

## Stone Productions Weight & Balance System

This system is a spreadsheet to calculate Aircraft Weight and Balance. The basic principle of this spreadsheet is as follows:

You can define a list of equipment. (what)

You can define a list of locations. (where)

You can define a list of configurations (what is where)

Select your flight profile with up to 3 different configurations

- ⇒ Your W&B profile will automatically be calculated and graphically depicted.
- ⇒ You can generate a list of locations with the equipment in accordance with a certain configuration. This can be used as a loading checklist.

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### Weight & Balance

Last Update: 1/07/2015  
LDS Date: 28/10/2018

Aircraft Type: VH-XCO  
Bell-412

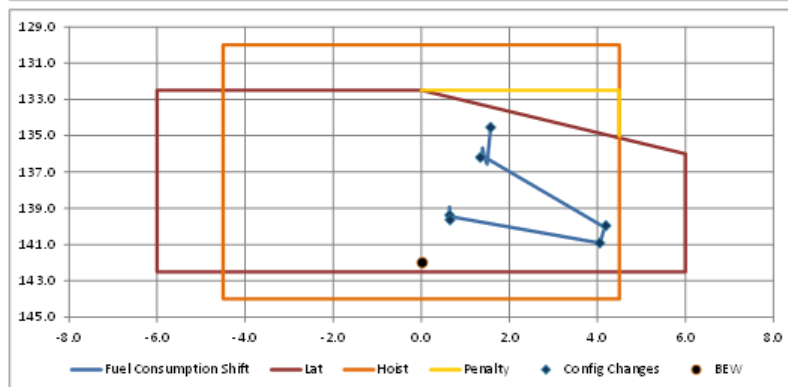
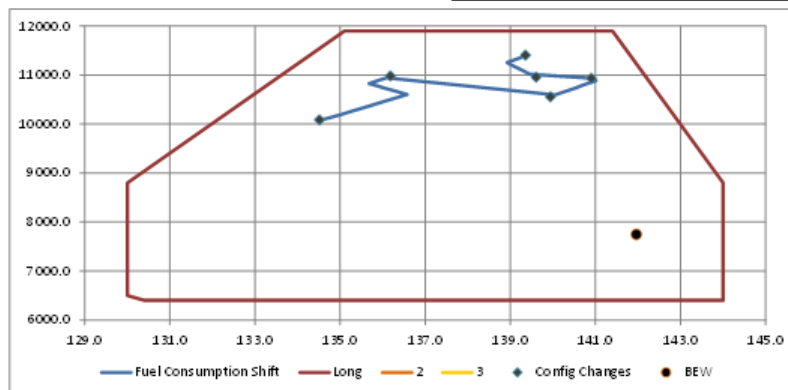
Fuel: Jet A-1 6.8 lbs / USG  
Burn Rate: 750 lbs / hour  
Tank Config: Standard 10 Cell 330.5 USG max capacity  
331 USG  
2247 lbs

Basic Empty Weight	Longitudinal Arm	Lateral Arm
7740.4 lbs	142.0 inch	0.0 inch

Configurations	Total
3	

hours	Fuel state	Config Weight	Total
Start Fuel	2150		
Configuration	Medical Transit	1509	11399
Time in config	0.6	1700 lbs	10949
Configuration	Double Winch Up	1494	10934
Time in config	0.5	1325 lbs	10559
Configuration	1 Patient xfer + 1 Pax	1909	10974
Time in config	1.2	425 lbs	10074

Longitudinal & Lateral W&B:



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The main sheet; flight phases and resulting W&B profile

The system has 2 levels of access: regular user can select flight phases and standard configurations. Some manual entries are possible and 1 Ad Hoq Configurations can be amended. W&B Officers can get access to aircraft set up data and manipulate equipment, locations and configurations lists.

The system is generic to set up for any aircraft type. Example data is loaded for a Bell-412. Stone Productions can assist in setting up for any other aircraft type. Please contact Stone Productions for any assistance.

