IceCube Upgrade
Schedule and Cost Database

Marek Rogal
Project Office WBS 1.1

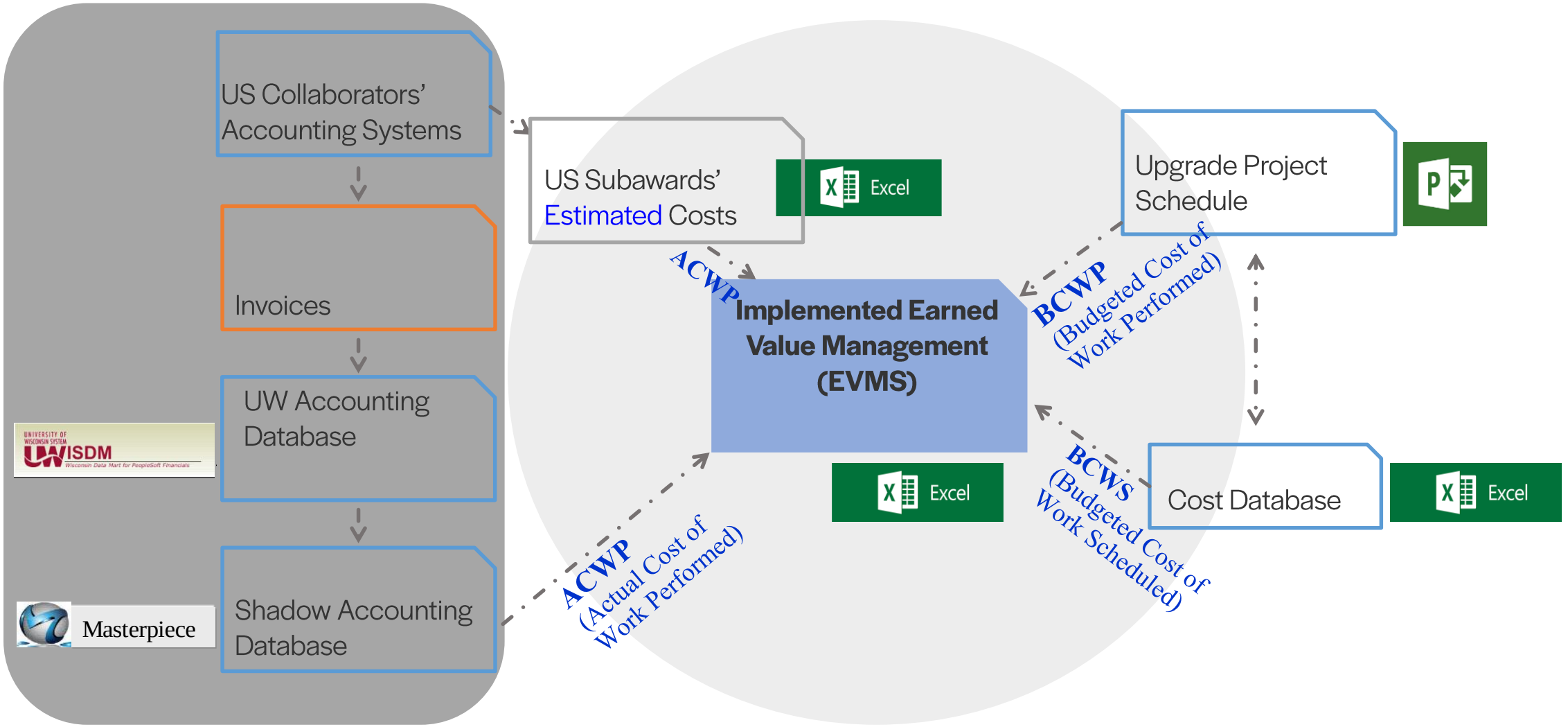
ICNO/Upgrade Project - NSF Site Visit Review
March 17, 2020

