

A10																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Parameter	0.0 ms	35.0 ms	70.0 ms	72.0 ms	120.0 ms	180.0 ms	240.0 ms	300.0 ms	360.0 ms	410.0 ms	450.0 ms	452.0 ms	660.0 ms	704.0 ms	750.0 ms	
2	1) Comb_Vol (cu in)	33.7	34.4	34.6	35.4	56.2	89.9	123.6	146.1	161.8	173.1	179.8	179.8	179.8	179.8	33.7	
3	2) Comb_Temp (Â°F)	70	70	70	451	420	360	295	210	145	92	70	70	90	83	70	
4	3) Comb_Press (PSI)	338.1	338.1	338.1	2611	1850.5	945	430.2	185.4	82.5	35.4	23.1	23.1	14.7	14.7	338.1	
5	4) Comb_Super_Valve	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed	Closed	Closed	
6	5) Comp_Vol (cu in)	402.1	402.1	402.1	402.1	402.1	402.1	402.1	402.1	402.1	402.1	402.1	402.1	32.7	32.7	402.1	
7	6) Comp_Temp (Â°F)	70	70	70	70	70	70	70	70	70	70	70	70	450	450	70	
8	7) Comp_Press (PSI)	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	338.1	338.1	14.7	
9	8) Valve_Flow_Gas (ft/s)	0	0	0	0	0	0	0	0	0	0	0	60.3	0	0	0	
10	9) Air_Chg_Vol (cu in)	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	
11	10) Air_Chg_Press (PSI)	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	
12	11) Air_Chg_Temp (Â°F)	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	
13	12) Valve_Flow_Air (ft/s)	0	0	0	0	0	0	0	0	0	0	0	0	60.3	0	0	
14	13) Accum_Temp (Â°F)	70	70	70	70	70	70	70	70	70	70	70	70	450	450	70	
15	14) Accum_Press (PSI)	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	338.1	
16	15) Accum_Piston_Vol (cu in)	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	196.3	
17	16) Accum_Comb_Valve	Closed	Open	Open	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	
18	17) Intercooler_Flow (ft/s)	0	0	0	0	0	0	0	0	0	0	0	0	0	60.3	0	
19	18) Intercooler_Temp (Â°F)	70	70	70	70	70	70	70	70	70	70	70	70	70	10	70	
20	19) Exhaust_In_Temp (Â°F)	70	70	70	70	70	70	70	70	70	70	70	70	125	83	70	
21	20) Exhaust_Out_Temp (Â°F)	70	70	70	70	70	70	70	70	70	70	70	70	90	10	70	
22	21) Air_In_Temp (Â°F)	70	451	451	70	70	70	70	70	70	70	70	70	451	451	70	
23	22) Air_Out_Temp (Â°F)	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	
24	23) Air_Comb_Flow (ft/s)	0	31.4	31.4	0	0	0	0	0	0	0	0	0	0	0	0	
25	24) Air_Comb_Valve	Closed	Open	Open	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	
26	25) Valve_Delta_P (PSI)	0	0	0	2272.9	1512.4	606.9	92.1	152.7	255.6	302.7	315	8.4	323.4	323.4	0	
27	26) Physics_Flow_Calc (L/min)	0	41.41	41.41	0	0	0	0	0	0	0	0	165.64	165.64	165.64	0	
28																	

[illegible]

Propeller Off-Design Analysis for full v/nD range.