**Aircraft Set Up**

Last Update	1/07/2015	Basic Empty Weight	7740.4	Longitudinal Arm	142.0	Lateral Arm	0.0	allow # configurations: 3 for Regular User
LDS date	28/10/2018	Type:	Bell-412	lbs	inch	inch		
Registration:	VH-XCO	Main Weight Unit	lbs	alternative unit = kg = 2.2046 lbs	1 lbs =	0.453592292	kg	
Type:	Bell-412	Main Distance Unit (Arm)	inch	alternative unit = cm = 0.3937 inch	1 inch =	2.54	cm	
Fuel Capacity Unit	USG	Fuel Type:	Jet A-1	Use Fuel Configuration:	1	Standard 10 Cell 330.5 USG	max capacity	331 USG
Fuel Density	6.8 lbs / USG							2247 lbs
Fuel Burn Rate	750 lbs / hour							

Aircraft Configuration Options	lbs			inch			kg		
	Δ Weight	Long Arm	Lat Arm	Δ Weight	Long Arm	Lat Arm	Δ Weight	Long Arm	Lat Arm
1 Winch installed				61	279.6229508	140.404918			
2 Nightsun				17	-18.55294118				
3 Cabin Door Open									
4 Cargo Hook	35	138							
5									
6									
7									
8									

	in main units		inch		Long		Lat		manual correction		System will use	
	lbs	Δ Weight	Long Arm	Lat Arm	Long Δ Moment	Lat Δ Moment	Long Δ Moment	Lat Δ Moment	Long Δ Moment	Lat Δ Moment	Long Δ Moment	Lat Δ Moment
1 Winch installed	134.5		110.1	55.3	14805	7434					14805	7434
2 Nightsun	37.5		-7.3	0.0	-274	0					-274	0
3 Cabin Door Open	0.0		0.0	0.0	0	0	3255				3255	0
4 Cargo Hook	35.0		138.0	0.0	4830	0					4830	0
5	0.0		0.0	0.0	0	0					0	0
6	0.0		0.0	0.0	0	0					0	0
7	0.0		0.0	0.0	0	0					0	0
8	0.0		0.0	0.0	0	0					0	0

**Fuel Tank Configurations**

Fuel Tank Config	331	2247			Fuel Tank Config	412	2802			Fuel Tank Config	3
1	Standard 10 Cell 330.5 USG				2	Std 10 Cell + Aux Tank LH Quad				3	
Volume USG	Weight lbs	Long Arm inch	Lat Arm inch		Volume USG	Weight lbs	Long Arm inch	Lat Arm inch		Volume USG	
1	10	68.0	139.40	0.00		10	68.0	139.40	0.00		
2	20	136.0	139.60	0.00		20	136.0	139.60	0.00		
3	30	204.0	139.80	0.00		30	204.0	139.80	0.00		
4	40	272.0	139.90	0.00		40	272.0	139.90	0.00		
5	50	340.0	139.90	0.00		50	340.0	139.90	0.00		
6	58.3	396.4	139.90	0.00		58.3	396.4	139.90	0.00		
7	60	408.0	141.10	-0.03		60	408.0	141.10	-0.03		
8	70	476.0	146.00	-0.06		70	476.0	145.80	-0.45		
9	80	544.0	149.80	-0.05		80	544.0	148.70	-1.45		
10	90	612.0	152.70	-0.04		90	612.0	150.70	-2.25		
11	100	680.0	155.00	-0.04		100	680.0	152.30	-2.97		
12	110	748.0	156.80	-0.03		110	748.0	153.60	-3.55		
13	120	816.0	158.30	-0.03		120	816.0	154.70	-4.04		
14	130	884.0	159.70	-0.03		130	884.0	155.70	-4.45		
15	140	952.0	160.90	-0.03		140	952.0	156.50	-4.80		
16	150	1020.0	156.40	-0.43		150	1020.0	157.20	-5.10		
17	160	1088.0	153.40	-0.58		160	1088.0	157.80	-5.34		