IceCube Upgrade

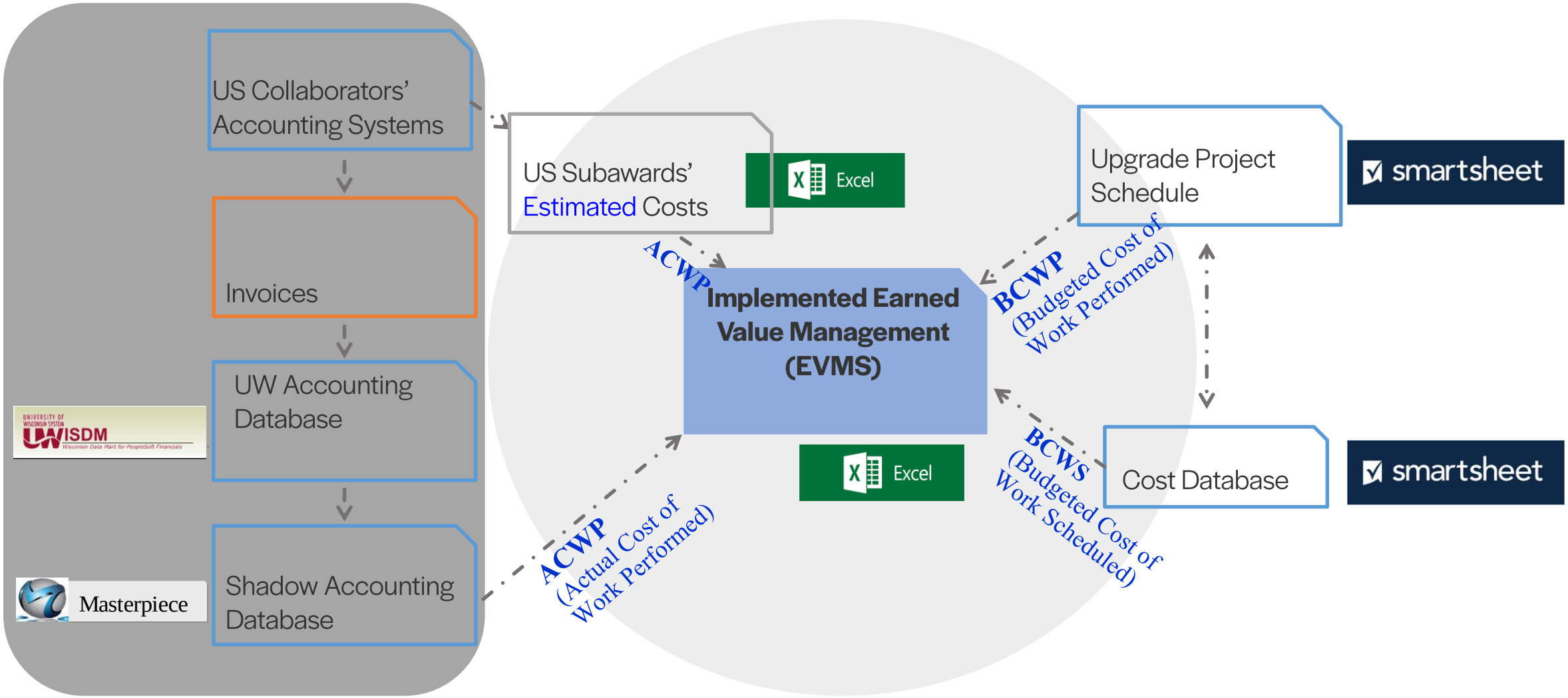
IceCube Upgrade Schedule and Cost Management System (Schedule and Cost Database)

1. Planning Stages Schedule and Cost Management System – How did we get here?
2. Current Iteration – Smartsheet^{tm} Cloud-based Schedule and Cost Management System
3. Management of Risks associated with Cost Uncertainty