ϕ	Cs	Tc	Pc	η	η^*	stalled	v	rpm	Power	Thrust	Torque
	[-]	[-]	[-]	[%]	[%]	[%]	[m/s]	[1/min]	[MW]	[N]	[Nm]
205	0.000051	9.999999	9.999999	0.00	0.00	43.00 !	0.00	2588	0.0119	359.64	44.07
731	0.161249	9.999999	9.999999	13.38	29.47	100.00 !	4.59	2582	0.0123	359.64	45.62
449	0.325596	7.764099	9.999999	27.89	49.71	43.00 !	9.21	2591	0.0119	359.64	43.78
145	0.486521	3.326250	8.407627	39.56	63.95	25.00	14.08	2639	0.0128	359.64	46.30
021	0.650344	1.799201	3.502228	51.37	73.73	0.00	19.14	2691	0.0134	359.64	47.54
350	0.816051	1.047176	1.759116	59.53	81.19	0.00	25.09	2822	0.0152	359.64	51.29
069	0.996666	0.599037	0.932170	64.26	87.35	0.00	33.17	3109	0.0186	359.64	57.01



☐ Add to existing plots

Analysis with T =prescribed



(Results)

Analyze!

Copy Text

Copy (HT)

Enter Design Parameters and press the 'Design It!' button.

Propeller Name:

Number of Blades B: [-]

Revolutions per minute rpm: [1/min]

Diameter D: [m]

Spinner Dia. Dsp: [m]

Velocity v: [m/s]

Thrust T: [N]

shroud chord: [-]

shroud angle: [°]

☐ shrouded rotor ☐ square tip ☐ open hub

Wind turbine			
$v/(nD)$	2.812	$v/(\Omega R)$	0.895
Efficiency η	5.343 %	loading	low
Thrust T	-319.97 N	Ct	-0.5058
Power P	-6,298.03 W	Cp	-0.4666
Torque Q	-50.12 Nm	Cs	3.2752
β at 75%R	22.7°	Pitch H	1.05 m

Combustion Chamber	13.4lbs x2 = 26.8lbs
Hyd Pump 1.29 lbs	x2 = 02.58 lbs
Air Charge Chamber 6.5 lbs	x2 = 13lbs
Supercharger Compressor Chamber	12.8lbs x2 = 25.6 lbs

dual engines wt = 26.8+2.58+13+25.6 = 67.988 lbs

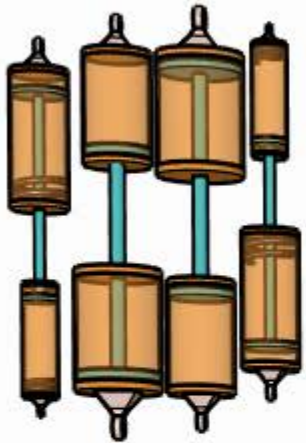
Drone Wt at the new size

2.8 lbs

Wing (8.06 lbs x2) = 16.12 lbs 16.12+28.3+68 = 112.42 lbs

Fuselage = 28.3lbs

Dual Engines = 68lbs



combustion chamber

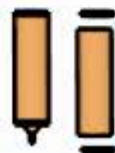
2205 duplex stainless steel is 7.8 g/cm^3 $781 \times 7.8 = 6091 \text{ gm} = 13.4 \text{ lbs}$

cap 186 cu cm

cyl 413 cu cm

cap 182 cu cm

$186 + 413 + 182 = 781 \text{ cu cm}$



Hyd Pump

cap 40.75 cu cm $40 + 128 + 41 = 209 \text{ cu cm}$

cyl 128.3 cu cm density aircraft alloy aluminum 7075-T73 / T76 / T7351: 2.81 g/cm^3

cap 41.6 cu cm $209 \times 2.81 = 588 \text{ gm} = 1.29 \text{ lbs}$

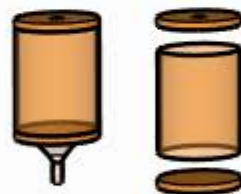


Air Charge Chamber

cap 303 cu/cm $303 + 453 + 296 = 1052 \text{ cu cm}$

cyl 453 cu cm

cap 296 cu cm $1052 \times 2.81 \text{ gm/cu cm} = 2956 \text{ gm} = 6.5 \text{ lbs}$



