

D0901137 - AdvLIGO Systems, BSC1-H1 Top Level Chamber Assembly - Mass Properties BOM							SUSPENDED MASS		NON-SUSPENDED MASS	
ITEM NO.	P/N	DESCRIPTION	QTY		SUB-TOTAL	TOTAL	SUB-TOTAL	TOTAL		
1	D0901139	AdvLIGO SEI BSC1-H1, XYZ Local CS for ISI Table	1			1618.25		1618.25		
	1.1	D0901182 AdvLIGO SEI BSC ISI Table Assembly	1	1	1618.25		1618.25			
	1.2	D1003140 Lifting Bar, 3-Point, BSC Cartridge, AdvLIGO	1	1	0.00		0.00			
2	D0901140	AdvLIGO SUS BSC1-L1, XYZ Local CS for ITMY	1		363.10	363.10	131.00	131.00		
	2.1	D0901346-03 AdvLIGO QUAD SUS Assembly Top Level TD-1084-090_ASM	1	1	338.25		106.53			
	2.2	D1002424 aLIGO, SUS, Viobration Absorber, 5LB Vertical with O-Rings	4		12.01		12.01			
	2.3	Dog Clamps Set	1		12.06		12.06			
	2.4	Hardware Set	1		0.78		0.40			
3	D1001989	AdvLIGO BSC1-H1 ISI Table, Payload & Suspended Mass Assembly	1			702.36		702.36		
4	D1200112	AdvLIGO, Cable Harness Routing BSC1	1			7.61		7.61		

CARTRIDGE CONFIGURATION	
SUB-TOTAL	TOTAL
	3475.99
3279.00	
196.99	
363.10	363.10
338.25	
12.01	
12.06	
0.78	
461.40	461.40
7.13	7.13

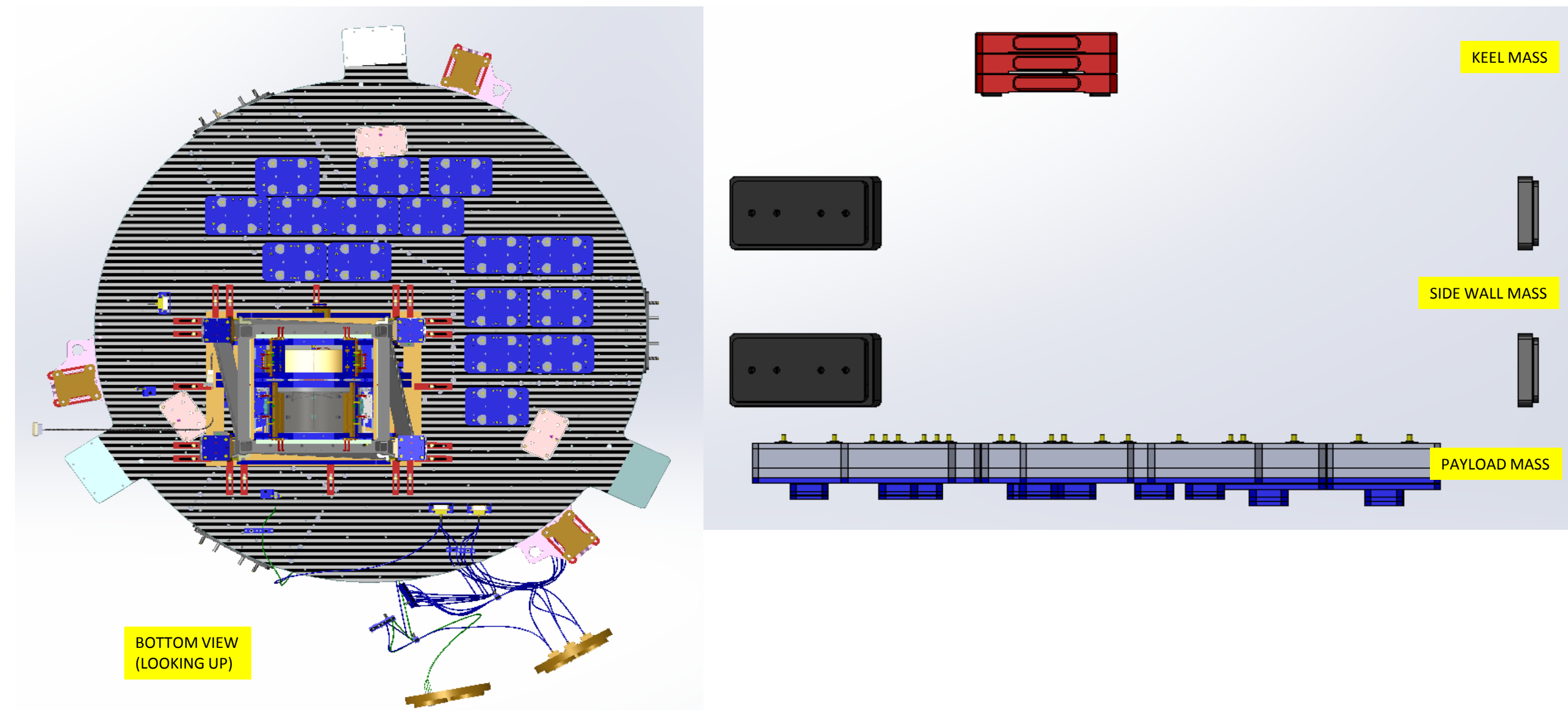
As per DCC # E1100006 (Pg 2) this is **TOTAL MASS ON STAGE 1-2 SPRINGS = 2690 Kg**
 As per DCC # E1100006 (Pg 2) this is **STAGE 2 BSC-ISI SUSPENDED MASS = 1618 Kg**
 As per DCC # E1100006 (Pg 2) this is **LEFT FOR "OPTICS + TABLE MASSES" = 1070 Kg**

TOTAL [Σ(J3:J19)]	2691.32
ISO TABLE [J4]	1618.25
TOTAL PAYLOAD (J21-J22)	1073.07

2459.22

4307.62
TARGET
10000 LBS
4536 Kg

CONFIGURATIONS	COUNTERBALANCE MASS			CENTER OF GRAVITY				TOTAL COUNTERBALANCE MASS
	PAYLOAD MASS (Kg)	OUTER WALL MASS (Kg)	KEEL MASS (Kg)	X = 0.0 ± 10 mm	Y = 0.0 ± 10 mm	Z = 180.34 ± 100 mm	"Z" TARGET 7.10 in 3.10 ≤ Z ≤ 11.10	
	CG XY-Calculation (SUSPENDED Mass)	336.43	95.50	270.43	-1.00	-1.70	136.54	
CG Z-Calculation (Non-SUSPENDED Mass)	336.43	95.50	270.43	17.82	-21.52	257.20	702.36	
CG XYZ-Calculation (Cartridge Configuration)	336.43	95.50	0.00	-3.05	-2.16	125.83	431.94	



D0901142 - AdvLIGO Systems, BSC2-H1 Top Level Chamber Assembly - Mass Properties BOM							SUSPENDED MASS		NON-SUSPENDED MASS	
ITEM NO.	P/N	DESCRIPTION	QTY		SUB-TOTAL	TOTAL	SUB-TOTAL	TOTAL		
1	D0901144	AdvLIGO SEI BSC2-H1, XYZ Local CS for ISI Table	1			1618.31		1618.31		
	1.1	AdvLIGO SEI BSC ISI Table Assembly	1	1	1618.31		1618.31			
	1.2	Lifting Bar, 3-Point, BSC Cartridge, AdvLIGO	1	1	0.00		0.00			
2	D0901145	AdvLIGO SUS BSC2-H1, XYZ Local CS for BS HR	1		204.70	204.70	167.95	167.95		
	2.1	AdvLIGO BS/FM Top Level Assembly	1	1	151.83		115.08			
	2.2	AdvLIGO SUS BSC8-H2, BS/FM Stay Assembly	4	4	19.73		19.73			
	2.3	aLIGO, SUS, Viobration Absorber, 5LB Vertical with O-Rings	4	4	12.70		12.70			
	2.4	AdLIGO AOS SLC BS Elliptical Baffle Assembly	1	1	2.25		2.25			
	2.5	Dog Clamps Set	1	1	17.29		17.29			
	2.6	Hardware Set	1	1	0.90		0.90			
4	D1001514	AdvLIGO BSC2-H1 ISI Table, Payload & Suspended Mass Assembly	1			861.77		861.77		
5	D1200060	AdvLIGO, Cable Harness Routing BSC2	1			5.86		5.86		

CARTRIDGE CONFIGURATION	
SUB-TOTAL	TOTAL
	3475.99
3279.00	
196.99	
204.70	204.70
151.83	
19.73	
12.70	
2.25	
17.29	
0.90	
591.34	591.34
5.86	5.86

