----------MISSION 1: RAMP START----------

(I took for granted the knowledge of some acronyms like HUD, ECM, IFF. The following list skips the controls that I have deemed cosmetic or eye-candy.)

1. MAIN PWR switch	BATT
2. Canopy	Closed – locked (spider) - no light
3. ENGINE FEED knob	NORM
4. AIR SOURCE knob	NORM
5. Aircraft Lights	As **SOP** [Standard Operating Procedure] (AC ON – Wing/fus: ON – FLASH) [MASTER to NORM]
6. COM1 & COM2 Vol knob	Set both CW (turns radio ON) [UHF knob to BOTH]
7. Set ON the INTERCOM and ILS on AUDIO 2 panel	
8. MAIN PWR Switch	MAIN PWR
9. **JFS**	START 2 [Jet Fuel Starter]
10. THROTTLE	Advance to IDLE at 25% RPM minimum [**SEC** - Secondary (SEC) engine control - caution light: check OFF around 20% RPM - wait for the RPM to go up to about 72% and stabilize]
11. AVIONICS POWER Panel	
a. **MMC** (FCC) switch:	ON [Modular Mission Computer (old FCC)]
b. **ST STA** (SMS) switch:	ON [Store Stations (old SMS)]
c. **MFD** switch:	ON [Multi-Function Displays]
d. **UFC** switch:	ON [Up Front Controls: Data Entry Display (**DED**) and a keyboard known as the Integrated Control Panel (**ICP**).]
e. **DL** switch:	ON [Data Link]
f. **EGI** [Embedded GPS/INS]:	Select ALIGN NORM after display visible on the DED
c. ECM switch:	Set as required (OPR)

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12. [**HMCS**: take the knob all the way forward (INC)]<--- Helmet Mounted Cueing System: only if required

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13. Depress the lower right POWER button on the **TWA** (THREAT WARNING AUX), located on the left auxiliary console and the SYSTEM POWER green light illuminates.

14. Chaff & Flares CMDs:

a. **MWS**	ON [Missile Warning System]
b. **JMR**	ON [JaMmeR]
c. **RWR**	ON [Radar Warning Receiver]
d. 01	ON
e. 02	ON
f. CH	ON [CHaff]
g. FL	ON [FLares]
h. MODE	MAN
15. HANDOFF button (left RWR)	press that once
16. HUD Panel:	As desired
	Set HUD SYM WHEEL ON
17. SNSR PWR panel:	
a. LEFT HDPT switch:	As required
b. RIGHT HDPT switch:	As required
c. **FCR** switch:	FCR (initiates FCR PO BIT) [Fire Control Radar - Power ON Built-In Test]
d. RDR ALT switch	STBY
18. SEAT	Adjust
19. **DTC**:	Load [Data Transfer Cartridge - on the right MFD hit DTE and then hit LOAD] (always load the DTC prior to setting up the UFC subpages)
20. IFF PANEL	IFF MASTER: NORM
	CNI (C&I) knob: UFC [Communication, Navigation and Identification]

21. Request EPU PIN removal from the Ground ATC menu

22. **FLCS** panel:	FLCS reset (FLCS light & PFD off) [FLight Control System]
23. UFC radio:	Set COM1 & COM2 frequency as briefed. [COM1 on 2 and ENTER]
	ATIS [Automated Terminal Information Service]: Listen to departure airbase VHF ATIS freq

24. Hit "T" on your keyboard until we see QNH and then press "1". Listen at QNH and set it on your altimeter by left bottom knob.

25. Check on FLT CONTROL panel on the left side that RUN test has terminated and go on the left hand MFD where we hit TEST and then CLEAR.

26. When RDY is flashing on the DED set EGI on NAV on the AVIONICS POWER panel.

27. Turn ON oxygen regulator.

28. Arm seat.

29. Turn ON TAXI LIGHTS.

30. ANTI-COLL on C.

31. SHIFT+key immediately to its left to get nose-wheel steering.

32. Request chocks removal from the Ground ATC menu.

33. Taxi to the runway.

34. Switch your TAXI light to LANDING light once you have been cleared to takeoff.

35. Check the runway QFU (magnetic heading), place the Radar Altimeter switch to the RDR ALT position, the IFF master knob to NORM and lower your visor.