Supercharger Compressor Chamber

cap 637 cu cm $637 + 788 + 651 = 2076 \text{ cu cm}$

cyl 788 cu cm

cap 651 cu cm $2076 \text{ cu cm} \times 2.81 \text{ gm/cu cm} = 5834 \text{ gm} = 12.8 \text{ lbs}$



wing 7.5ft long vol= 2462.8 cu cm in carbon fiber $\times 1.5\text{gm/cu cm} = 3694\text{ gm} = 8.06\text{ lbs}$



fuselage 7.5 ft long 8586.5 cu cm $\times 1.5\text{ gm/cu cm} = 12,879\text{ gm} = 28.3\text{ lbs}$



combustion chamber
2200 duplex stainless steel $\times 7.8\text{ gm/cm}^3$ 701 $\times 7.8 = 5468\text{ gm} = 12.4\text{lbs}$
cap 100 cu cm
cyl 413 cu cm
cap 102 cu cm
100+413+102 = 701 cu cm



Hyd Pump
cap 46.55 cu cm 46+100+46 = 193 cu cm
cyl 105.5 cu cm density of hydrotanium 2000-170 / 100 / 19000: 5.56 gm/cm³
cap 46.5 cu cm 193 $\times 5.56 = 1073\text{ gm} = 2.37\text{lbs}$



Air Charge Chamber
cap 100 cu/cm 100+400+100 = 600 cu cm
cyl 400 cu cm
cap 100 cu cm 600 $\times 2.61\text{ gm/cu cm} = 1566\text{ gm} = 3.5\text{ lbs}$



Supercharger Compressor Chamber
cap 627 cu cm 627+700+661 = 1988 cu cm
cyl 700 cu cm
cap 661 cu cm 1988 cu cm $\times 2.61\text{ gm/cu cm} = 5189\text{ gm} = 11.5\text{ lbs}$

Combustion Chamber 13.4lbs $\times 2 = 26.8\text{lbs}$
Hyd Pump 1.29 lbs $\times 2 = 2.58\text{ lbs}$
Air Charge Chamber 3.5 lbs $\times 2 = 7\text{ lbs}$
Supercharger Compressor Chamber 11.5lbs $\times 2 = 23\text{ lbs}$

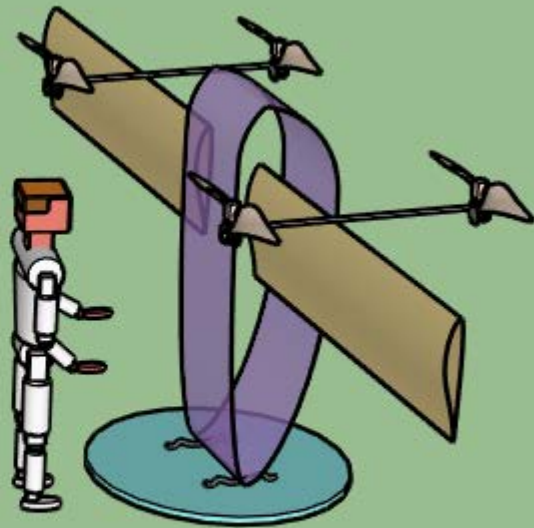
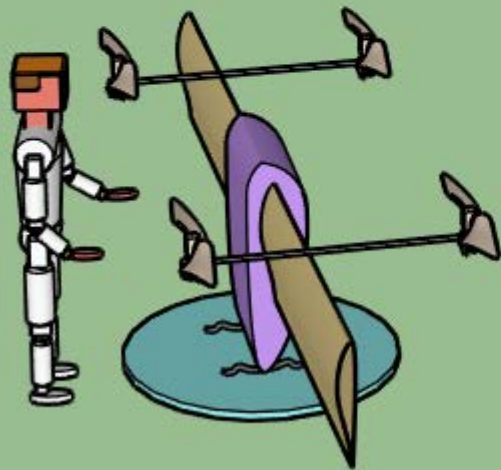
dual engines wt = 26.8+2.58+7+23 = 59.38 lbs