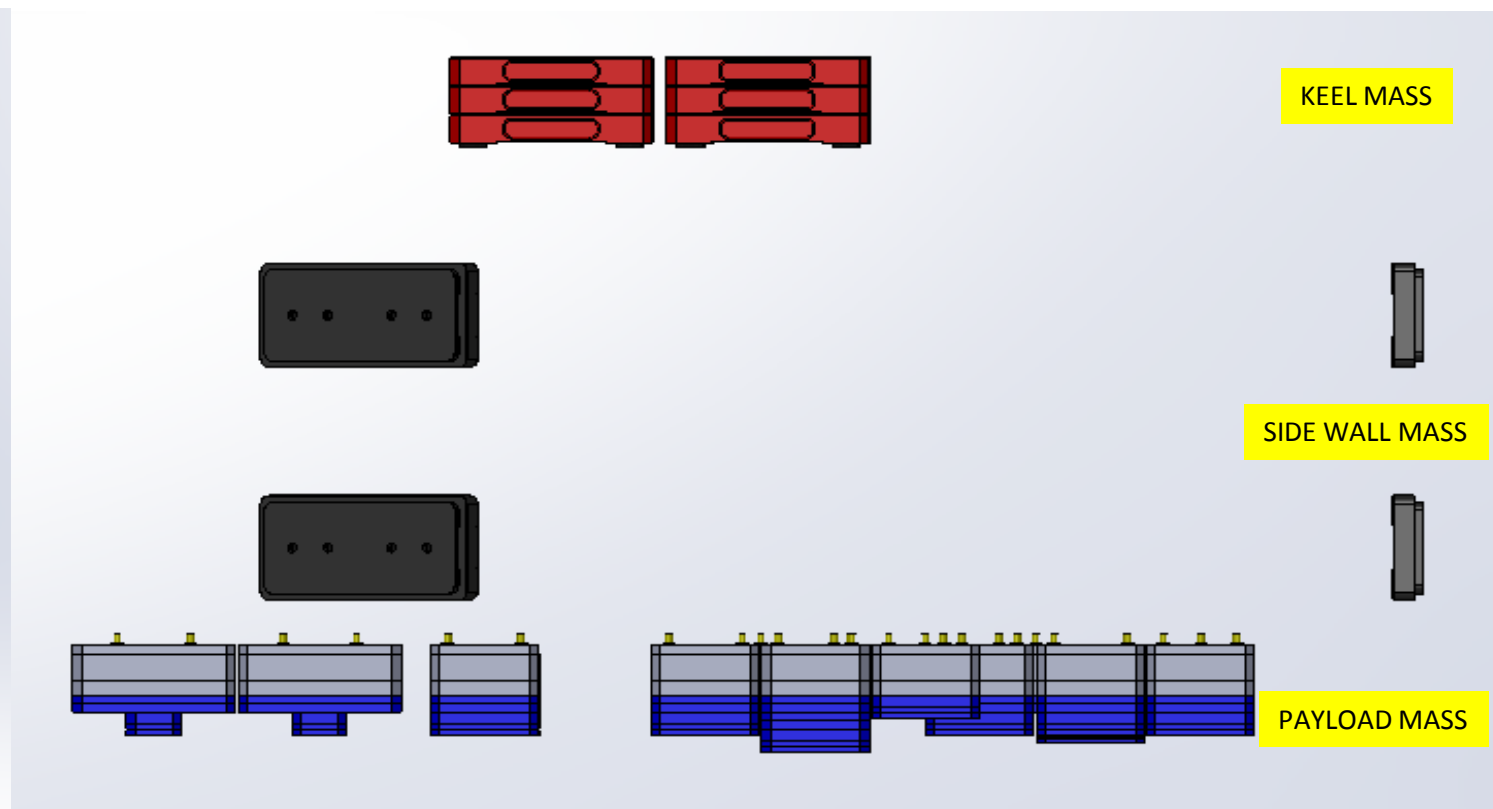
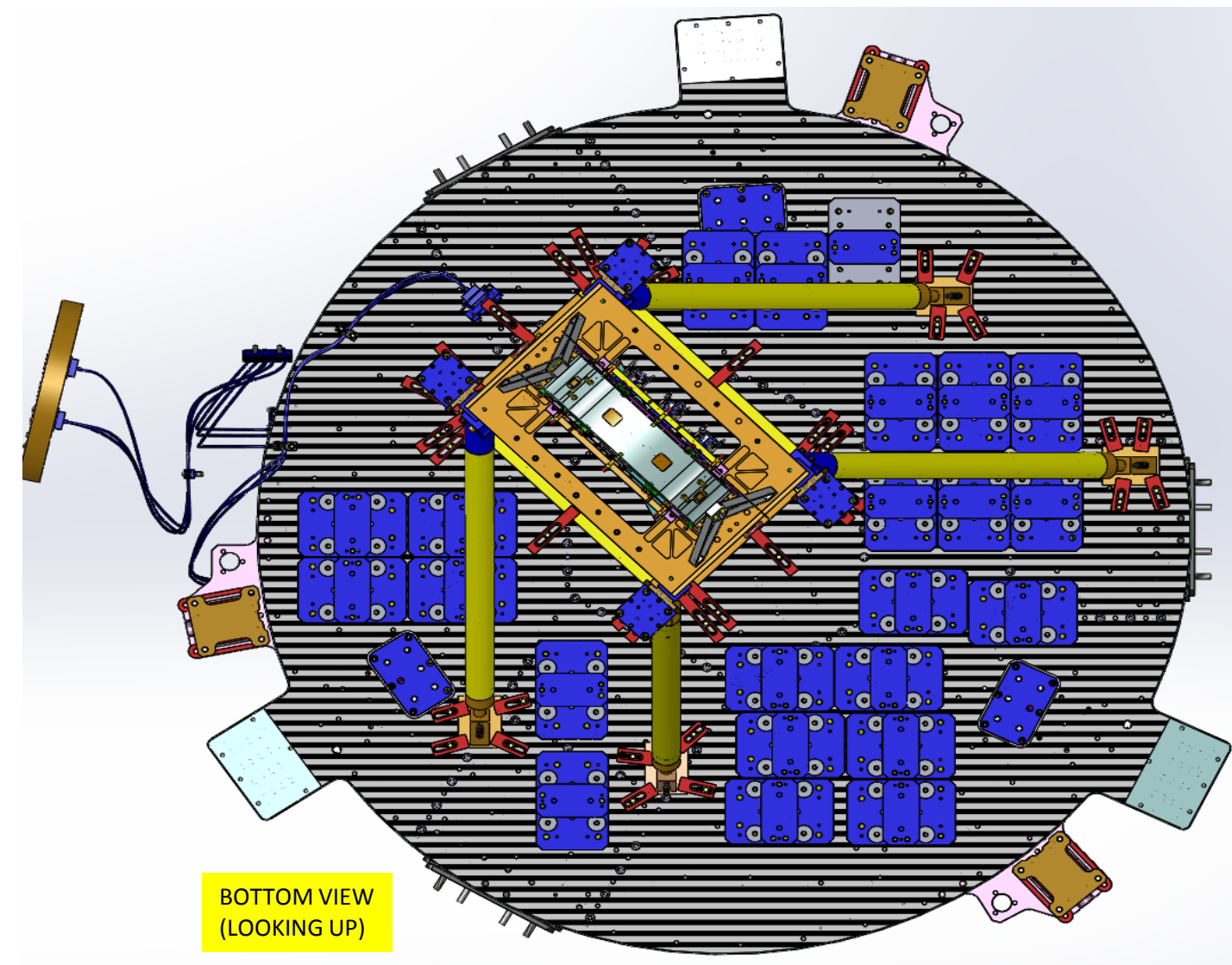
As per DCC # E1100006 (Pg 2) this is **TOTAL MASS ON STAGE 1-2 SPRINGS = 2390 Kg**
 As per DCC # E1100006 (Pg 2) this is **STAGE 2 BSC-ISI SUSPENDED MASS = 1618 Kg**
 As per DCC # E1100006 (Pg 2) this is **LEFT FOR "OPTICS + TABLE MASSES" = 1070 Kg**

TOTAL [Σ(J3:J19)]	2690.64
ISO TABLE [J4]	1618.31
TOTAL PAYLOAD (J21-J22)	1072.33

2653.88

4277.89
TARGET
10000 LBS
4536 Kg

CONFIGURATIONS	COUNTERBALANCE MASS			CENTER OF GRAVITY				TOTAL COUNTERBALANCE MASS
	PAYLOAD MASS (Kg)	OUTER WALL MASS (Kg)	KEEL MASS (Kg)	X = 0.0 ± 10 mm	Y = 0.0 ± 10 mm	Z = 180.34 ± 100 mm	"Z" TARGET 7.10 in 3.10 ≤ Z ≤ 11.10	
	CG XY-Calculation (SUSPENDED Mass)	495.84	95.50	270.43	-0.12	-0.84	198.63	
CG Z-Calculation (Non-SUSPENDED Mass)	495.84	95.50	270.43	1.64	2.48	221.98	8.74	861.77
CG XYZ-Calculation (Cartridge Configuration)	495.84	95.50	0.00	1.89	0.54	164.86	6.49	591.34