36. If your jet is positioned correctly with the nose wheel straight on the centerline you will not need NWS during take-off, so it may be safer to align carefully on the runway and disable NWS before advancing the throttle. If NWS is disabled, one will not be able to steer the aircraft on the runway with the nose wheel; however, as speed increases so does the air flow on your rudder. Increasing rudder authority/effectiveness allows one to steer and compensate for crosswinds.

37. The first step is to keep the brakes firmly engaged and add power to 90% RPM.

38. Once stabilized, check engine gauges and if all is good release the brakes and advance the throttle to full military power (aka Buster or MIL), then smoothly forward to engage afterburner.

39. Once rotation speed is attained, pull back gently on the stick and place the gun cross on the 10° pitch up line. Do not climb too steeply and keep under 14° pitch as you rotate, or you may risk scraping the nozzle on the runway.

40. Continue flying on the runway heading and raise the landing gear. The gear must be in the wells before the airspeed reaches 300 kts.

41. Once your airspeed reaches 350 kts disengage the afterburner. Maintain buster and pull more on the stick to adjust your climb angle to maintain 350 kts.

42. Switch to the Departure frequency (preset 4) and select ‘Report Airborne’ on the ATC menu Departure page.

43. Level out at 5000 ft on given heading and retard the throttle to maintain 350 kts.

----------MISSION 2: BASIC NAVIGATION----------

44. You are between Gunsan airbase and Steerpoint 2, level at 4800 feet QNH. Calibrated airspeed is 300 kts.

45. Steer towards Steerpoint 2 by placing the tadpole inside the FPM [Flight Path Marker]. [Always follow the tadpole horizontally and never vertically]

46. Select the ICP STPT page with the STPT button and DCS [Data Command Switch] right. The DED will toggle from MAN to AUTO. DCS left to return to the CNI page and note that the steerpoint number is now followed by an A, indicating Automatic mode is active. When reaching Stpt 2, the system will automatically switch to the next steerpoint.

47. Upon reaching Steerpoint 2 the HUD will switch symbology to STPT 3. Turn the aircraft to the right, maintaining level flight until the steerpoint diamond in the HUD becomes visible. Align it with the FPM and ensure the tadpole is vertical. You are now flying directly to STPT 3.

48. The flight plan calls for a climb to FL200. Advance your throttle to buster (MIL power - you may set "*g_bNoRPMOnHud*" to "*0*" into your Falcon BMS.cfg file to know on your HUD RPM which engages AB and stay a bit lower), wait for 350 kts and then pull the stick and adjust the climb angle to maintain 350 kts throughout the climb.

49. Before reaching FL200 decrease your climb to level out at your assigned altitude. Depending on your gross weight you may also need to retard the throttle a bit to maintain 350 kts.

50. Passing Steerpoint 3, the avionics will switch to STPT 4 and your HUD should show information related to STPT 4.

51. Autopilot can also be used to fly the aircraft while the pilot is busy with other tasks. The autopilot of the F-16 is very reliable and features different modes of operation: PITCH HOLD, ATT HOLD, ROLL HDG SEL and STRG SEL.

The mode that is interesting to us for this training mission is the STRG SEL mode that will follow the INS route. It must be used in conjunction with the AUTO steerpoint toggle we discussed before, so the AP is able to steer to the next steerpoint when the current one is reached. Failure to use the AUTO mode will result in the aircraft circling the current steerpoint when reached until the pilot switches to the next steerpoint manually.

Move the LEFT AP switch to STRG SEL and move the right AP switch to ALT hold. The autopilot will engage (if the relevant conditions are met) and fly the aircraft. At any moment you can take control over the AP simply by moving the stick but be aware that if you exceed any of the above limitations the autopilot will disengage and WARN will be displayed in the HUD.

Note: there is no auto throttle on the F-16 so the throttle always has to be controlled by the pilot.

Approaching STPT 4 the system will switch to STPT 5 and the AP will fly the jet to the steerpoint.