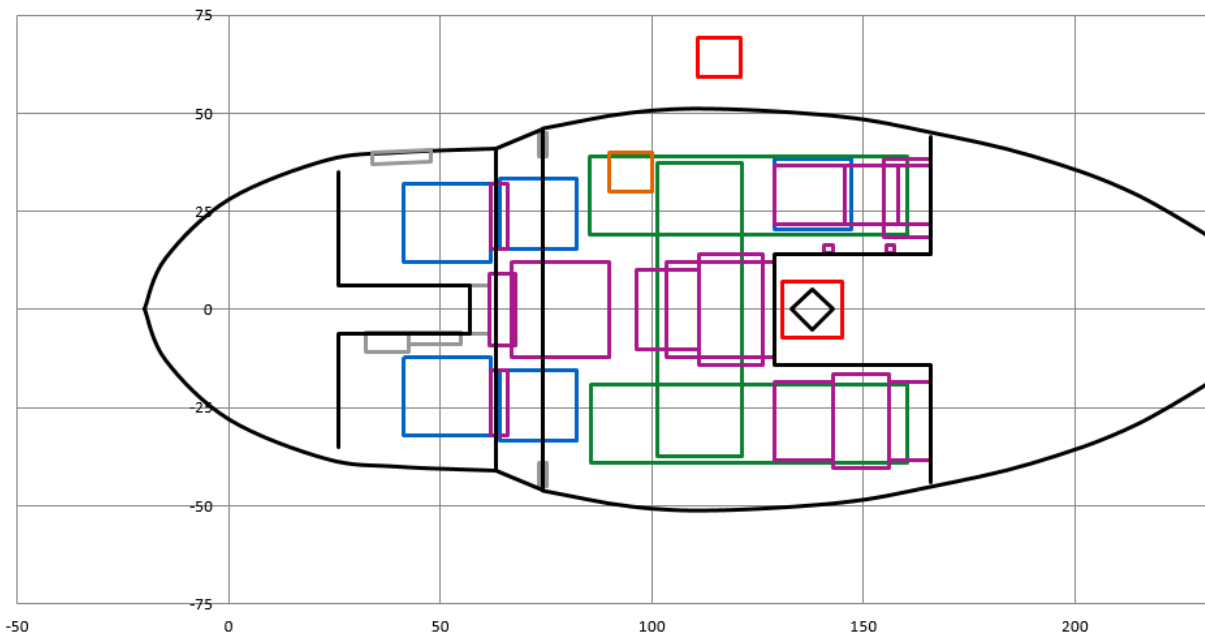
Aircraft Set Up sheet snippets

Equipment List		Weight		System	enable
(if included in BEW set weight to zero)			alt unit	will use	Gen
Group header	Equipment	lbs	kg	lbs	User entry
1	<b>Seats &amp; Stretchers</b>			0.0	
2	RF LH Seat		10.2	22.5	
3	RF Ctr Seat		10.2	22.5	
4	RF RH Seat		10.2	22.5	
5	Jump Seat		10.2	22.5	
6	FF Ctr LH Seat		10.2	22.5	
7	FF Ctr RH Seat			0.0	
8	FF RH Outer Seat			0.0	
9	FF RH Quad Seat		10.2	22.5	
10				0.0	
11	Stretcher 1		17.0	37.5	
12	Stretcher 2		17.0	37.5	
13				0.0	
14				0.0	
15	<b>Crew, Pax/Patients &amp; Non Standard Cargo</b>			0.0	
16	Pilot (incl helmet)	200.0		200.0	x
17	Co-pilot/Crewman (incl helmet)	200.0		200.0	x
18	Doctor (incl helmet)	200.0		200.0	x
19	Paramedic (incl helmet)	200.0		200.0	x
20	Patient 1 (stretcher)	200.0		200.0	x
21	Patient 2 (stretcher)	200.0		200.0	x
22	Pax 1	200.0		200.0	x
23	Pax 2	200.0		200.0	x
24	Pax 3 (incl headset/earmuff)	200.0		200.0	x
25	Pax 4 (incl headset/earmuff)			0.0	x
26	Pax 5 (incl headset/earmuff)			0.0	x
27	Pax 6 (incl headset/earmuff)			0.0	x
85				0.0	
86	<b>Winch Equipment</b>			0.0	
87	Emergency Hook / Quick Splice		2.2	4.7	
88	Shot Bag / Jungle Penetrator		3.9	8.6	
89	Cable Cutter		0.8	1.7	
90	Para DTW Vest (6 Lbs)		2.6	5.7	
91	Winch Litter		12.5	27.6	
92	Winch Equipment Bag		4.8	10.6	
93	Tag Line + bag		2.7	5.9	
94	Rescue Strop		1.3	2.9	
95	Hi Line Bag		2.3	5.1	
96	Y-Piece 1		1.0	2.1	
97	Y-Piece 2		1.0	2.1	
98	Equipment Strop		0.5	1.1	
99				0.0	
100				0.0	
101	<b>Medical Equipment</b>			0.0	
102	Primary Pack		21.0	46.3	
103	Oxy bag		10.0	22.0	
104	IFT-Bag		13.0	28.7	
105	Bridge + Monitor		25.0	55.1	
106	Sheets & Pillow		4.0	8.8	
107	Scoop		8.0	17.6	
108	Ultrasound		5.0	11.0	
109	Vac Mattress, bag and pump		11.0	24.3	
110				0.0	
111	Neonatal Crib [3rd Party Equipment]	200.0		200.0	
112				0.0	
113				0.0	