1. Planning Stages Schedule and Cost Management System How did we get here?



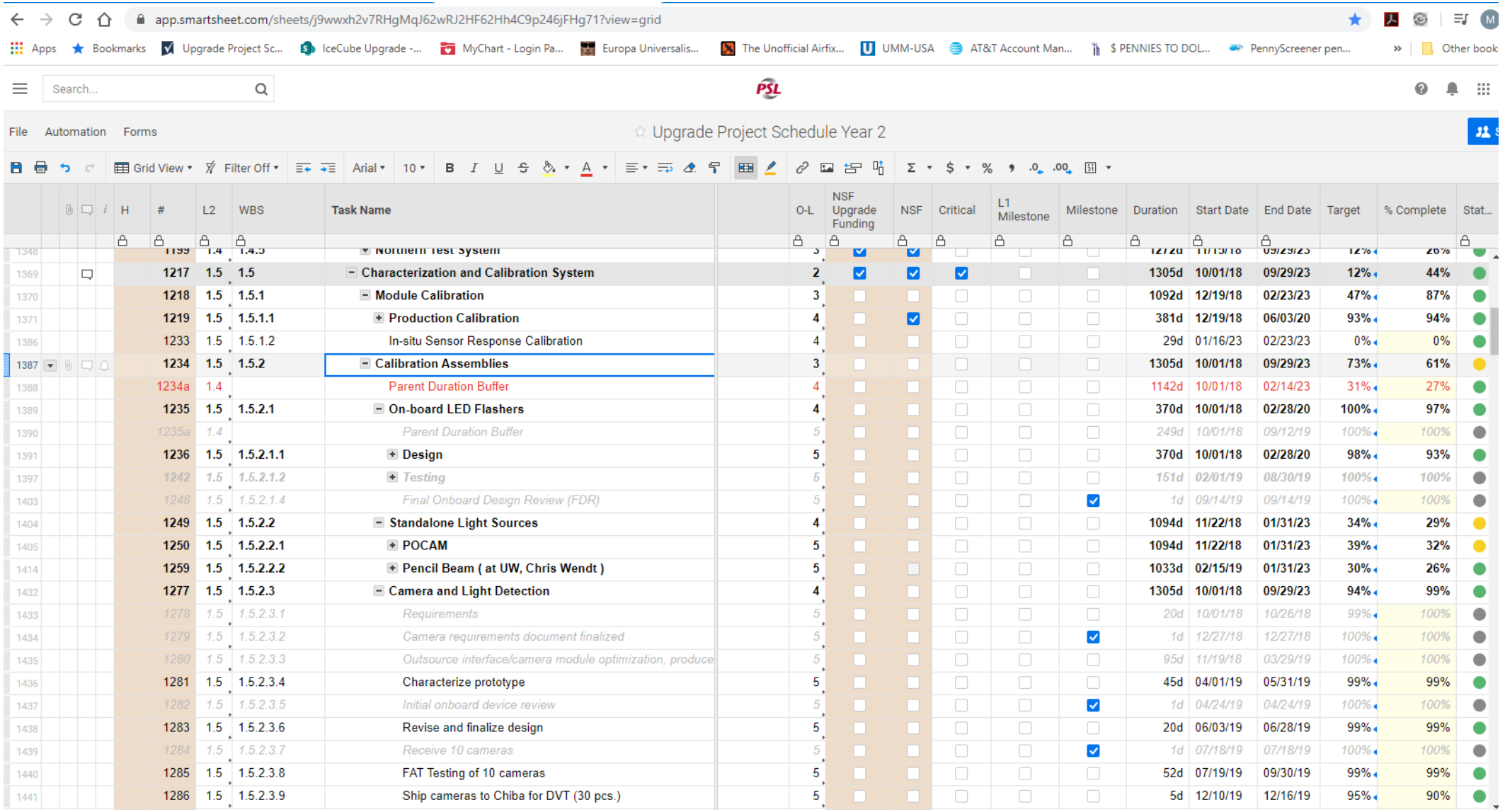
2. Current Iteration – Smartsheet[tm] Cloud-based Schedule and Cost Management System



2. Current Iteration – Smartsheet^{tm} Cloud-based Schedule and Cost Management System

- Collaborative approach – allows all managers to be actively involved.
- Both Schedule and Cost Management are possible via interacting cost workbook and schedule.
- Allows for ease of use in conjunction with EVMS system