D0901146 - AdvLIGO Systems, BSC3-H1 Top Level Chamber Assembly - Mass Properties BOM							SUSPENDED MASS		NON-SUSPENDED MASS	
ITEM NO.	P/N	DESCRIPTION	QTY		SUB-TOTAL	TOTAL	SUB-TOTAL	TOTAL		
1	D0901148	AdvLIGO SEI BSC3-H1, XYZ Local CS for ISI Table	1			1618.25		1618.25		
	1.1	AdvLIGO SEI BSC ISI Table Assembly		1	1618.25		1618.25			
	1.2	Lifting Bar, 3-Point, BSC Cartridge, AdvLIGO		1	0.00		0.00			
2	D0901149	AdvLIGO SUS BSC3-H1, XYZ Local CS for ITMX	1		363.11	363.11	131.00	131.00		
	2.1	AdvLIGO QUAD SUS Assembly Top Level TD-1084-090_ASM		1	338.25		106.53			
	2.2	aLIGO, SUS, Vibration Absorber, 5LB Vertical with O-Rings		4	12.01		12.01			
	2.3	Dog Clamps Set		1	11.96		11.96			
	2.4	Hardware Set		1	0.89		0.50			
3	D1002185	AdvLIGO BSC3-42 ISI Table, Payload & Suspended Mass Assembly	1			701.42		701.42		
4	D1200059	AdvLIGO, Cable Harness Routing BSC3	1			6.96		6.96		

CARTRIDGE CONFIGURATION	
SUB-TOTAL	TOTAL
	3475.99
3279.00	
196.99	
363.11	363.11
338.25	
12.01	
11.76	
0.89	
430.99	430.99
6.96	6.96

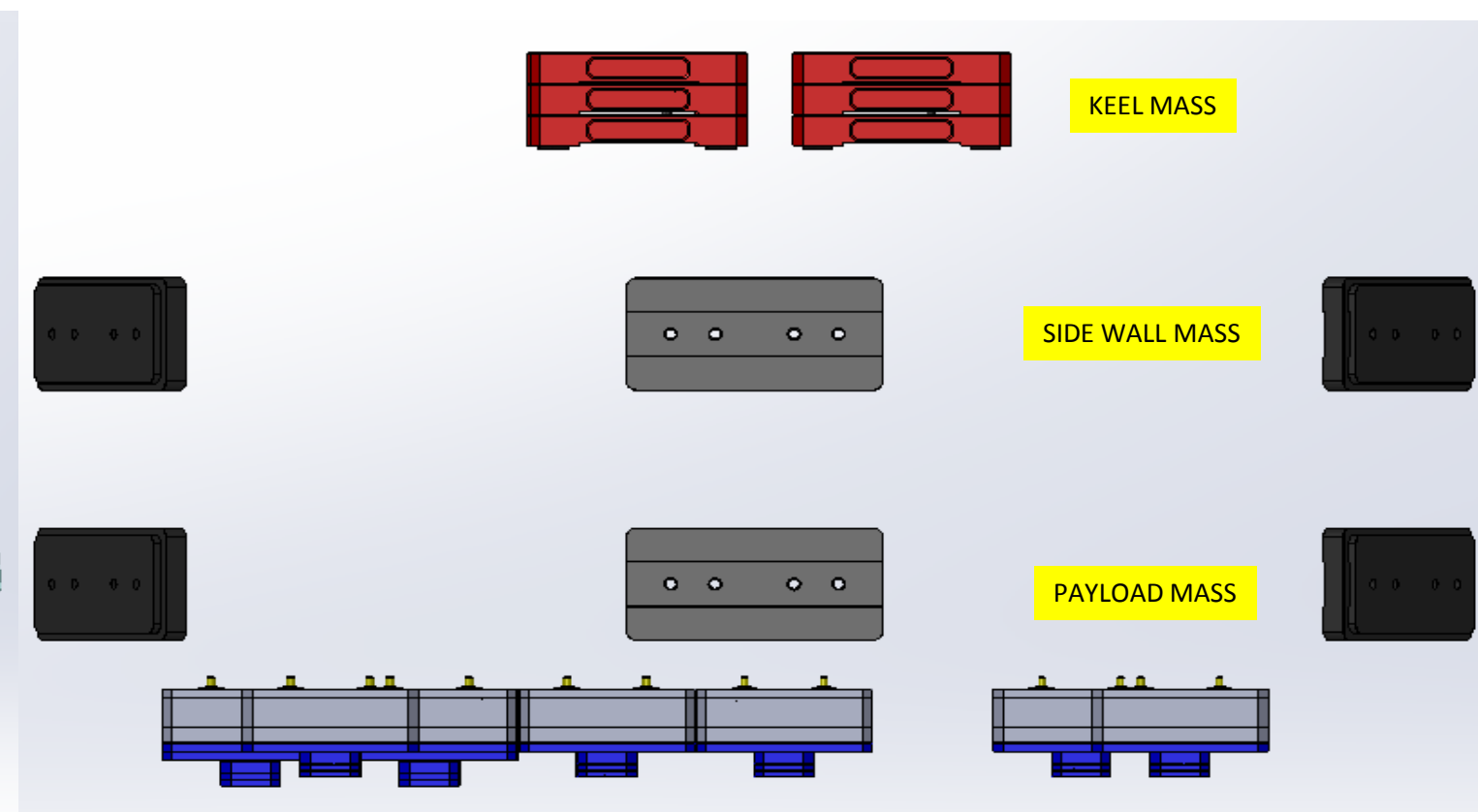
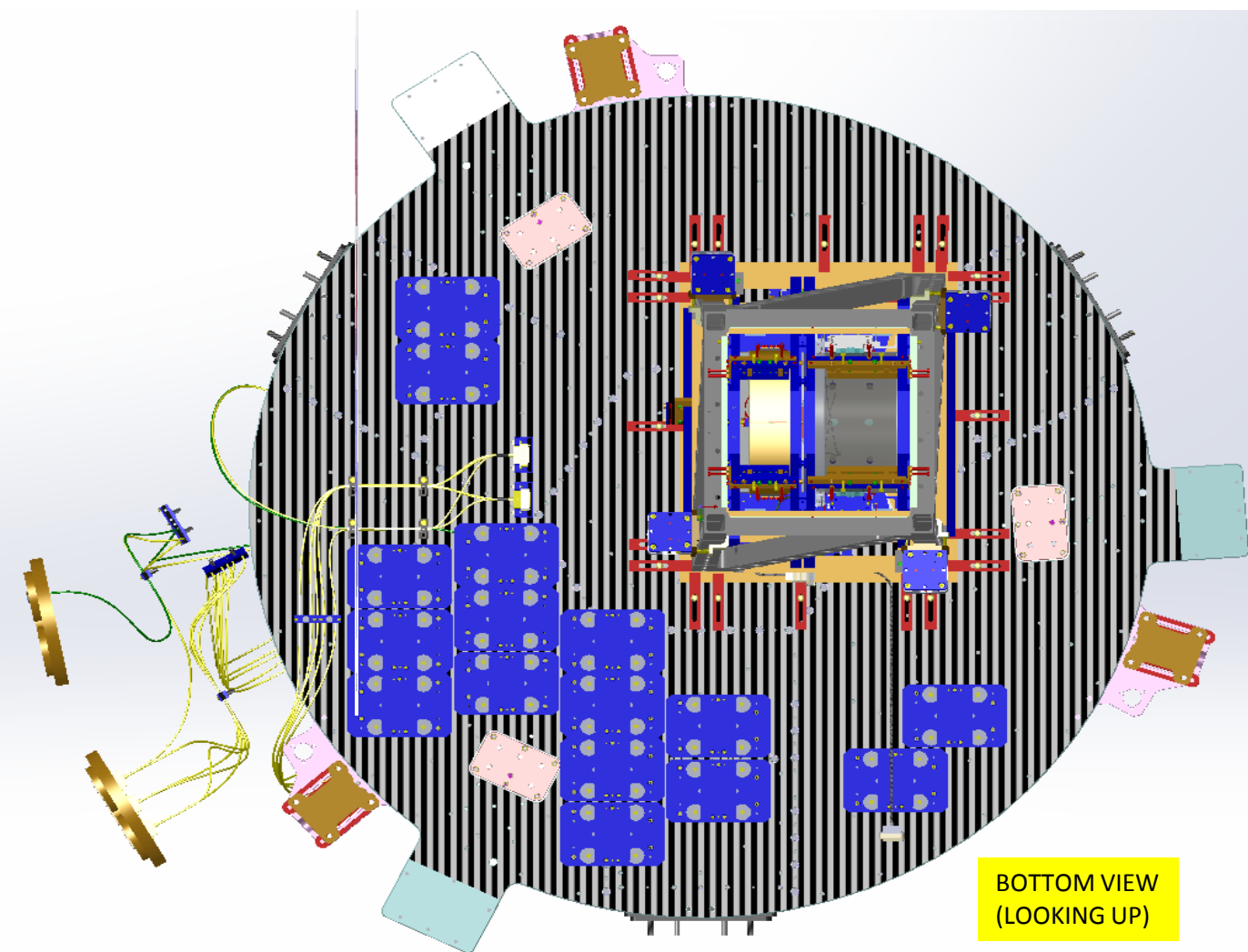
As per DCC # E1100006 (Pg 2) this is **TOTAL MASS ON STAGE 1-2 SPRINGS = 26900 Kg**
 As per DCC # E1100006 (Pg 2) this is **STAGE 2 BSC-ISI SUSPENDED MASS = 1618 Kg**
 As per DCC # E1100006 (Pg 2) this is **LEFT FOR "OPTICS + TABLE MASSES" = 1070 Kg**

