

## Background:


A Flight Readiness Review evaluates the readiness to begin and safely conduct flight tests or flight operations. FRR approval is necessary in order to determine that the system under review can proceed into its test environment having met the standards to be considered airworthy. These standards require that the aviation system be under configuration management, have flight clearance, approved flight test plans, discrepancy tracking, and appropriate risk assessment processes in place.



## Objectives:

As an Autonomous Flight Lab we are interested in developing a protocol that will make this processes more accessible to individuals trying to utilize UAVs for various research projects. Currently there is no process in place to assist individuals in preparing an FRR. We have been working on generating a user friendly guide to developing quality student presentations in the form of FRRs.

### Pulse Vapor 55



Weights	
Empty Weight w/o batt.	21 lb
Empty Weight w/ batt.	43 lb
MTOW	55 lb
Dimensions	
Fuselage Length	77 in
Rotor Diameter	90 in
Overall Length (with rotor)	97 in
Power	
Motor Type:	Electric motor with two stage transmission
Battery Type	Lithium Ion
Temperature Limits	Motor Temp of 190° F
Performance	
Maximum Speed	20 kts
Cruise Speed	20 kts
Rate of Climb	390 fpm
Maximum Altitude	12,000 ft
Maximum Duration-Cruise	1 hr
Maximum Duration-Hover	45 min
Value	Approx. \$120,000



Above- Example STEP 1 (Vapor 55 description); Right-Example STEP 2- Test site

## Process:

**Step 1:** Identify vehicle (Fixed wing/Rotor Vehicles) or Take off method (Vertical/Horizontal take off).

**Step 2:** Identify Mission/test site- Mission objectives

**Step 3:** Identify Crew- think about mission and objectives of that mission- pilot proficiency, currency, how is your crew coordinating?

**Step 4:** Environment- likelihood of air traffic, weather, obstructions, non-crew member interference, what is the population density

**Other Necessary Requirements for FRR:**

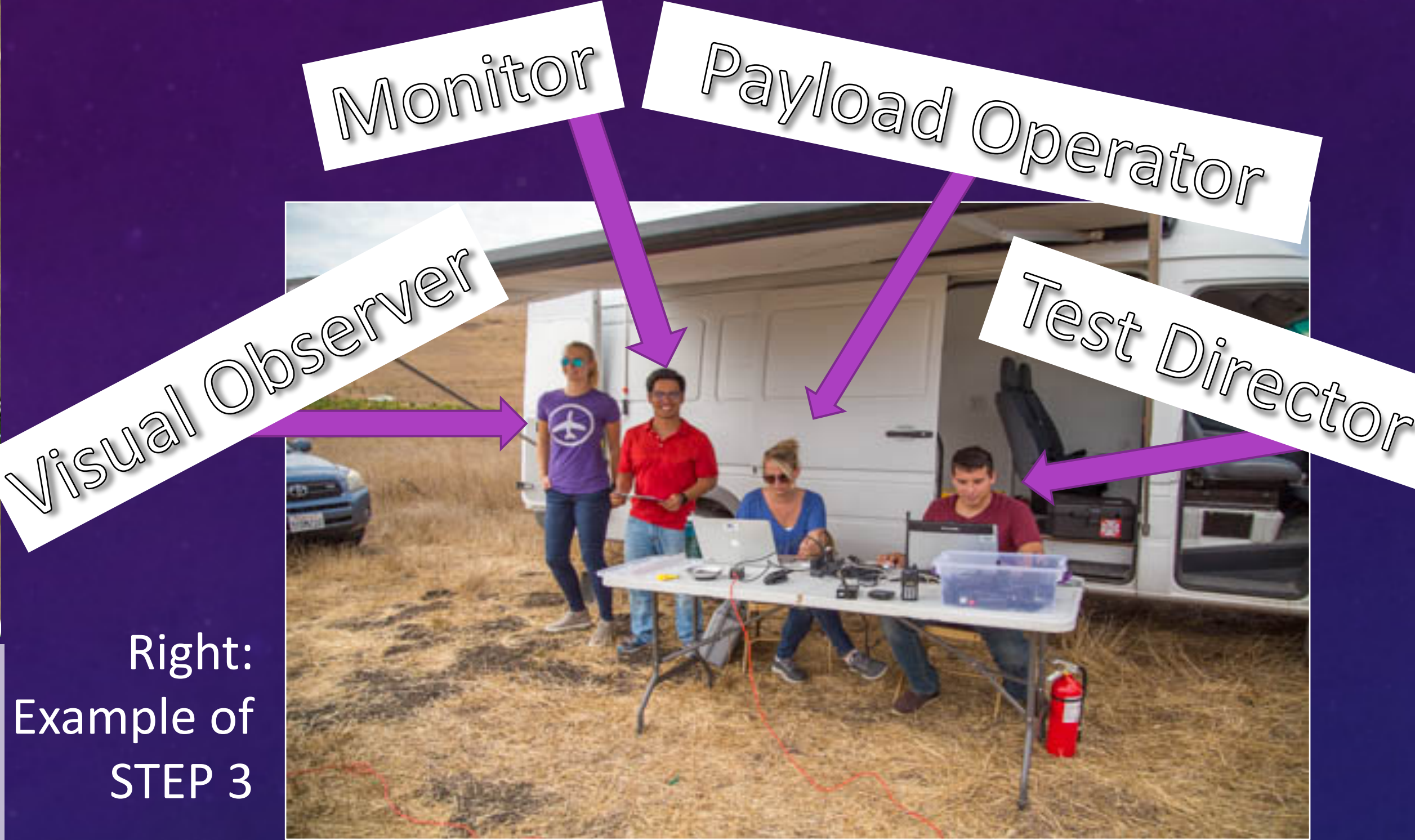
- Crew Resource Management:** effective use of all available resources—human, hardware, and information—prior to and during flight to ensure the successful outcome of the operation
- Risk Management:** The final “link” in the accident chain; Risk management Matrix projects all possible risks involved in operations in terms of severity and probability.

### Risk Assessment Matrix

		Mishap Severity Category			
		I. Catastrophic	II. Critical	III. Minor	IV. Negligible
Mishap Probability Category	A. Frequent				
	B. Occasional				
	C. Likely				
	D. Unlikely	2, 8	6	1, 4, 5, 7, 10, 11	
	E. Remote			3, 9	



Left- Example of Risk Management matrix; Right- Pre-flight vehicle check



Right: Example of STEP 3

## Example: Crew Members/Job Descriptions:

**Visual Observer:** Watch the vehicle and report potential hazards to the rest of the crew members.

**Monitor:** Keep track of time limits; Preflight and Post-flight check lists

**Payload Operator:** Coordinates with TD to operate payload in accordance with the mission.

**Test Director:** (Remote Pilot in Control) In charge of all crew and operations ; Must hold a remote pilot certificate with sUAS rating

\*descriptions are for Vapor 55 operations at Chorro Creek Vineyard

## Conclusion:

Ultimately we hope that by having a procedure in place to assist individuals in developing FRRs, we can greatly reduce lab member dependency and need for multiple FRR revisions.