



Trainer Training Notes

1. **Prepare the student to fly Fixed Wing**
 - a. Weather
 - i. Check weather KSTF METAR
 1. Ceiling 500' above planned flight level
 2. 3SM visibility
 3. 2000' away from clouds
 4. Winds below 11kt
 - b. Tools
 - c. Equipment
 - d. Attitude
 - e. Transmitter batteries installed and antenna is at 90° angle and all switches are pushed away from pilot.
2. **Pre-flight Check**
 - a. From under the belly, up and over to the tail (upside-down Nike swoosh)
 - i. Wheels and wheel hubs
 - ii. Nose-wheel connected
 - iii. Prop free spinning and clean
 - iv. Receiver cords property seated
 - v. Servos to nose and tail connected
 - vi. Servos on tail connected
 - vii. Check receiver pin wires (push with two thumb nails)
 - viii. Power switch OFF
3. **Add Wings**
 - a. Brown to brown wires
 - b. Wires tucked under wing
 - c. Antenna properly attached
 - d. Rubber bands – 2 straight, 2 diagonal, Repeat
 - e. Align wing after 1st two rubber bands attached
 - i. Stretching from away to the student is easiest
 - ii. Do not affect the foam
 - iii. Check wing alignment
4. **Add Battery**
 - a. Power switch OFF
 - b. Check battery
 - c. Go through modes and check battery function
 - d. Max volt / nominal volt = 113% over nominal voltage
 - e. Difference between cells ~< 0.01 is ideal.
 - f. Insert battery and connect
 - i. I'm looking for my transmitter song



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g. Check battery case box for tight, closing fit



6. **Center of Gravity**
 - a. Power switch OFF
 - b. Verify center of gravity is correct
7. **On Flight Sequence**
 - a. Airplane on runway
 - b. Turn ESC power on airplane....wait 5 seconds
 - c. Verify wind is NOT shaking plane. If so, hold plane still
 - d. Demonstrate Roll, Pitch, Yaw controls
 - e. Turn on transmitter
 - f. Self-check sounds. If motor does not beep, do not proceed. Unhook battery and begin again.
 - g. Check surfaces...Recite Roll, Pitch, Yaw while fully extended.
 - h. Check surfaces for alignment...aileron, elevator, rudder. Trim if necessary.
 - i. 1-second motor check
 - j. Verify SAFE technology is on and all switches are pushed away from pilot.
8. **Take-off**
 - a. Instructor or Assisted take-off, as needed
 - b. Start Timer
 - c. Flight
 - d. Safe and level flight....125-200 feet.
 - e. If climbing, teach to use nose down
 - f. Keep the Thumbs on the Sticks
 - g. Micro motions
 - h. Coordinated stick turns (both left and right moving parallel)
 - i. Keep the distance constrained to the oval track polygon
 - j. Flight patterns
 - i. Ovals left
 - ii. Ovals right
 - iii. Figure 8 on diagonal
 - iv. Circles to landing
 - v. Fly-by's
 - vi. Touch & Go
 - vii. Landing
 - viii. Take off
 - ix. Flying without SAFE Technology
 1. Easy loops
 2. Easy rolls



Date:			Trainer:		
Student me:	Task	Score	Student Name:	Task	Score
	LH Oval			LH Oval	
	RH Oval			RH Oval	
	Height Regulation			Height Regulation	
	Speed Regulation			Speed Regulation	
	Figure 8's			Figure 8's	
	Downward Spiral			Downward Spiral	
	Fly-by			Fly-by	
	Touch-n-Go			Touch-n-Go	
	Landing			Landing	
	Takeoff			Takeoff	
Total			Total		

Date:			Trainer:		
Student Name:	Task	Score	Student Name:	Task	Score
	LH Oval			LH Oval	
	RH Oval			RH Oval	
	Height Regulation			Height Regulation	
	Speed Regulation			Speed Regulation	
	Figure 8's			Figure 8's	
	Downward Spiral			Downward Spiral	
	Fly-by			Fly-by	
	Touch-n-Go			Touch-n-Go	
	Landing			Landing	
	Takeoff			Takeoff	



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Total		Total	
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Date:			Trainer:		
Student Name:	Task	Score	Student Name:	Task	Score
	5' Throttle Test			5' Throttle Test	
	Up-Out 50; R/P/Yaw			Up-Out 50; R/P/Yaw	
	Square Figure 8 Nout			Square Figure 8 Nout	
	Square Figure 8 Nin			Square Figure 8 Nin	
	Square Figure 8 NDofT			Square Figure 8 NDofT	
	Smooth Figure 8 NDofT			Smooth Figure 8 NDofT	
	MLS Recovery 250'			MLS Recovery 250'	
	MLS Recovery 500'			MLS Recovery 500'	
	MLS Recover 1000'			MLS Recover 1000'	
	Free Flight			Free Flight	
Total			Total		

Date:			Trainer:		
Student Name:	Task	Score	Student Name:	Task	Score
	5' Throttle Test			5' Throttle Test	
	Up-Out 50; R/P/Yaw			Up-Out 50; R/P/Yaw	
	Square Figure 8 Nout			Square Figure 8 Nout	
	Square Figure 8 Nin			Square Figure 8 Nin	
	Square Figure 8 NDofT			Square Figure 8 NDofT	
	Smooth Figure 8 NDofT			Smooth Figure 8 NDofT	
	MLS Recovery 250'			MLS Recovery 250'	
	MLS Recovery 500'			MLS Recovery 500'	
	MLS Recover 1000'			MLS Recover 1000'	