TOTAL [Σ(J3:J19)]	2689.74
ISO TABLE [J4]	1618.25
TOTAL PAYLOAD (J21-J22)	1071.49

2457.63

4277.05
TARGET
10000 LBS
4536 Kg

CONFIGURATIONS	COUNTERBALANCE MASS			CENTER OF GRAVITY				TOTAL COUNTERBALANCE MASS
	PAYLOAD MASS (Kg)	OUTER WALL MASS (Kg)	KEEL MASS (Kg)	X = 0.0 ± 10 mm	Y = 0.0 ± 10 mm	Z = 180.34 ± 100 mm	"Z" TARGET 7.10 in 3.10 ≤ Z ≤ 11.10	
	CG XY-Calculation (SUSPENDED Mass)	335.49	95.50	270.43	-0.29	-2.42	136.95	
CG Z-Calculation (Non-SUSPENDED Mass)	335.49	95.50	270.43	-22.82	16.20	257.73	10.15	701.42
CG XYZ-Calculation (Cartridge Configuration)	335.49	95.50	0.00	-1.40	8.29	125.17	4.93	430.99



BSC4-H2									
	Suspended		Inc/Dec	Certainty	Indicator	Non-Sus		Inc/Dec	Full Cartridge
	Full	Simple				Full	Simple		
	Kg	Kg				Kg	Kg		
HR (BS)	173.48					132.9	160.15		63.99
Elliptical Baffle									
2X VibAbs HR (BS)	12.70					12.72			16.39
Spacer HR (BS)									
Dog Clamp HR (BS)	9.89					9.89			
Cabling									
Cabling Brackets									
Counterbalance Mass Total	965.73					965.73	965.73		965.73
BSC ISI Table	1612.24					1612.24	1661.53		3920.79
Sub-TOTAL	1161.80					1121.24	1125.878		1046.11
TOTAL	2774.04					2733.48	2787.41		4966.90
Table Total Mass	805.97					765.41	770.05		

Sub-TOTAL	Sum of all items on table (including Keel Mass)	(B5:B29)(C5:C29)(G5:G29)(H5:H29)
TOTAL	Sum of "Sub-TOTAL + BSC Table"	(B30+B32)(C30+C32)(G30+G32)(H30+H32)

Table Mass Total	Sum of all items on table (excluding Keel Mass)	(B32-P6)(C32-P4)(G32-P7)(H32-P5)
------------------	---	----------------------------------

BSC4-H2										
		Table Total	Payload	Outer Wall	Keel Mass	X = 0	Y = 0	Z = 180.34	"Z" Target	CounterBala nce Mass
		Mass	Mass	Mass	Mass	± 10 mm	± 10 mm	± 100 mm	(7.1 in)	
		Kg	Kg	Kg	Kg	mm	mm	mm	3.16 ≤ Z ≤ 11.04	
Simple	CG XY-Calc (SUS Mass)	0.00	490.361	119.543	355.824	2.93	-4.58	220.32		965.728
	CG Z-Calc (Non-SUS Mass)	770.05	490.361	119.543	355.824	3.46	-4.08	230.32	9.07	965.728
Full	CG XY-Calc (SUS Mass)	805.97	490.361	119.543	355.824	-2.85	3.46	213.56		965.728
	CG Z-Calc (Non-SUS Mass)	0.00	490.361	119.543	355.824	-1.44	5.15	235.16	9.26	965.728

BSC5-H2										
	Suspended		Inc/Dec	Certainty	Indicator	Non-Sus		Inc/Dec	Full	
	Full	Simple				Full	Simple			Cartridge
	Kg	Kg				Kg	Kg			
				%						
ETMX (QUAD)		371.37	-371.37			116.99	-116.99		215.76	
TMS (ETM)		188.00	-188.00			68.00	-68.00		177.23	
Arm Cavity Baffle										
			0.00				0.00			
			0.00				0.00			
2X VibAbs ETMY		16.39	-16.39			16.39	-16.39		6.08	
			0.00				0.00			
			0.00				0.00			
			0.00				0.00			
Spacer ETMX			0.00				0.00			
Spacer TMS			0.00				0.00			
			0.00				0.00			
			0.00				0.00			
Dog Clamp ETMX			0.00				0.00			
Dog Clamp TMS			0.00				0.00			
			0.00				0.00			
			0.00				0.00			
Cabling			0.00				0.00			
Cabling Brackets			0.00				0.00			
Counterbalance Mass Total		590.99	-590.99			590.99	-590.99		590.99	
BSC ISI Table		1661.53				1661.53			3891.04	
Sub-TOTAL	0.00	1166.75	-1166.75			792.366	-792.37		990.06	
TOTAL		2828.28				2453.90			4881.10	

Table Total Mass		855.40				481.02			
------------------	--	---------------	--	--	--	---------------	--	--	--

Sub-TOTAL	Sum of all items on table (including Keel Mass)	(B5:B29)(C5:C29)(G5:G29)(H5:H29)
TOTAL	Sum of "Sub-TOTAL + BSC Table"	(B30+B32)(C30+C32)(G30+G32)(H30+H32)

Table Mass Total	Sum of all items on table (excluding Keel Mass)	(B32-P6)(C32-P4)(G32-P7)(H32-P5)
------------------	--	----------------------------------

BSC5-H2										
		Table Total	Payload	Outer Wall	Keel Mass	X = 0	Y = 0	Z = 180.34	"Z" Target	CounterBa lance
		Mass	Mass	Mass	Mass	± 10 mm	± 10 mm	± 100 mm	(7.1 in)	
		Kg	Kg	Kg	Kg	mm	mm	mm	$3.16 \leq Z \leq 11.04$	
Simple	CG XY-Calc (SUS Mass)	855.40	95.114	119.543	355.824	2.26	-6.89	66.76		570.481
	CG Z-Calc (Non-Sus Mass)	481.02	95.114	119.543	355.824	-27.96	3.71	291.17	11.463	570.481
Full	CG XY-Calc (SUS Mass)									0
	CG Z-Calc (Non-Sus Mass)									0

Alternate Calculation, using 310 Kg on Keel (instead of 360), to get the Z-value within range.

Simple	CG XY-Calc (SUS Mass)	855.40	160.097	119.543	311.346	2.5	9.33	50.9		590.986
	CG Z-Calc (Non-Sus Mass)	481.02	160.097	119.543	311.346	12.1	-19.96	270.47	10.648	590.986

D0900512 - AdvLIGO Systems, BSC6-H2 Top Level Chamber Assembly - Mass Properties BOM							SUSPENDED MASS		NON-SUSPENDED MASS	
ITEM NO.	P/N	DESCRIPTION	QTY		SUB-TOTAL	TOTAL	SUB-TOTAL	TOTAL		
1		D0900514 AdvLIGO SEI BSC6-H2, XYZ Local CS for ISI Table	1			1618.33		1618.33		
	1.1	D0901182 AdvLIGO SEI BSC ISI Table Assembly		1	1618.33		1618.33			
	1.2	D1003140 Lifting Bar, 3-Point, BSC Cartridge, AdvLIGO		1	0.00		0.00			
2		D0900515 AdvLIGO SUS BSC6-H2, XYZ Local CS for ETMY	1		389.12	389.12	137.70	137.70		
	2.1	D0901346 AdvLIGO QUAD SUS Assembly Top Level TD-1084-090_ASM		1	365.61		113.80			
	2.2	D1002424 aLIGO, SUS, Viobration Absorber, 5LB Vertical with O-Rings		4	12.01		12.01			
	2.3			1	10.98		11.37			
	2.4			1	0.52		0.52			
3		D0900419 AdvLIGO SUS BSC6-H2, XYZ Local CS for ETM Tel Assy	1		208.68	208.68	82.32	82.32		
	3.1	D0901880 AOS ETM Telescope Upper Suspension & Structure Envelope		1	190.58		64.22			
	3.3	D1002424 aLIGO, SUS, Viobration Absorber, 5LB Vertical with O-Rings		2	6.15		6.15			
	3.4			1	1.91		1.91			
	3.5			1	9.99		9.99			
	3.6			1	0.05		0.05			
4		D1000897 AdvLIGO BSC6-H2 ISI Table, Payload & Suspended Mass Assembly	1			498.71		498.71		
5		D1101142 AdvLIGO, Cable Harness Routing BSC6 & BSC8	1			8.00		8.00		

CARTRIDGE CONFIGURATION	
SUB-TOTAL	TOTAL
	3475.99
3279.00	
196.99	
389.12	389.12
365.61	
12.01	
10.98	
0.52	
215.61	215.61
197.51	
6.15	
1.91	
9.99	
0.05	
	224.85
	8.00