52. Passing Steerpoint 5 the aircraft, still on Autopilot, steers towards Steerpoint 6. It is now time to switch from INS navigation to TACAN navigation. Muan and Mokpo are 2 VORTAC stations with a limited range of 40 Nm. Let’s fly direct to Muan. Select the T-ILS page and enter Muan channel: 065X in the scratchpad (to perform this, press the ICP numerical keys 6 and 5 then the ENTER key. Next is to set the correct band. In BMS, we mostly use the X band for ground and Y band for air. Strictly speaking we are not restricted to enforce that rule, Y band tacan may work for ground stations but most of the time we stick to Y band for air to air. To change the band simply input “0” (zero) in the scratchpad and press ENTER. That will toggle the band from Y to X to Y. The last thing you need to set as far as the tacan is concerned is the T/R

or A/A TR. That is done by depressing the DCS switch to the right (SEQ position). The value will toggle from T/R to A/A TR and back. T/R means Transmit/Receive and is the ground to air mode and A/A TR is the air to air mode.

Therefore, you must set the correct T/R mode according to which type of station you want to receive: A/A TR for tacan from other aircraft and T/R for ground stations. In this example we do not need to change it as the initial setup was already set to T/R and we want to track Muan ground station. T-ILS is also the page where you input the ILS frequency. The UFC is capable of detecting the difference between a tacan channel and an ILS frequency so if you enter 11030 in the scratchpad the UFC will understand it's an ILS frequency and will input it in the FRQ line after you hit ENTER. The autopilot is still flying the aircraft in STRG SEL mode, so let's move the heading roll bug on the station bearing with the left HSI knob [as well as CRS by the right knob] and switch the AP from STRG SEL to ROLL HDG SEL.

The aircraft will immediately start a right turn to align with the HDG bug on the HSI (the yellow captain bars). You may need to refine the HDG bug alignment with the bearing pointer to overfly the station.)

53. It is now time to RTB (Return to Base). Remember that the MOAs[Military Operating Area (training area)] West of Gunsan are active so we should avoid them. Disengage the autopilot by moving the right AP switch to A/P OFF and fly heading 090° to get back on our initial route, staying clear of MOA19. Once established back on track select STPT 7 (JULOP) which is the last steerpoint of this mission. The TACAN is still set to Muan so we need to switch back to KUN TACAN 75X and check the HSI, which can remain in TACAN mode. We can now start our descent, so we overfly JULOP at 2800 feet. Retard the throttle to IDLE and the FPM will pitch down slightly. Let the aircraft descend while taking care not to let her accelerate too fast. Aim for 350-400 KCAS in the descent. The hardest thing to know is when to start your descent. With the landing steerpoint selected and its diamond visible in the HUD, wait until the diamond is about 7° below your horizon ghost line. That is the cue to start descending. Switch the UHF radio back 7to Gunsan Approach 292.65 using the COM1 page (if it was changed) and request QNH using the ATC menu (or listen to ATIS on VHF) as you descend through the transition layer of FL140. Once you have the QNH, set it in the pressure window of the altimeter and continue your descent to 2800 ft.

----------MISSION 3: LANDING----------

3.1 Landing straight-in

54. CONDITION: Aircraft level at 2500 feet over JULOP fix - heading 360° - speed 420 kts. Fuel level just hit Bingo.

55. If you follow the AOA cues you will always fly the correct on speed AOA for approach. Always place the DRIFT C/O switch in NORM so the FPM drifts with the wind. That way you will automatically compensate for drift by placing the FPM on your desired touch down point. Listen to the ATC to build situational awareness of the traffic around the airport. Ground, Tower and Approach/Departure each have a separate frequency. Make sure you have tuned to the correct one. ATC is also able to tell you which runway is active for departure and arrival. At night, the ALS (Airport Lighting System) will be off unless you initiate contact with ATC and it will remain lit as long as aircraft are in the landing queue. If you don't make contact with the ATC and there are no other aircraft taking off or landing, the ALS will remain off.