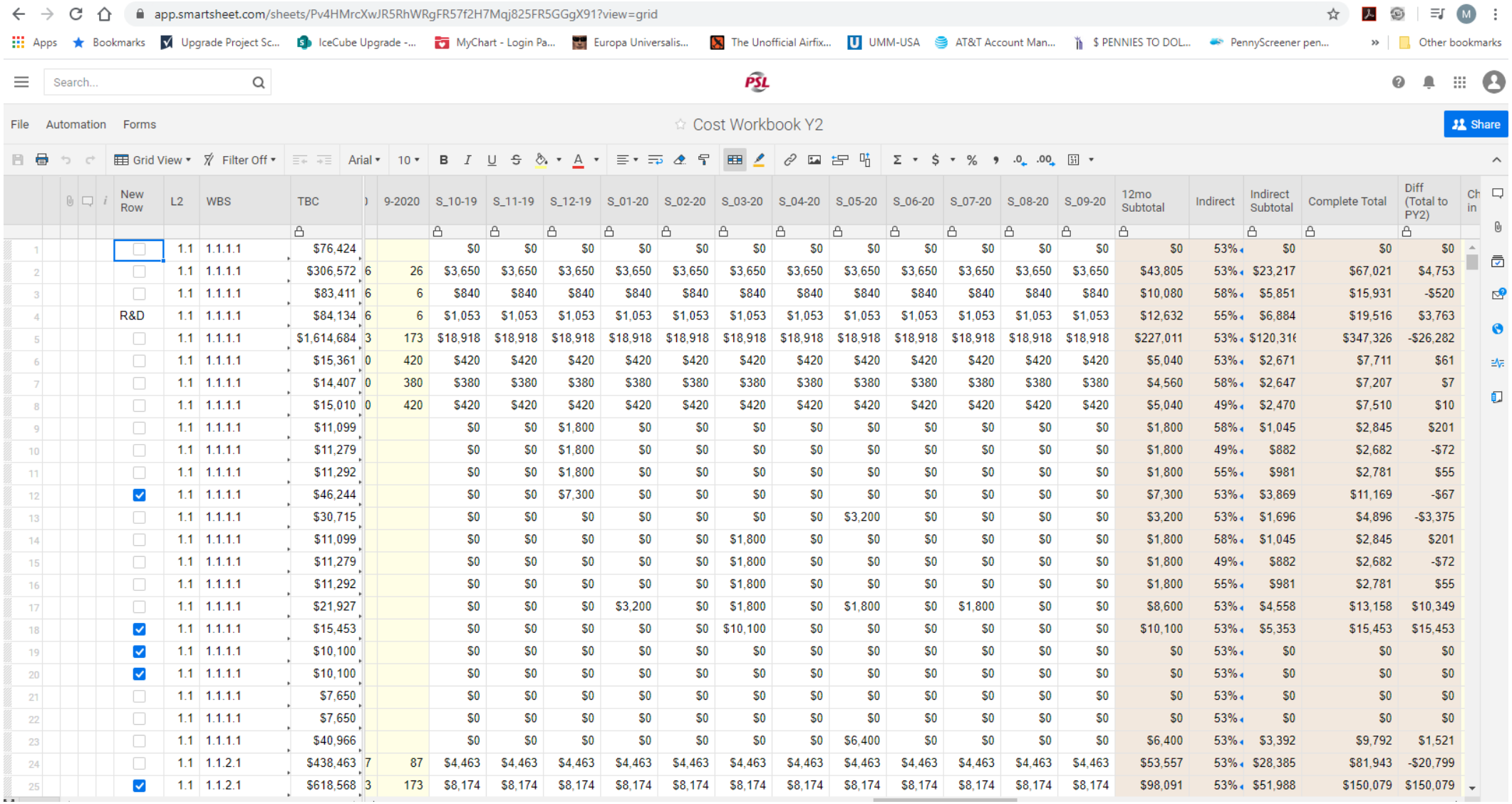
2. Current Iteration – Smartsheet™ Cloud-based Schedule and Cost Management System