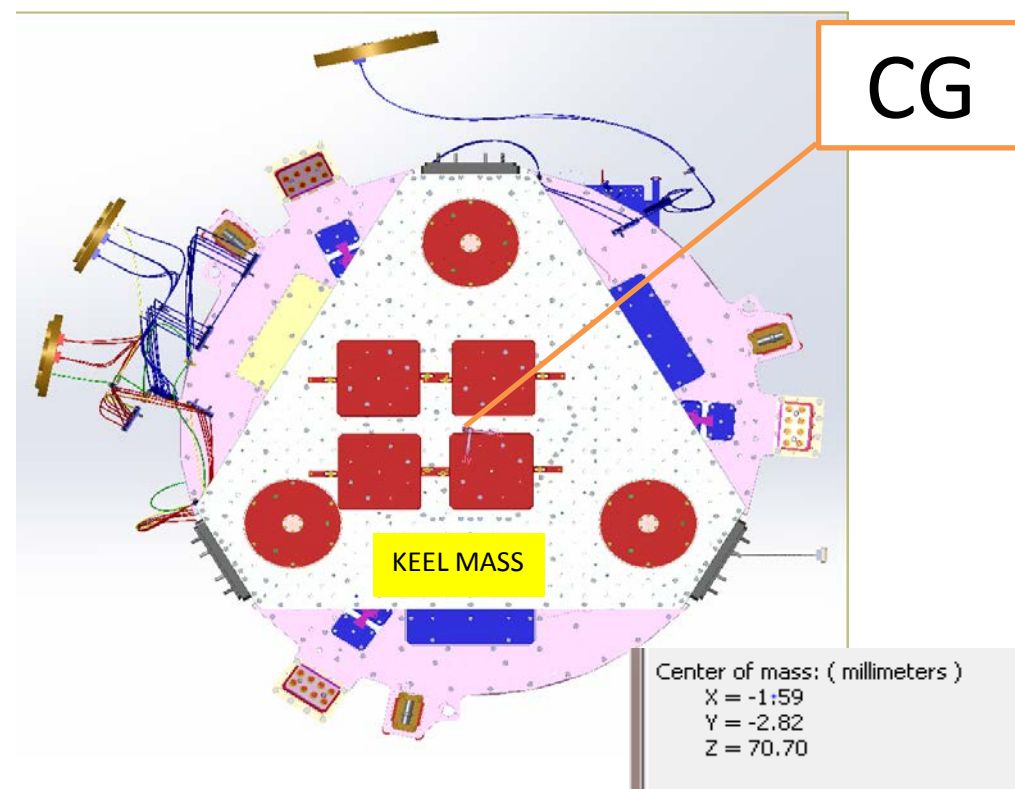
As per DCC # E1100006 (Pg 2) this is **TOTAL MASS ON STAGE 1-2 SPRINGS = 2690 Kg**
 As per DCC # E1100006 (Pg 2) this is **STAGE 2 BSC-ISI SUSPENDED MASS = 1618 Kg**
 As per DCC # E1100006 (Pg 2) this is **LEFT FOR "OPTICS + TABLE MASSES" = 1070 Kg**

TOTAL MASS [E(J3:J18)]	2722.84
ISO TABLE [J3]	1618.33
TOTAL PAYLOAD [J20-J21]	1104.51

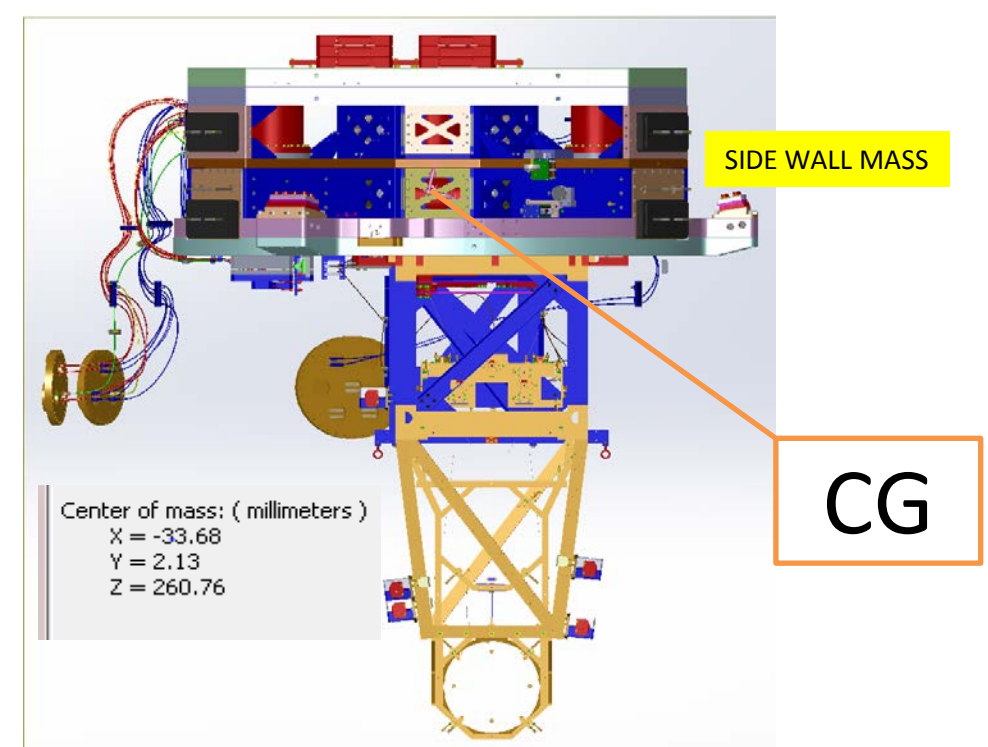
2345.06

4313.57	TARGET
	10000 LBS
	4536 Kg

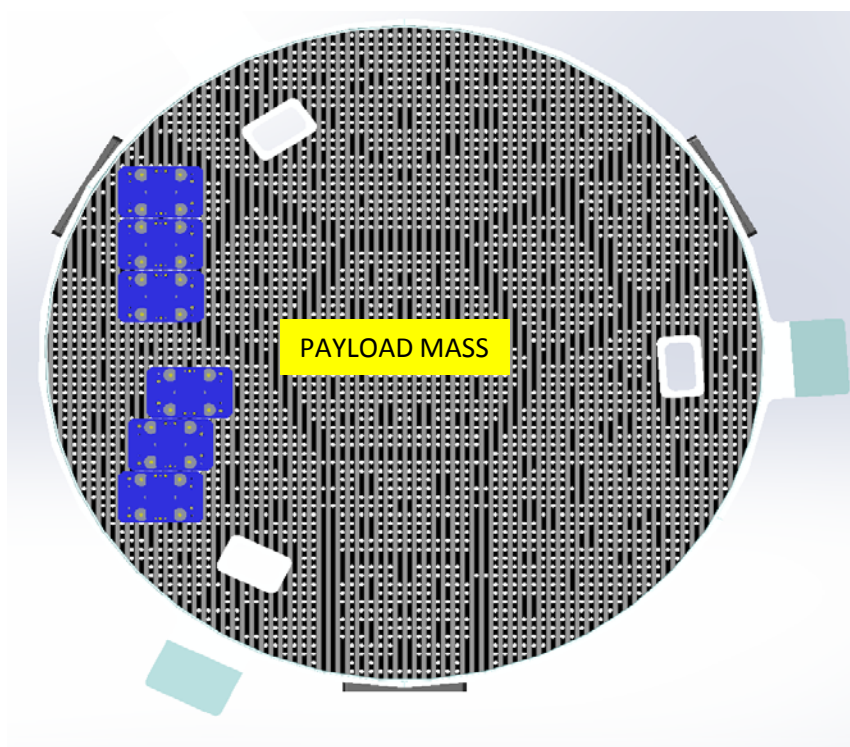
CONFIGURATIONS	COUNTERBALANCE MASS			CENTER OF GRAVITY				TOTAL COUNTERBALANCE MASS
	PAYLOAD MASS (Kg)	OUTER WALL MASS (Kg)	KEEL MASS (Kg)	X = 0.0 ± 10 mm	Y = 0.0 ± 10 mm	Z = 180.34 ± 100 mm	"Z" TARGET 7.10 in 3.10 ≤ Z ≤ 11.10	
	CG XY-Calculation (SUSPENDED Mass)	129.35	95.50	273.86	-1.59	-2.82	70.70	
CG Z-Calculation (Non-SUSPENDED Mass)	129.35	95.50	273.86	-33.68	2.13	260.76	10.27	498.71
CG XYZ-Calculation (Cartridge Configuration)	129.35	95.50	0.00	6.60	-4.33	82.38	3.24	224.85



SUSPENDED MASS



NON-SUSPENDED MASS



BOTTOM VIEW (LOOKING UP)

BSC7-H2									
	Suspended		Inc/Dec	Certainty	Indicator	Non-Sus		Inc/Dec	Full
	Full	Simple				Full	Simple		
	Kg	Kg	Kg	%		Kg	Kg	Kg	Kg
ITMX (QUAD)	359.68	371.37				115.34	116.99		215.76
FMX (BS)	181.43	174.28				140.87	131.9		63.99
2X FM Beam D. B.									31.88
FM Elliptical B.	1.16	1.16				1.16			16.15
Arm Cavity B.									38.18
4X VibAbs ITMX	12.00	16.39				12.00	16.39		
4X VibAbs FMX	12.72	14.72				12.72	14.72		
Spacer ITMX									
Spacer FMX									
Dog Clamp ITMX	9.89					9.89			
Dog Clamp FMX	9.89					9.89			
Cabling									
Cabling Brackets									
Counterbalance									
Mass Total	585.497	585.497				585.497	585.497		585.50
BSC ISI Table	1612.24	1661.53				1612.24	1661.53		3891.04
Sub-TOTAL	1172.27	1163.42				887.37	865.50		951.46
TOTAL	2784.51	2824.95				2499.61	2527.03		4842.50
Table Total Mass	816.44	807.59				531.54	509.67		

