tactics (Medium)	2
23.350	Tiltrotor VIE	2
24.360	Mountain Area Training	2
25.390	TAC Review	2
<b>400 Level</b>		
26.400	DCM versus RW/FW	4
27.410	Day/NVD VLAT Externals	1
28.420	Day/NVD NBC Operations	2
29.430	Aerial Delivery/Softduck/H-cast/SAR	2
30.440	High Threat Tactics	4
31.450	Unaided Shipboard Operations	1
<b>500 Level</b>		
32.500	Basic IOS Operator	2
<b>600 Level</b>		
33.600	NATOPS Check Review	2
33.601	Instrument Ground School	4