56. A straight-in landing is a long, controlled descent to the runway; usually beginning at a distance between 6 to 9 nautical miles. The landing phase will start aligned with the runway axis; you can use the airbase TACAN to do that, but it can be done visually as well. Altitude should be 2000 feet and airspeed less than 300 knots for safe extension of the landing gear. Due to the low drag nature of the F-16, speed brakes may need be opened to reduce speed. Initiate contact with ATC by requesting unrestricted approach. ATC will insert your flight into the landing queue, light up the approach lights and afford your flight some flexibility for this scenario. Open the ATC menu Approach page and select 'Request unrestricted approach' by pressing ‘t t t 4’. Approach will instruct us to continue inbound and give us QNH. From this point on we will no longer refer to airspeed but instead use Angle Of Attack (AOA). The optimal approach airspeed depends on your gross weight and the best way to be ‘on speed’ is to forget all about airspeed and think 13° AOA for landing. First lower your landing gear (double-check your airspeed: it must be below 300 kts). Doing so will automatically deploy leading and trailing edge flaps and the FLCS will switch to take-off and landing gains. The drag caused by dirtying up your aircraft configuration will further decrease your airspeed and pitch the nose down a bit. The HUD symbology will change: notably an AOA bracket will be displayed upon nose wheel lock in the down position. This symbol is used in conjunction with the flight path marker and the Indexer lights as your main cues for controlling the approach. At 10 Nm, Gunsan approach will call you to switch to Tower frequency. Input preset #3 or 292.3 into the COM1 radio and ‘Request Landing’ at initial contact with the tower with ‘t t 2’. Tower will clear you to continue inbound and ask you to “Report on Final”. The glide slope is 3° down to the runway. By placing the FPM on the -2.5° dashed line or slightly below you should fly a correct profile for your descent to the runway. Most runways in BMS are equipped with a visual landing aid system called Precision Approach Path Indicator or PAPI. It consists of four equally spaced lights situated to one side or both sides of the runway. The lights will be seen as white or red according to the position of the aircraft with respect to the optimal glideslope. The more red lights are visible from the landing aircraft, the lower you are on the glideslope. The more white lights seen from the aircraft the higher you are above the glideslope. The optimal glide slope is thus flown when 2 red and 2 white lights are seen. A rule of thumb to remember: Red is dead! [Paraphrasing the VASI motto: half white, all right! All red: you're dead!]

57. So there you are with the runway and PAPI visual at around 6 Nm, aligned correctly with the centerline at 2000 feet, gear down and flying around 250 knots.

58. You know that you have to place the FPM on the runway threshold to land.

59. All you have left to do is to understand angle of attack and how to control it with the throttle.

The optimal touch down AOA for the F-16 is 13° AOA; corresponding to when the flight path marker is in the middle of the AOA bracket. At this moment, the AOA indexer located on the left of the HUD will show the middle green doughnut illuminated. The top of the HUD AOA bracket indicates 11° AOA and the bottom mark of the HUD AOA bracket indicates 15° AOA. The bracket therefore corresponds to 5° AOA: from 11 (top) to 15° (bottom). AOA is controlled by the power setting. Increasing power decreases AOA. (The FPM moves up while the nose remains steady) Reducing power increases the AOA (The FPM moves down in the HUD while the nose remain steady).

60. ‘Report Final’ to the Tower Controller via the ATC Tower menu ‘t t 4’. Tower will then give you surface winds and clear you for landing.

61. The next phase will be the flare just prior to touch down. The F-16 does not require much flare. The idea here is to transition the FPM from the top of the AOA bracket (11° AOA) to the center of the bracket (13° AOA), with the green doughnut illuminated on the left indexer.

Decreasing power is usually all it takes to transition to 13° AOA. Once there, maintain it until the wheels kiss the ground and pull the power back to idle. If you land with the correct on-speed AOA the aircraft will not bounce off the runway and will not want to fly again unless you increase power.

62. Maintain aero braking by keeping the FPM in the middle of the AOA bracket and the green doughnut illuminated in the left indexer. Since you are rolling and not flying anymore that is done by pulling gently on the stick. Beware that pulling too much will scrape the exhaust nozzle or the airbrakes and damage the aircraft. You can maintain directional control with the rudder during the landing roll; rudder efficiency is greater at higher speed and will decrease as your speed decays.

63. Around 80-90 knots the nose gear will drop to the runway; gently cushion it by pulling the stick.

Wheel braking can then be initiated, being careful to avoid causing a hot brakes condition; nosewheel steering can be engaged once you are below control speed (70-80 knots) to steer the aircraft on the ground. Congratulations, you just made your first solo landing.

3.2 Overhead landing

64. Overhead landing is the preferred method for landing because it allows multiple aircraft to land in the minimum amount of time [under certain conditions].