Sub-TOTAL	Sum of all items on table (including Keel Mass)	(B5:B29)(C5:C29)(G5:G29)(H5:H29)
TOTAL	Sum of "Sub-TOTAL + BSC Table"	(B30+B32)(C30+C32)(G30+G32)(H30+H32)
Table Mass Total	Sum of all items on table (excluding Keel Mass)	(B32-P6)(C32-P4)(G32-P7)(H32-P5)

BSC7-H2										
		Table Total	Payload	Outer Wall	Keel Mass	X = 0	Y = 0	Z = 180.34	"Z" Target	CounterBalance
		Mass	Mass	Mass	Mass	± 10 mm	± 10 mm	± 100 mm	(7.1 in)	
		Kg	Kg	Kg	Kg	mm	mm	mm	3.16 ≤ Z ≤ 11.04	Kg
Simple	CG XY-Calc (SUS Mass)	807.59	110.13	119.543	355.824	7.27	6.47	105.76		585.497
	CG Z-Calc (Non-Sus Mass)	509.67	110.13	119.543	355.824	-24.17	-15.76	253.91	9.996	585.497
Full	CG XY-Calc (SUS Mass)	816.44	110.13	119.543	355.824	4.22	5.00	101.54		585.497
	CG Z-Calc (Non-Sus Mass)	531.54	110.13	119.543	355.824	-24.94	-16.97	241.82	7.591	585.497

D0900360 - AdvLIGO Systems, BSC8-H2 Top Level Chamber Assembly - Mass Properties BOM							SUSPENDED MASS		NON-SUSPENDED MASS	
ITEM NO.	P/N	DESCRIPTION	QTY		SUB-TOTAL	TOTAL	SUB-TOTAL	TOTAL		
1		D0900362 AdvLIGO SEI BSC8-H2, XYZ Local CS for ISI Table	1			1618.33		1618.33		
	1.1	D0901182 AdvLIGO SEI BSC ISI Table Assembly		1	1618.33		1618.33			
	1.2	D1003140 Lifting Bar, 3-Point, BSC Cartridge, AdvLIGO		1	0.00		0.00			
2		D0900363 AdvLIGO SUS BSC8-H2, XYZ Local CS for ITMY	1		389.69	389.69	138.62	138.62		
	2.1	D0901346 AdvLIGO QUAD SUS Assembly Top Level TD-1084-090_ASM		1	365.06		113.80			
	2.2	D1002424 aLIGO, SUS, Viobration Absorber, 5LB Vertical with O-Rings		4	12.01		12.01			
	2.3			1	11.18		11.37			
	2.4			1	1.44		1.44			
3		D0900364 AdvLIGO SUS BSC8-H2, XYZ Local CS for FMY	1		204.29	204.29	163.78	163.78		
	3.1	D1000392 AdvLIGO BS/FM Top Level Assembly		1	152.88		111.27			
	3.2	TBD AdvLIGO SUS BSC8-H2, BS/FM Stay Assembly		4	19.73		19.73			
	3.3	D1002424 aLIGO, SUS, Viobration Absorber, 5LB Vertical with O-Rings		4	12.70		12.70			
	3.4	D1000424 AdLIGO AOS SLC FM Ellipse Baffle Assembly		1	1.33		1.33			
	3.5			1	16.70		17.81			
	3.6			1	0.95		0.94			
4		D1000898 AdvLIGO BSC8-H2 ISI Table, Payload & Suspended Mass Assembly	1			498.71		498.71		
5		D1101142 AdvLIGO, Cable Harness Routing BSC6 & BSC8	1			8.00		8.00		

CARTRIDGE CONFIGURATION	
SUB-TOTAL	TOTAL
	3475.99
3279.00	
196.99	
389.69	389.69
365.06	
12.01	
11.18	
1.44	
204.29	204.29
152.88	
19.73	
12.70	
1.33	
16.70	
0.95	
224.85	224.85
8.00	8.00

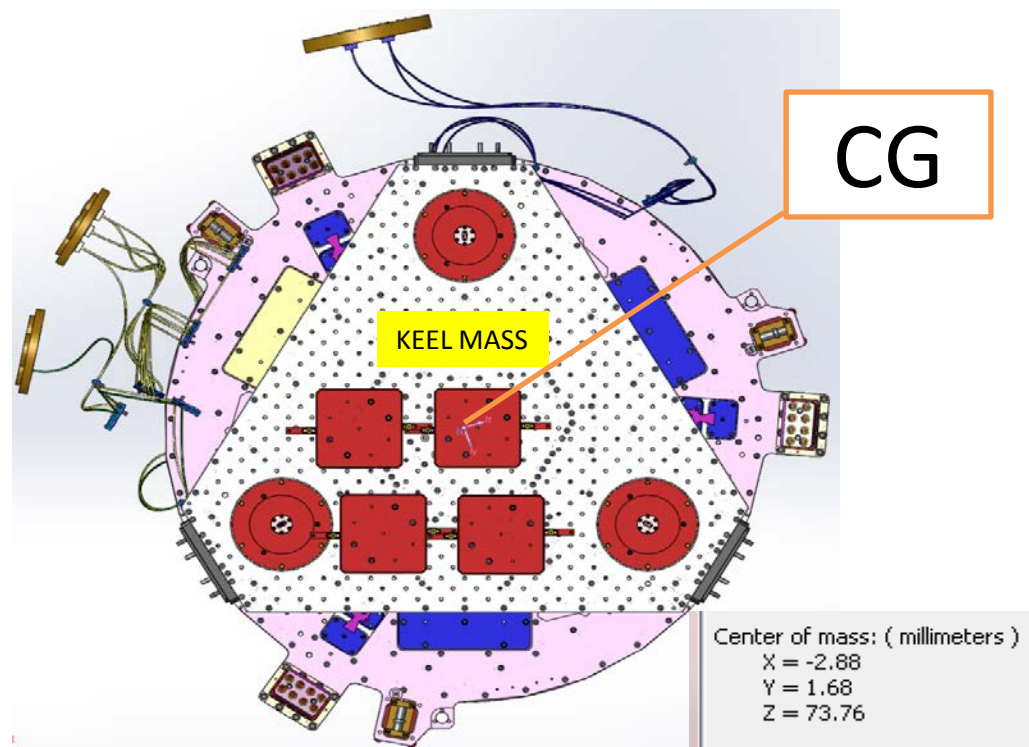
As per DCC # E1100006 (Pg 2) this is **TOTAL MASS ON STAGE 1-2 SPRINGS = 2690 Kg**
 As per DCC # E1100006 (Pg 2) this is **STAGE 2 BSC-ISI SUSPENDED MASS = 1618 Kg**
 As per DCC # E1100006 (Pg 2) this is **LEFT FOR "OPTICS + TABLE MASSES" = 1070 Kg**