Equipment List sheet snippets

Locations can be defined by Arm references. Any entry can be visually checked by a graphical depiction of the entered data.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Area Dimensions				define rectangle if not parallel and perpendicular to grid										Show
Locations	nr	Long1	Long2	Lat1	Lat2	X1	Y1	X2	Y2	X3	Y3	X4	Y4			
		lower first														
Co-pilots Seat	1	41.3	62.0	-32.00	-12.00										x	
Pilots Seat	2	41.3	62.0	12.00	32.00										x	
	3															
RF LH Seat	4	64.2	82.2	-33.50	-15.50										x	
RF Ctr Seat	5	64.8	82.8	-9.00	9.00											
RF RH Seat	6	64.2	82.2	15.50	33.50										x	
Jump Seat	7	79.8	97.8	-9.00	9.00											
	8															
FF Ctr LH Seat	9	109.7	127.7	-18.55	-0.60											
FF Ctr RH Seat	10	109.7	127.7	1.50	19.50											
FF RH Outer Seat (most R)	11	109.7	127.7	22.30	40.30											
FF RH Quad Seat (most fwd)	12	129.1	147.1	20.30	38.30										x	
FF RH Quad Seat (most aft)	13	141.0	159.0	20.30	38.30											
	14															
Single Lateral Stretcher/Crib	15	101.2	121.2	-37.45	37.45										x	
Left Longitudinal Stretcher	16	85.5	160.5	-39.10	-19.10										x	
Right Longitudinal Stretcher	17	85.5	160.5	19.05	39.10										x	
	18															
Ctr Console Left Nav Bin fwd	19	32.6	42.6	-10.90	-5.90										x	
Ctr Console Left Nav Bin aft	20	42.6	54.8	-8.90	-5.90										x	
RH Door Nav Bin	21					34.00	40.00	47.70	40.80	47.70	37.80	34.00	37.00		x	
Aft Ctr Console Nav Bin	22	57.0	61.7	-6.00	6.00										x	
	23															
Behind Center Console Aft Bin	24	61.7	67.7	-9.00	9.00										x	
Behind Co-pilot Seat	25	62.0	66.0	-32.00	-15.50										x	
Behind Pilot Seat	26	62.0	66.0	15.50	32.00										x	
Between RF Seats	27	67.0	90.0	-12.00	12.00										x	
RH Door Post aft edge	28	73.3	75.3	39.00	45.00										x	
LH Door Post aft edge	29	73.3	75.3	-45.00	-39.00										x	
Winch Operator Position	30	90.0	100.0	30.00	40.00										x	
Ctr Cabin Area	31	96.3	111.2	-10.00	10.00										x	
Winch Load	32	111.0	121.0	59.10	69.10										x	
Fwd of Transm Wall betw rails	33	111.2	126.2	-14.00	14.00										x	
Fwd of Transm Wall (Pri packs)	34	103.4	129.0	-12.00	12.00										x	
Cargo Hook	35	131.0	145.0	-7.00	7.00										x	
	36															
LH Quad fwd section	37	129.0	143.0	-38.30	-18.30										x	
LH Quad ctr section	38	143.0	156.0	-40.30	-16.30										x	
LH Quad against aft Cabin Wall	39	156.0	166.0	-38.30	-18.30										x	



Locations sheet snippets

To define Configurations; simply select where a certain piece of equipment is located.