	H	#	L2	WBS	Task Name	O-L	NSF Upgrade Funding	NSF	Critical	L1 Milestone	Milestone	Duration	Start Date	End Date	Target	% Complete	Stat...
1369		1217	1.5	1.5	Characterization and Calibration System	2	☑	☑	☑	☐	☐	1305d	10/01/18	09/29/23	12%	44%	
1370		1218	1.5	1.5.1	Module Calibration	3	☐	☐	☐	☐	☐	1092d	12/19/18	02/23/23	47%	87%	
1371		1219	1.5	1.5.1.1	Production Calibration	4	☐	☑	☐	☐	☐	381d	12/19/18	06/03/20	93%	94%	
1386		1233	1.5	1.5.1.2	In-situ Sensor Response Calibration	4	☐	☐	☐	☐	☐	29d	01/16/23	02/23/23	0%	0%	
1387		1234	1.5	1.5.2	Calibration Assemblies	3	☐	☐	☐	☐	☐	1305d	10/01/18	09/29/23	73%	61%	
1388		1234a	1.4		Parent Duration Buffer	4	☐	☐	☐	☐	☐	1142d	10/01/18	02/14/23	31%	27%	
1389		1235	1.5	1.5.2.1	On-board LED Flashers	4	☐	☐	☐	☐	☐	370d	10/01/18	02/28/20	100%	97%	
1390		*1235a*	*1.4*		*Parent Duration Buffer*	*5*	☐	☐	☐	☐	☐	*249d*	*10/01/18*	*09/12/19*	*100%*	*100%*	
1391		1236	1.5	1.5.2.1.1	Design	5	☐	☐	☐	☐	☐	370d	10/01/18	02/28/20	98%	93%	
1397		*1242*	*1.5*	*1.5.2.1.2*	*Testing*	*5*	☐	☐	☐	☐	☐	*151d*	*02/01/19*	*08/30/19*	*100%*	*100%*	
1403		*1248*	*1.5*	*1.5.2.1.4*	*Final Onboard Design Review (FDR)*	*5*	☐	☐	☐	☐	☑	*1d*	*09/14/19*	*09/14/19*	*100%*	*100%*	
1404		1249	1.5	1.5.2.2	Standalone Light Sources	4	☐	☐	☐	☐	☐	1094d	11/22/18	01/31/23	34%	29%	
1405		1250	1.5	1.5.2.2.1	POCAM	5	☐	☐	☐	☐	☐	1094d	11/22/18	01/31/23	39%	32%	
1414		1259	1.5	1.5.2.2.2	Pencil Beam (at UW, Chris Wendt)	5	☐	☐	☐	☐	☐	1033d	02/15/19	01/31/23	30%	26%	
1432		1277	1.5	1.5.2.3	Camera and Light Detection	4	☐	☐	☐	☐	☐	1305d	10/01/18	09/29/23	94%	99%	
1433		*1278*	*1.5*	*1.5.2.3.1*	*Requirements*	*5*	☐	☐	☐	☐	☐	*20d*	*10/01/18*	*10/26/18*	*99%*	*100%*	
1434		*1279*	*1.5*	*1.5.2.3.2*	*Camera requirements document finalized*	*5*	☐	☐	☐	☐	☑	*1d*	*12/27/18*	*12/27/18*	*100%*	*100%*	
1435		*1280*	*1.5*	*1.5.2.3.3*	*Outsource interface/camera module optimization, produce*	*5*	☐	☐	☐	☐	☐	*95d*	*11/19/18*	*03/29/19*	*100%*	*100%*	
1436		1281	1.5	1.5.2.3.4	Characterize prototype	5	☐	☐	☐	☐	☐	45d	04/01/19	05/31/19	99%	99%	
1437		*1282*	*1.5*	*1.5.2.3.5*	*Initial onboard device review*	*5*	☐	☐	☐	☐	☑	*1d*	*04/24/19*	*04/24/19*	*100%*	*100%*	
1438		1283	1.5	1.5.2.3.6	Revise and finalize design	5	☐	☐	☐	☐	☐	20d	06/03/19	06/28/19	99%	99%	
1439		*1284*	*1.5*	*1.5.2.3.7*	*Receive 10 cameras*	*5*	☐	☐	☐	☐	☑	*1d*	*07/18/19*	*07/18/19*	*100%*	*100%*	
1440		1285	1.5	1.5.2.3.8	FAT Testing of 10 cameras	5	☐	☐	☐	☐	☐	52d	07/19/19	09/30/19	99%	99%	
1441		1286	1.5	1.5.2.3.9	Ship cameras to Chiba for DVT (30 pcs.)	5	☐	☐	☐	☐	☐	5d	12/10/19	12/16/19	95%	90%	