TOTAL [Σ(J3:J19)]	2719.01
ISO TABLE [J4]	1618.33
TOTAL PAYLOAD (J21-J22)	1100.68

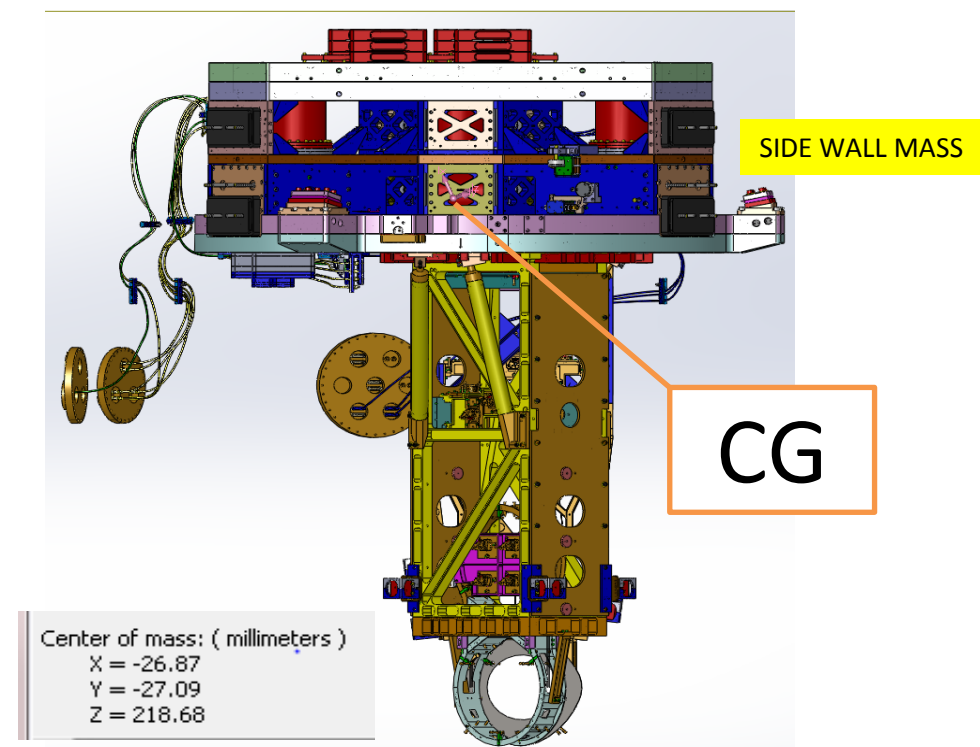
2427.43

4302.82	TARGET
	10000 LBS
	4536 Kg

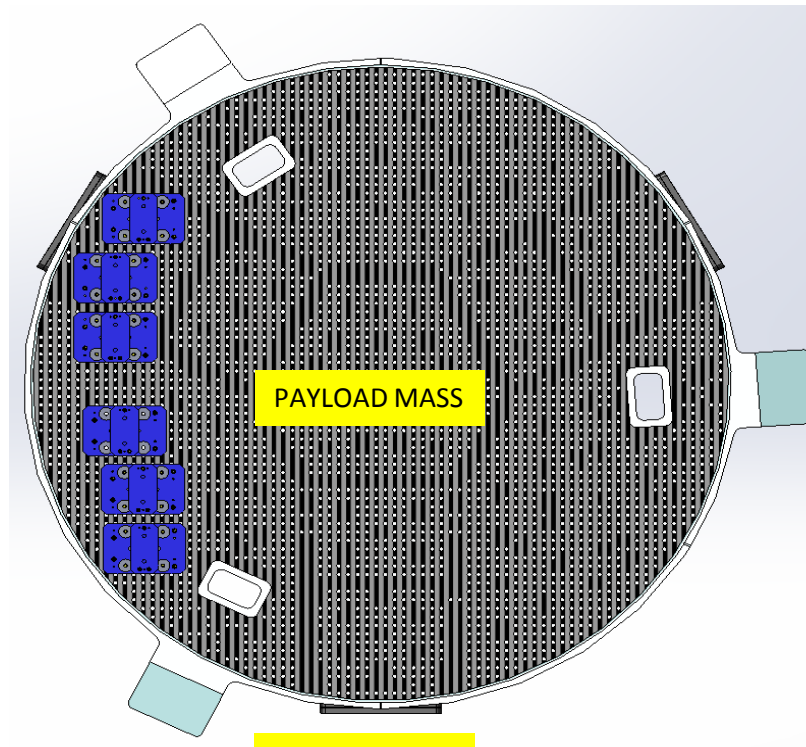
CONFIGURATIONS	COUNTERBALANCE MASS			CENTER OF GRAVITY				TOTAL COUNTERBALANCE MASS
	PAYLOAD MASS	OUTER WALL MASS	KEEL MASS	X = 0.0	Y = 0.0	Z = 180.34	"Z" TARGET 7.10 in	
	(Kg)	(Kg)	(Kg)	± 10 mm	± 10 mm	± 100 mm	3.10 ≤ Z ≤ 11.10	
CG XY-Calculation (SUSPENDED Mass)	129.35	95.50	273.86	-2.88	1.68	73.76		498.71
CG Z-Calculation (Non-SUSPENDED Mass)	129.35	95.50	273.86	-26.87	-27.09	218.68	8.61	498.71
CG XYZ-Calculation (Cartridge Configuration)	129.35	95.50	0.00	5.29	10.90	85.16	3.35	224.85



SUSPENDED MASS



NON-SUSPENDED MASS



D0901150 - AdvLIGO Systems, BSC9-H1 Top Level Chamber Assembly - Mass Properties BOM				SUSPENDED MASS		NON-SUSPENDED MASS	
ITEM NO.	P/N	DESCRIPTION	QTY	SUB-TOTAL	TOTAL	SUB-TOTAL	TOTAL
1	D0901152	AdvLIGO SEI BSC9-H1, XYZ Local CS for ISI Table	1		1618.25		1618.25
1.1	D0901182	AdvLIGO SEI BSC ISI Table Assembly	1	1618.25		1618.25	
1.2	D1003140	Lifting Bar, 3-Point, BSC Cartridge, AdvLIGO	1	0.00		0.00	
2	D0901153	AdvLIGO SUS BSC9-H1, XYZ Local CS for ETMX	1	363.27	363.27	130.02	130.02
2.1	D0901346-04	AdvLIGO QUAD SUS Assembly Top Level TD-1084-090_ASM	1	339.78		106.53	
2.2	D1002424	aLIGO, SUS, Viobration Absorber, 5LB Vertical with O-Rings	4	12.01		12.01	
2.3		Dog Clamps Set	1	11.00		11.00	
2.4		Hardware Set	1	0.48		0.48	
3	D0902163	AdvLIGO SUS BSC9-H1, XYZ Local ETM Tel Assy	1	206.10	206.10	81.52	81.52
3.1	D0901880	AOS ETM TELESCOPE UPPER SUSPENSION & STRUTURE ENV. ASSY	1	189.44		64.88	
3.2	D1002424	aLIGO, SUS, Viobration Absorber, 5LB Vertical with O-Rings	2	6.14		6.14	
3.3		Dog Clamps Set	1	9.62		10.00	
3.4		Hardware Set	1	0.90		0.50	
4	D1002191	AdvLIGO BSC9-H1 ISI Table, Payload & Suspended Mass Assembly	1		495.28		495.28
5	D1300007	AdvLIGO, Cable Harness Routing BSC4_BSC9	1		4.58		4.58

CARTRIDGE CONFIGURATION	
SUB-TOTAL	TOTAL
	3475.99
3279.00	
196.99	
363.27	363.27
339.78	
12.01	
11.00	
0.48	
81.52	81.52
64.88	
6.14	
10.00	
0.50	
224.85	224.85
4.58	1.25