Drone Wt at the new size

Wing (8.06 lbs $\times 2$) = 16.12 lbs 16.12+28.3+59.38 = 103.8 lbs

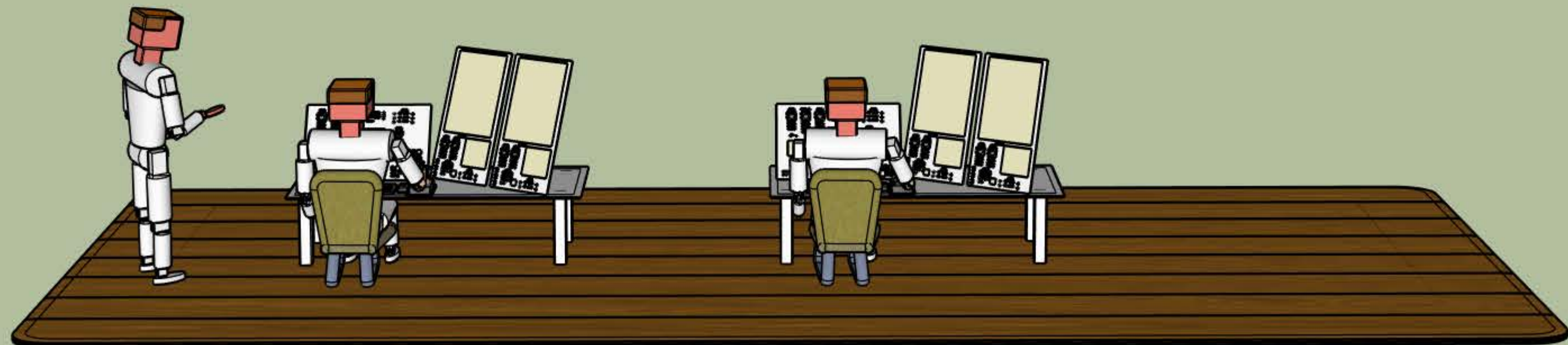
Fuselage = 28.3lbs

Dual Engines = 59.38 lbs

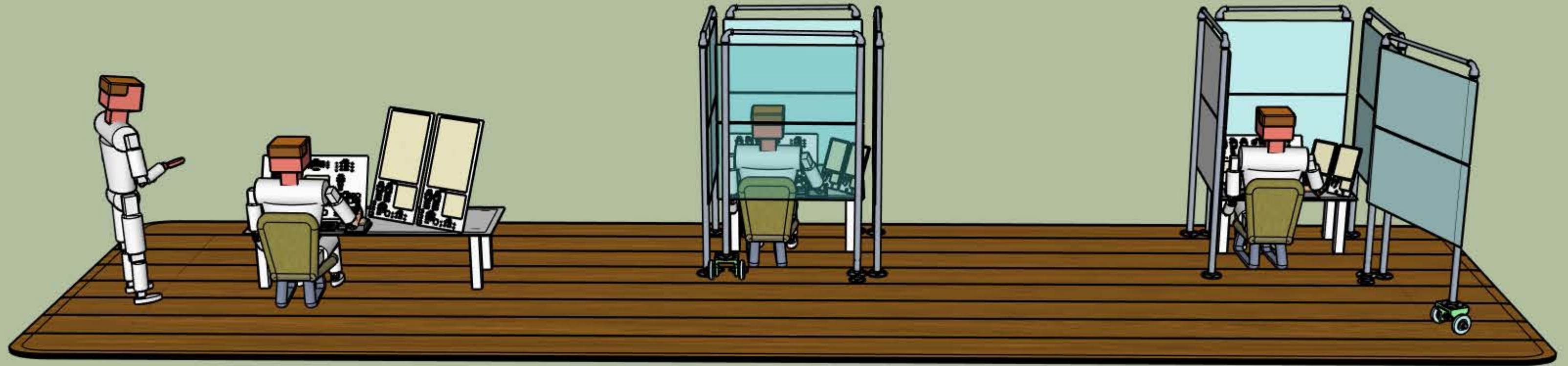


This is what a real (this is not a drill) mission would look like:

- 1) pilot on the right running the mission**
- 2) chief of ground crew on the left present to provide help as needed**
- 3) the standing person might be the commanding officer or perhaps someone from the take off/landing area who came in with info**
- 4) of note, almost always with very few exceptions all comms go first to the chief of the ground crew, then he relays comms to the pilot this is to allow the pilot to maintain a close focus on the mission and the flying of the drone**



Of note: I lowered the opacity of the LED screens in one of the views so folks can see what it looks like inside the sort of "simulator"



Training Setup this is sent as a package to the isolated outpost

The pilots go into the LED screen area and close the back rolling screen set
They work in there in a manner where they can "sort of" see what flying is like

The ground crew group go to the desktop setup. Their job is to
monitor the situation of the drone to notice "little problems" and
to do activities to keep "little problems" from becoming "big problems"

Ground crew would go into the LED display "box" to learn:

- 1) how to look for notice and see the drone as it arrives
- 2) how to learn how to make comms to the pilot about the drone
- 3) how to learn how to help soldiers being helped to comm to the pilot where is the drone and what flying is needed to get it to land where they want it to land
- 4) how to help the pilot to land the drone back at home base including in situations where there is a drone problem or bad weather

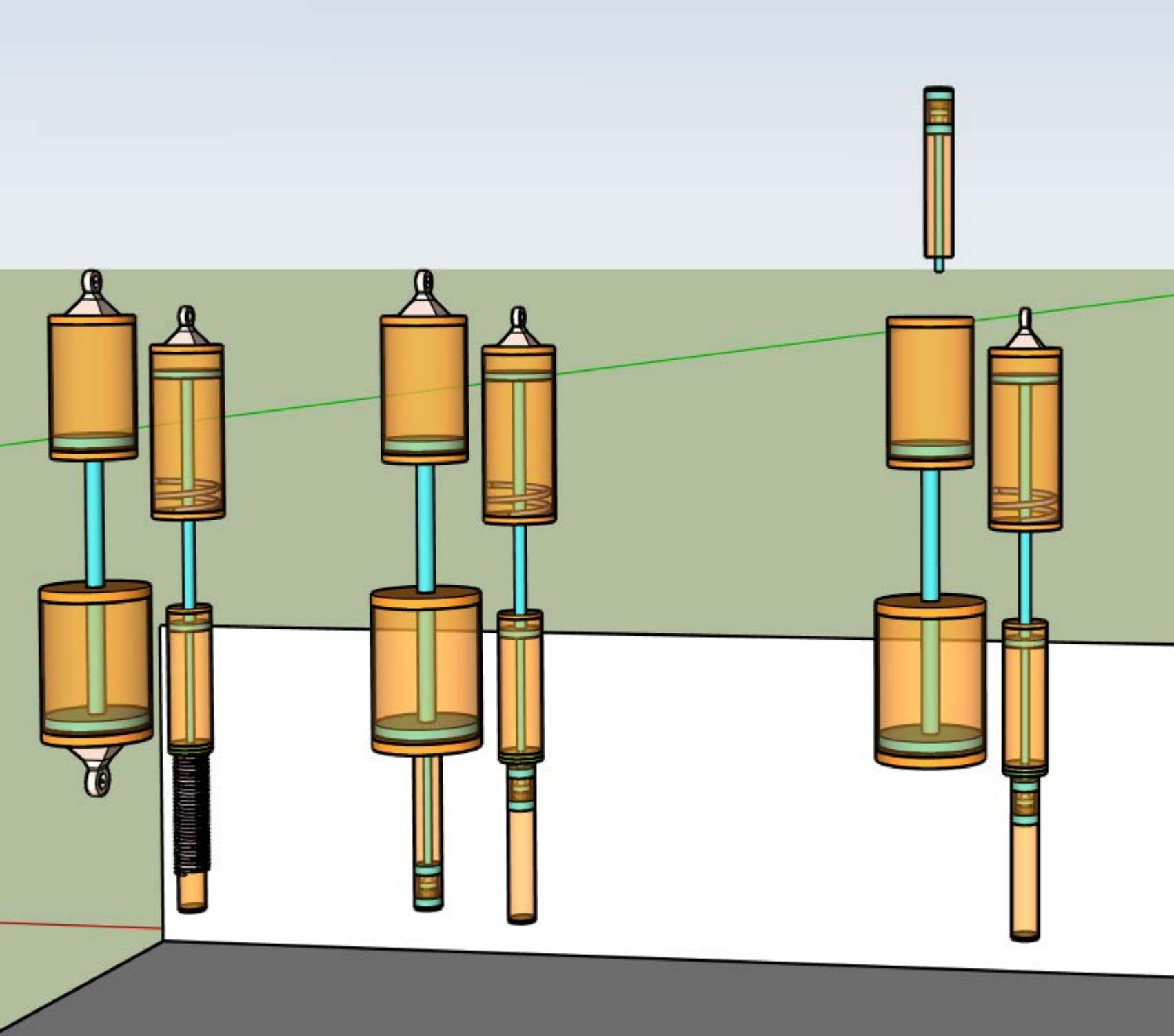
The pilots and the ground crew have the sort of programmable display screens to their right. What is on these screens can be chosen by the person.
Ground crew (example) dense data about an engine they are worried about.
Pilot (example) navigation showing their drone superimposed on a satellite image