Schedule

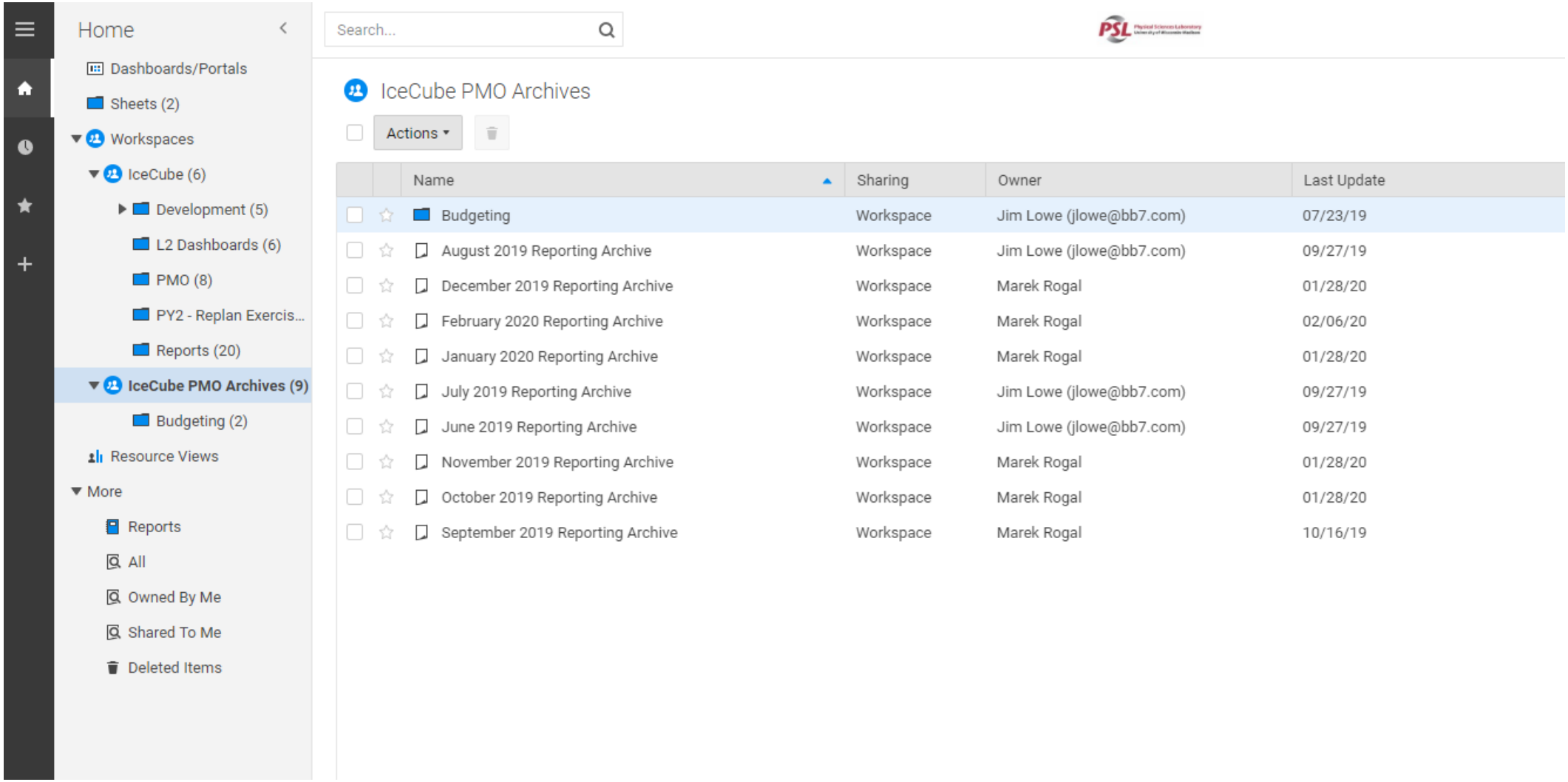
2. Current Iteration – Smartsheet™ Cloud-based Schedule and Cost Management System