© Stone Productions			Standard Configuration			
Aircraft Configuration		Weight	Ad Hoc Loads	Medical Transit	Medical Transit + 1 Pax	1 Patient
		lbs	1,109	1,509	1,709	1,709
1	Winch installed	134.5	Yes	Yes	Yes	Yes
2	Nightsun	37.5	No	No	No	No
3	Cabin Door Open	0.0	No	No	No	No
4	Cargo Hook	35.0	No	No	No	No
5		0.0	No	No	No	No
6		0.0	No	No	No	No
7		0.0	No	No	No	No
8		0.0	No	No	No	No
1	<b>Seats &amp; Stretchers</b>	0.0				
2	RF LH Seat	22.5	RF LH Seat	RF LH Seat	RF LH Seat	RF LH
3	RF Ctr Seat	22.5	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
4	RF RH Seat	22.5	RF RH Seat	RF RH Seat	RF RH Seat	RF RH
5	Jump Seat	22.5	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
6	FF Ctr LH Seat	22.5	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
7	FF Ctr RH Seat	0.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
8	FF RH Outer Seat	0.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
9	FF RH Quad Seat	22.5	FF RH Quad Seat (most fwd)	FF RH Quad Seat (most fwd)	FF RH Quad Seat (most fwd)	FF RH Quad Se
10		0.0				
11	Stretcher 1	37.5	LH Quad against aft Cabin Wall	LH Quad against aft Cabin Wall	LH Quad against aft Cabin Wall	Single Lateral S
12	Stretcher 2	37.5	Tail Boom Locker Aft	Tail Boom Locker Aft	Tail Boom Locker Aft	Tail Boom L
13		0.0				
14		0.0				
15	<b>Crew, Pax/Patients &amp; Non Standard Cargo</b>	0.0				
16	Pilot (incl helmet)	200.0	Pilots Seat	Pilots Seat	Pilots Seat	Pilots
17	Co-pilot/Crewman (incl helmet)	200.0	Co-pilots Seat	Co-pilots Seat	Co-pilots Seat	Co-pilot
18	Doctor (incl helmet)	200.0	NOT ON BOARD	RF LH Seat	RF LH Seat	RF LH
19	Paramedic (incl helmet)	200.0	NOT ON BOARD	FF RH Quad Seat (most fwd)	FF RH Quad Seat (most fwd)	RF RH
20	Patient 1 (stretcher)	200.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	Single Lateral S
21	Patient 2 (stretcher)	200.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
22	Pax 1	200.0	NOT ON BOARD	NOT ON BOARD	RF RH Seat	NOT ON
23	Pax 2	200.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
24	Pax 3 (incl headset/earmuff)	200.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
25	Pax 4 (incl headset/earmuff)	0.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
26	Pax 5 (incl headset/earmuff)	0.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
86	<b>Winch Equipment</b>	0.0				
87	Emergency Hook / Quick Splice	4.7	RF RH Seat	RF RH Seat	RF RH Seat	RF RH
88	Shot Bag / Jungle Penetrator	8.6	RF RH Seat	RF RH Seat	RF RH Seat	RF RH
89	Cable Cutter	1.7	RH Door Post aft edge	RH Door Post aft edge	RH Door Post aft edge	RH Door Pr
90	Para DTW Vest (6 Lbs)	5.7	RH Quad against aft Cabin Wall	RH Quad against aft Cabin Wall	RH Quad against aft Cabin Wall	RH Quad agains
91	Winch Litter	27.6	RH Quad against aft Cabin Wall	RH Quad against aft Cabin Wall	RH Quad against aft Cabin Wall	RH Quad agains
92	Winch Equipment Bag	10.6	RH Quad against aft Cabin Wall	RH Quad against aft Cabin Wall	RH Quad against aft Cabin Wall	RH Quad agains
93	Tag Line + bag	5.9	RH Quad against aft Cabin Wall	RH Quad against aft Cabin Wall	RH Quad against aft Cabin Wall	RH Quad agains
94	Rescue Strop	2.9	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side 1
95	Hi Line Bag	5.1	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side 1
96	Y-Piece 1	2.1	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side 1
97	Y-Piece 2	2.1	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side 1
98	Equipment Strop	1.1	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side Wall aft Mount	RH Quad Side 1
99		0.0				
100		0.0				
101	<b>Medical Equipment</b>	0.0				
102	Primary Pack	46.3	Between RF Seats	Between RF Seats	Between RF Seats	Between
103	Oxy bag	22.0	Between RF Seats	Between RF Seats	Between RF Seats	Between
104	IFT-Bag	28.7	LH Quad ctr section	LH Quad ctr section	LH Quad ctr section	LH Quad c
105	Bridge + Monitor	55.1	LH Quad fwd section	LH Quad fwd section	LH Quad fwd section	Single Lateral
106	Sheets & Pillow	8.8	LH Quad against aft Cabin Wall	LH Quad against aft Cabin Wall	LH Quad against aft Cabin Wall	Single Lateral
107	Scoop	17.6	Tail Boom Locker Fwd	Tail Boom Locker Fwd	Tail Boom Locker Fwd	Tail Boom
108	Ultrasound	11.0	LH Quad ctr section	LH Quad ctr section	LH Quad ctr section	LH Quad c
109	Vac Mattress, bag and pump	24.3	Tail Boom Locker Ctr	Tail Boom Locker Ctr	Tail Boom Locker Ctr	Single Lateral
110		0.0				
111	Neonatal Crib [3rd Party Equipment]	200.0	NOT ON BOARD	NOT ON BOARD	NOT ON BOARD	NOT ON
112		0.0				
113		0.0				
114	<b>Over Water Equipment</b>	0.0				
115	Life Vest 1	3.5	Tail Boom Locker Fwd	Tail Boom Locker Fwd	Tail Boom Locker Fwd	Tail Boom
116	Life Vest 2	3.5	Tail Boom Locker Fwd	Tail Boom Locker Fwd	Tail Boom Locker Fwd	Tail Boom