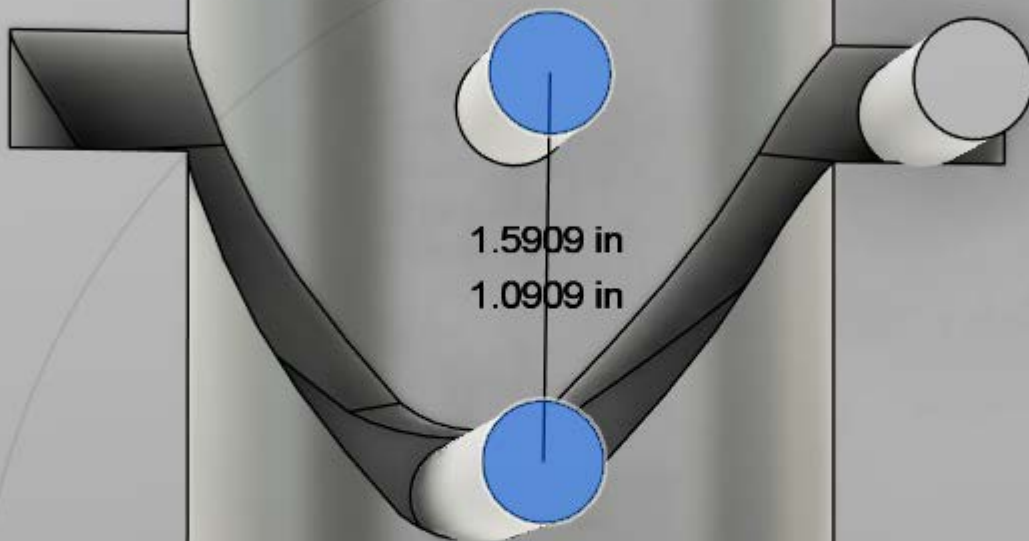
The servers that come with this training setup include programming for:

- 1) normal ground crew activities
- 2) normal pilot activities
- 3) management of preflight activities
- 4) management of issues and how the cpu displays its messages about issues
- 5) example real world scenarios for training pilots and ground crew

Of note: I lowered the opacity of the LED screens in one of the views so folks can see what it looks like inside the sort of "simulator"







1.5909 in
1.0909 in

Click and drag to sele