65. As with all the other approaches, the type of approach is requested on the Approach ATC menu. In this case, ‘Request Overhead Approach’ with: ‘t t t 3’.

66. 10 Nm from the airbase, approach will request a frequency change to Tower. Once the frequency is inputted into the radio make initial contact as before with ‘Request Landing’ on the Tower ATC page: ‘t t 2’. It is important to make this initial contact before the break point. Tower will clear you inbound and request you to “Report overhead break”. The flight should be in a wingtip or echelon-close formation. The side of the formation is opposite the direction of the break, e.g.: left break for RWY 36 = flight lead left and wingmen in right echelon. Speed is 300 kts, altitude 1500 ft AGL and the flight aligned with the runway axis.

67. To make overhead less restrictive and granted more often, the ATC code now requires the lead to call it’s break turn at all times. This is done with the ‘Report Overhead Break’ option on the Tower ATC menu: ‘t t 5’. This is the only indication for the AI ATC to know you’re breaking so it can deconflict other flights faster.

68. From there aircraft will break in sequence, gain separation and fly the downwind leg; bleeding airspeed and lowering the gear. At base, the jet will turn towards the runway and start descending to land in sequence.

69. Timing the break turn depends on how many aircraft there are in your flight and on how long you want your downwind leg to be. The sooner you break, the shorter your downwind leg will be.

70. A good cue for single-ship training is to wait for the opposite landing threshold (RWY 18 in this case) to disappear under your aircraft's nose. In a 4-ship scenario, lead has the shortest downwind and should start his break much sooner (like the beginning of the runway) to allow the rest of the flight to break before overflying the opposite end runway threshold.

71. The break turn is a maneuver that will turn 180° level. Don't forget to report the break to ATC with "t t 5". While turning you will be bleeding airspeed and once established on the downwind leg (356-180=176°) you can lower your landing gear immediately.

72. The downwind leg is flown at 230 to 200 kts - 1500 feet until you reach the Perch. That's the point where you will turn toward the runway and start your descent.

73. Retard the throttle (or deploy speed brakes) and start a left descending turn towards RWY 36. Keeping the runway in sight throughout the turn is very important. Avoid slowing down too much in the turn.

74. Final approach is when you are aligned with the runway. Use PAPI as a landing aid and maintain on-speed AOA or just a tad above (yellow triangle) as explained in the straight-in landing section.

75. Speedbrakes should be deployed on final if they weren't deployed earlier. To keep engine revolutions high without accelerating, speedbrakes are used.

76. In case of a go-around the speed brakes are retracted and the engine spool time will be faster since the setting was higher than without use of the speedbrakes. Touch down on centerline and maintain aerobraking as explained in the section above.

3.3 Taxi back and shutdown the jet

77. Exit the runway and retract your speed brakes.

78. Set Ground (preset #2) and 'Request Taxi Back to Ramp' on the Tower ATC page: 't 4'.

79. Switch the nosewheel light from LANDING to TAXI.

80. Once parked, 'Install / Remove chocks' on the Ground ATC menu: 't 2' and then safe the EPU: 't 1'.

81. Shut down all avionics before placing the throttle in CUTOFF:

a. Ejection Seat	Safe
b. RWR PWR	OFF
c. JMR & ECM PWR	OFF
d. MWS	OFF
e. Chaff & Flares CMDs	OFF
f. HUD	ICP SYM knob OFF
g. L/R Hardpoints [SNSR PWR panel]	Power OFF
h. FCR [SNSR PWR panel]	Power OFF

i. MMC (FCC) [AVIONICS POWER Panel] Power OFF

l. ST STA (SMS) [AVIONICS POWER Panel] Power OFF

m. MFD [AVIONICS POWER Panel] Power OFF

n. UFC/DED [AVIONICS POWER Panel] Power OFF

o. DL [AVIONICS POWER Panel] Power OFF

p. EGI [AVIONICS POWER Panel] OFF

q. EPU OFF

r. IFF [IFF PANEL] OFF

s. C&I switch [IFF PANEL] BACKUP

82. AIR Source [AIR COND panel] Set OFF

83. Radios & Volume knobs All OFF

84. Throttle (Idle Detent) Cut OFF position

85. Open the canopy and then place the POWER switch on the ELEC panel to OFF.

86. Oxygen regulator OFF