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	Free Flight			Free Flight	
		Total		Total	



1. **Prepare the Students to Fly Multirotor**
 - a. Weather
 - i. Check weather KSTF METAR
 1. Ceiling 500' above planned flight level
 2. 3SM visibility
 3. 2000' away from clouds
 4. Winds below 11kt
 - b. Tools
 - c. Equipment
 - d. Attitude
 - e. Transmitter batteries installed and antenna is at 90° angle and all switches are pushed away from pilot.
2. **Preflight Check of Equipment**
 - a. Follow step-by-step setup procedures
3. **Turning the System On**
 - a. Verify a Wi-Fi hotspot is available on phone
 - b. Plug in Battery on copter
 - c. Turn on computer and install telemetry to computer
 - d. Transmitter on
4. **Launch Mission Planner → Opens on Flight Data**
 - a. Choose Connect and verify the connection occurs.
 - b. Validate Mission Planner Settings
 - c. Config Tuning Tab → Planner menu option
 - i. Enable Speech
 1. Waypoint
 2. Mode
 3. Battery Warning: 14.3 V, 35%
 4. Arm/Disarm
 5. Dist Units: Feet – Feet
 6. Speed Units: mph
 7. All other defaults
5. **Set up Survey**
 - a. Go to Flight Plan tab.
 - b. CLEAR Mission.
 - c. Verify or Add Home point.
 - d. Pick up Polygon tool and load SHPFile or create sampling grid.
 - e. RC – AutoWP → Survey (grid).
 - f. Simple Tab. Select Advanced Options.
 - g. Create a Survey Grid. Verify the grid settings.
 - i. Control S = Save the Survey Grid.
 - ii. Control O = Load Grid
 - h. Configuring the Grid for Flight



- i. Simple Tab
 - ii. Select Advanced Options
 - iii. Set up camera flight options. Note flight time parameters.
 - iv. Set Altitude maximum ≤ 400 ft
 - v. Speed ≤ 20 mph
 - vi. Use speed for this mission
 - vii. Add Takeoff and Land WP's, as needed
 - viii. Use RTL
 - ix. Split into "1" segment, by default. Accept and view waypoints. At bottom of split Screen. Confirm Takeoff and RTL have been added as first and last waypoints before writing mission. Each of the three tabs must be completed before accepting.
- i. **Grid Options Tab**
- i. Uncheck Cross grid for 2D only (use cross grid for 3D)
 - ii. Verify Distance between lines
 - iii. Set Overshoot and LeadIn
 - iv. StartFrom = Away to Top Left Could be any corner, depends on home point
 - v. Check Overlap and Sidelap (75%/75%) Varies depending on sensor
 - vi. Verify Corridor Width Corridor is not used in survey missions
 1. Heading Hold for LiDAR/RaDAR only
 - vii. Note flight time parameters.
 - viii. Insert Camera Config options here
 - ix. Confirm camera focal length is correct when camera is not a fixed focal length lens
 1. Trigger Method
 2. Cam_Trigg_Dist
 3. Breakup Starts
- j. **Simple Tab**
- i. Control S = Save the Survey Grid.
 - ii. Control O = Load Grid
 - iii. Save WP File saves polygon in .txt or survey in .grid
 - iv. Note all Flight Stats
 - v. Accept
- k. **Completing the Setup**
- i. Open the Polygon and Survey grids in Mission Planner
 - ii. Review Waypoints and edit. Confirm Takeoff is first waypoint and RTL is last
 - iii. Finalize
 - iv. Write WPs.
 - v. Read WPs.



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vi. Return to Flight Plan to fly.



First Flights in Multirotor

1. Set a single point within 200 feet of flight origin for beginning students only.
2. 5-foot throttle test (for new pilots)
 - a. In Loiter mode, accelerate slowly to 50% throttle.
 - b. At 51%, gain altitude of 5 feet.
 - c. Hold in place.
 - d. Move up and down to 10 feet and back to 5 feet. Hold each time.
 - e. Land
2. Operational test
 - a. In Loiter mode, up and out 50 feet in a diagonal line.
 - b. Hold in position
 - c. Roll left and return to origin. Roll right and return to origin.
 - d. Pitch forward and backward to return to origin.
 - e. Yaw 180 degrees left, return to origin. Yaw 180 degrees right, return to origin.
3. Figure 8's
 - a. Square Figure 8 Nose Out
 - b. Square Figure 8 Nose In
 - c. Square Figure 8 Nose in Direction of Travel
 - d. Smooth Figure 8 Nose in Direction of Travel
4. Maximum Line of Sight Recovery
 - a. Out 500 feet and recover
 - b. Out 750 feet and recover
 - c. Out 1000 feet and recover.

Next Flights in Multirotor

1. Always require Operational test (above) upon each battery change.
2. Follow the requirements for AMA training protocol.
3. Instruct on autonomous flights
 - a. Set up mission before startup procedures.

Supplemental Notes:

- Create a flight line where spectators are 20 feet behind the PIC and VO (and yourself). Everyone loves to crowd the line, but they need to back up.
 - Keep the newbies on the oval track; especially those learning to land and take off.
- Students **MUST** be able to fly without SAFE for ½ a battery before they earn the privilege to learn rolls and loops. There are few in this class who will achieve this.



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Force all students to fly safe and level, in ovals, figure 8's across the track, in circles, etc.

- Throttle Up! Throttle Down to (%). Clear Throttle!
- Finally, we need to prepare and practice this evasive motion. Better to crash a trainer plane than to crash into a real one!