Configurations sheet snippets

A handy sheet for checking your aircraft configuration is the sheet that converts your equipment and configurations list data into a checklist ordered by aircraft location.

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	Basic Empty Weight		7740.4			1098867	152
Medical Transit + 1 Pax	Configuration Changes		134.5			14805	7434
	Crew/Pax/Equipment/Cargo Loading		1574.4			166508	5386
	Start Fuel		2150.0			323347	-847
Update							
	Bell-412: VH-XCO		11599.3	138.2	1.0	1603527	12126
	Medical Transit + 1 Pax		lbs	inch	inch		
Values							
Items @ Location	Amount	Weights	Long-Arm	Lat-Arm	Long-Moment	Lat-Moment	
<b>1</b>							
Co-pilots Seat	1	200.0	51.7	-22.0	10330	-4400	
Co-pilot/Crewman (incl helmet)	1	200.0	51.7	-22.0	10330	-4400	
<b>2</b>							
Pilots Seat	4	205.5	51.7	22.0	10615	4521	
Pilot (incl helmet)	1	200.0	51.7	22.0	10330	4400	
Shammy	1	0.2	51.7	22.0	11	5	
TR Strap + Pitot covers	1	0.7	51.7	22.0	34	15	
Tech Log & MEL	1	4.6	51.7	22.0	239	102	
<b>4</b>							
RF LH Seat	4	230.8	73.2	-24.5	16891	-5653	
Doctor (incl helmet)	1	200.0	73.2	-24.5	14640	-4900	
Harness 1	1	4.4	73.2	-24.5	323	-108	
Restraint Strap 1	1	3.9	73.2	-24.5	282	-95	
RF LH Seat	1	22.5	73.2	-24.5	1646	-551	
<b>6</b>							
RF RH Seat	7	248.9	73.2	24.5	18219	6098	
Emergency Hook / Quick Splice	1	4.7	73.2	24.5	347	116	
Harness 2	1	4.4	73.2	24.5	323	108	
Restraint Strap 2	1	3.9	73.2	24.5	282	95	
RF RH Seat	1	22.5	73.2	24.5	1646	551	
Shot Bag / Jungle Penetrator	1	8.6	73.2	24.5	629	211	
Strap Bag	1	4.8	73.2	24.5	352	118	
Pax 1	1	200.0	73.2	24.5	14640	4900	
<b>12</b>							
FF RH Quad Seat (most fwd)	5	229.6	138.1	29.3	31708	6728	
FF RH Quad Seat	1	22.5	138.1	29.3	3105	659	
Hand Held Night Scanner 12 Volt + bag	1	1.8	138.1	29.3	244	52	
Paramedic (incl helmet)	1	200.0	138.1	29.3	27617	5860	
Personal Protection Bag	1	1.5	138.1	29.3	210	45	
Restraint Strap 3	1	3.9	138.1	29.3	533	113	
<b>19</b>							
Ctr Console Left Nav Bin fwd	1	1.8	37.6	-8.4	66	-15	

Checklist sheet snippet

On request Stone productions can provide a sheet with basic Bk117 data. When provided with flight manual data Stone Productions can set up this system for any aircraft type.