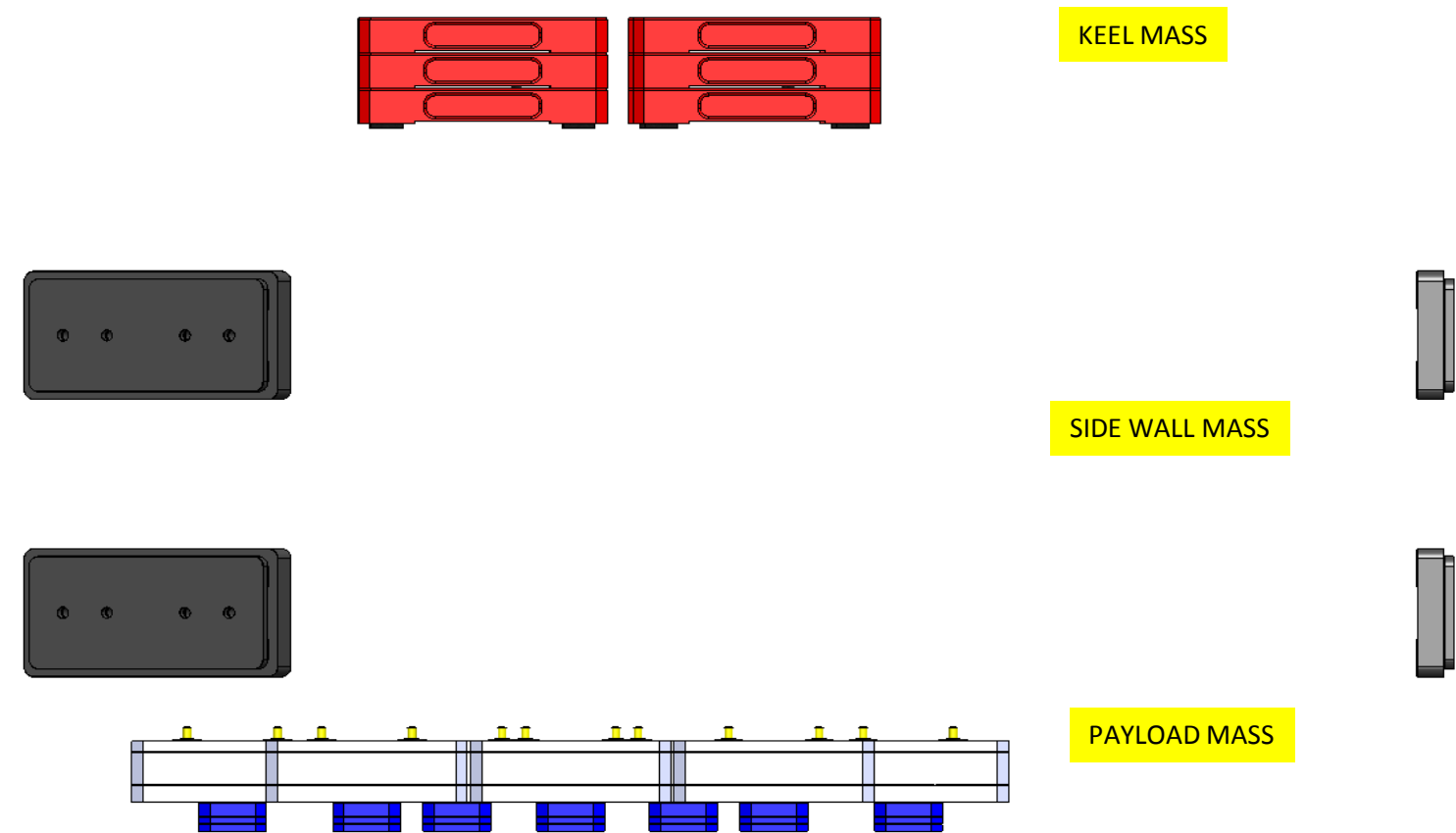
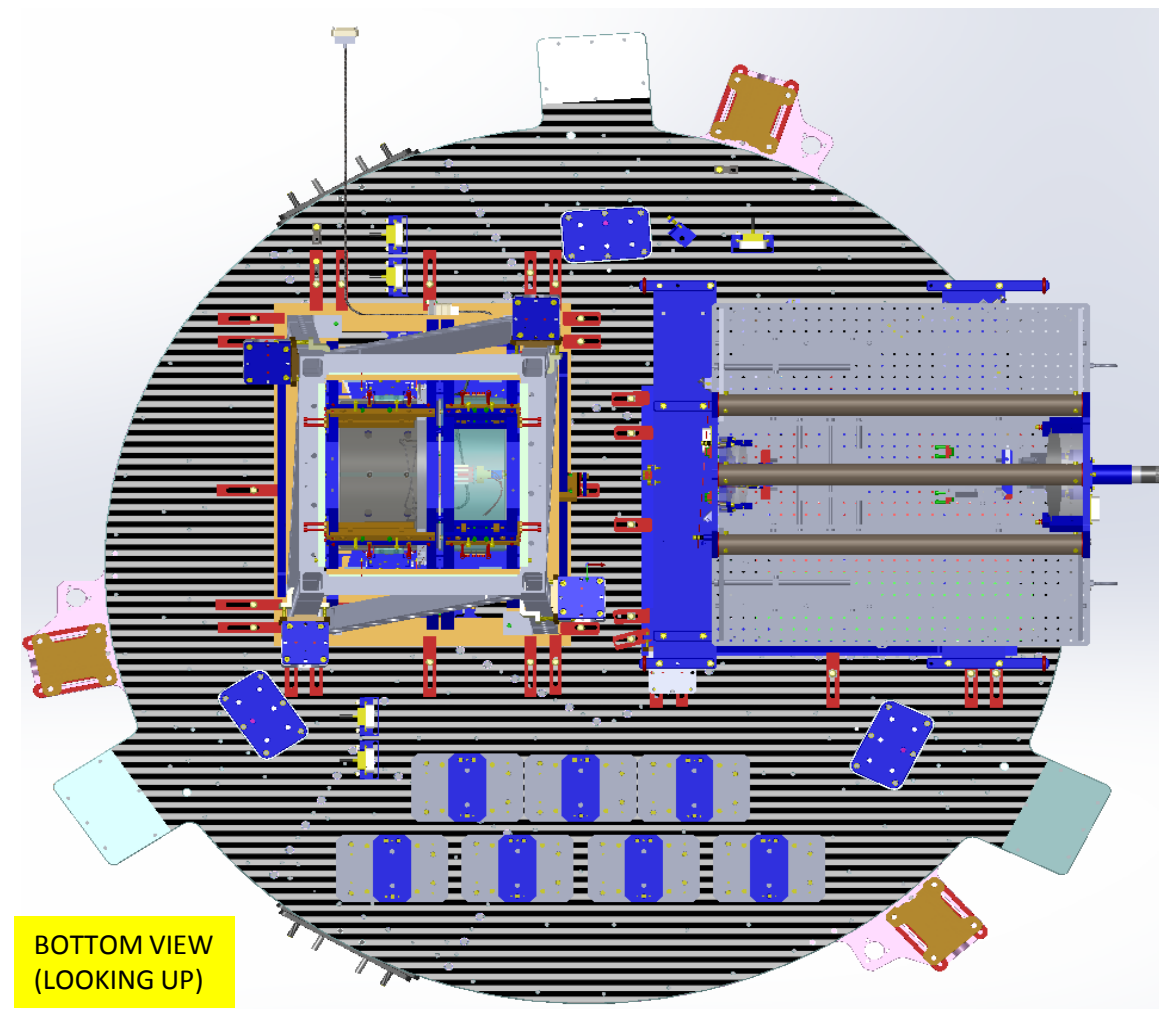
As per DCC # E1100006 (Pg 2) this is **TOTAL MASS ON STAGE 1-2 SPRINGS = 2690 Kg**
 As per DCC # E1100006 (Pg 2) this is **STAGE 2 BSC-ISI SUSPENDEd MASS = 1618 Kg**
 As per DCC # E1100006 (Pg 2) this is **LEFT FOR "OPTICS + TABLE MASSES" = 1070 Kg**

TOTAL [Σ(J3:J19)]	2687.48
ISO TABLE [J4]	1618.25
TOTAL PAYLOAD (J21-J22)	1069.23

2329.65

4146.88
TARGET
10000 LBS
4536 Kg

CONFIGURATIONS	COUNTERBALANCE MASS			CENTER OF GRAVITY				TOTAL COUNTERBALANCE MASS
	PAYLOAD MASS (Kg)	OUTER WALL MASS (Kg)	KEEL MASS (Kg)	X = 0.0 ± 10 mm	Y = 0.0 ± 10 mm	Z = 180.34 ± 100 mm	"Z" TARGET 7.10 in 3.10 ≤ Z ≤ 11.10	
CG XY-Calculation (SUSPENDED Mass)	129.35	95.50	270.43	0.55	1.53	81.11		495.28
CG Z-Calculation (Non-SUSPENDED Mass)	129.35	95.50	270.43	5.38	26.30	268.21	10.56	495.28
CG XYZ-Calculation (Cartridge Configuration)	129.35	95.50	0.00	-4.26	-5.92	90.37	3.56	224.85



D0901154 - AdvLIGO Systems, BSC10-H1 Top Level Chamber Assembly - Mass Properties BOM				SUSPENDED MASS		NON-SUSPENDED MASS	
ITEM NO.	P/N	DESCRIPTION	QTY	SUB-TOTAL	TOTAL	SUB-TOTAL	TOTAL
1	D0901156	AdvLIGO SEI BSC10-H1, XYZ Local CS for ISI Table	1		1618.26		1618.26
1.1	D0901182	AdvLIGO SEI BSC ISI Table Assembly	1	1618.26		1618.26	
1.2	D1003140	Lifting Bar, 3-Point, BSC Cartridge, AdvLIGO	1	0.00		0.00	
2	D0901157	AdvLIGO SUS BSC10-H1, XYZ Local CS for ETMY	1	363.35	363.35	130.17	130.17
2.1	D0901346-04	AdvLIGO QUAD SUS Assembly Top Level TD-1084-090_ASM	1	339.86		106.53	
2.2	D1002424	aLIGO, SUS, Vibration Absorber, 5LB Vertical with O-Rings	4	12.01		12.01	
2.3		Dog Clamps Set	1	10.85		11.00	
2.4		Hardware Set	1	0.63		0.63	
3	D0902168	AdvLIGO SUS BSC10-H1, XYZ Local ETM Tel Assy	1	206.10	206.10	79.62	79.62
3.1	D0901880	AOS ETM TELESCOPE UPPER SUSPENSION & STRUTURE ENV. ASSY	1	189.44		61.58	
3.2	D1002424	aLIGO, SUS, Vibration Absorber, 5LB Vertical with O-Rings	2	6.14		6.14	
3.3		Dog Clamps Set	1	9.62		11.00	
3.4		Hardware Set	1	0.90		0.90	
4	D1002266	AdvLIGO BSC10-H1 ISI Table, Payload & Suspended Mass Assembly	1		495.28		495.28
5	D1200111	AdvLIGO, Cable Harness Routing BSC5_BSC10	1		4.51		4.51

CARTRIDGE CONFIGURATION	
SUB-TOTAL	TOTAL
	3475.99
3279.00	
196.99	
363.35	363.35
339.86	
12.01	
10.85	
0.63	
79.62	79.62
61.58	
6.14	
11.00	
0.90	
224.85	224.85
4.51	4.51

As per DCC # E1100006 (Pg 2) this is **TOTAL MASS ON STAGE 1-2 SPRINGS = 2690 Kg**
 As per DCC # E1100006 (Pg 2) this is **STAGE 2 BSC-ISI SUSPENDED MASS = 1618 Kg**
 As per DCC # E1100006 (Pg 2) this is **LEFT FOR "OPTICS + TABLE MASSES" = 1070 Kg**

TOTAL [Σ(J3-J19)]	2687.50
ISO TABLE [J4]	1618.26
TOTAL PAYLOAD (J21-J22)	1069.24

2327.84

4148.32
TARGET
10000 LBS
4536 Kg

CONFIGURATIONS	COUNTERBALANCE MASS			CENTER OF GRAVITY				TOTAL COUNTERBALANCE MASS
	PAYLOAD MASS (Kg)	OUTER WALL MASS (Kg)	KEEL MASS (Kg)	X = 0.0 ± 10 mm	Y = 0.0 ± 10 mm	Z = 180.34 ± 100 mm	"Z" TARGET 7.10 in 3.10 ≤ Z ≤ 11.10	
	CG XY-Calculation (SUSPENDED Mass)	129.35	95.50	270.43	-0.02	-0.65	80.34	
CG Z-Calculation (Non-SUSPENDED Mass)	129.35	95.50	270.43	30.81	6.39	267.47	495.28	
CG XYZ-Calculation (Cartridge Configuration)	129.35	95.50	0.00	-2.74	-24.48	125.25	4.93	224.85