	New Row	L2	WBS	TBC		9-2020	S_10-19	S_11-19	S_12-19	S_01-20	S_02-20	S_03-20	S_04-20	S_05-20	S_06-20	S_07-20	S_08-20	S_09-20	12mo Subtotal	Indirect	Indirect Subtotal	Complete Total	Diff (Total to PY2)	Ch in
1		1.1	1.1.1.1	$76,424			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	53%	$0	$0	$0	
2		1.1	1.1.1.1	$306,572	6	26	$3,650	$3,650	$3,650	$3,650	$3,650	$3,650	$3,650	$3,650	$3,650	$3,650	$3,650	$3,650	$43,805	53%	$23,217	$67,021	$4,753	
3		1.1	1.1.1.1	$83,411	6	6	$840	$840	$840	$840	$840	$840	$840	$840	$840	$840	$840	$840	$10,080	58%	$5,851	$15,931	-$520	
4	R&D	1.1	1.1.1.1	$84,134	6	6	$1,053	$1,053	$1,053	$1,053	$1,053	$1,053	$1,053	$1,053	$1,053	$1,053	$1,053	$1,053	$12,632	55%	$6,884	$19,516	$3,763	
5		1.1	1.1.1.1	$1,614,684	3	173	$18,918	$18,918	$18,918	$18,918	$18,918	$18,918	$18,918	$18,918	$18,918	$18,918	$18,918	$18,918	$227,011	53%	$120,316	$347,326	-$26,282	
6		1.1	1.1.1.1	$15,361	0	420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$5,040	53%	$2,671	$7,711	$61	
7		1.1	1.1.1.1	$14,407	0	380	$380	$380	$380	$380	$380	$380	$380	$380	$380	$380	$380	$380	$4,560	58%	$2,647	$7,207	$7	
8		1.1	1.1.1.1	$15,010	0	420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$5,040	49%	$2,470	$7,510	$10	
9		1.1	1.1.1.1	$11,099			$0	$0	$1,800	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,800	58%	$1,045	$2,845	$201	
10		1.1	1.1.1.1	$11,279			$0	$0	$1,800	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,800	49%	$882	$2,682	-$72	
11		1.1	1.1.1.1	$11,292			$0	$0	$1,800	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,800	55%	$981	$2,781	$55	
12	☑	1.1	1.1.1.1	$46,244			$0	$0	$7,300	$0	$0	$0	$0	$0	$0	$0	$0	$0	$7,300	53%	$3,869	$11,169	-$67	
13		1.1	1.1.1.1	$30,715			$0	$0	$0	$0	$0	$0	$0	$3,200	$0	$0	$0	$0	$3,200	53%	$1,696	$4,896	-$3,375	
14		1.1	1.1.1.1	$11,099			$0	$0	$0	$0	$0	$1,800	$0	$0	$0	$0	$0	$0	$1,800	58%	$1,045	$2,845	$201	
15		1.1	1.1.1.1	$11,279			$0	$0	$0	$0	$0	$1,800	$0	$0	$0	$0	$0	$0	$1,800	49%	$882	$2,682	-$72	
16		1.1	1.1.1.1	$11,292			$0	$0	$0	$0	$0	$1,800	$0	$0	$0	$0	$0	$0	$1,800	55%	$981	$2,781	$55	
17		1.1	1.1.1.1	$21,927			$0	$0	$0	$3,200	$0	$1,800	$0	$1,800	$0	$1,800	$0	$0	$8,600	53%	$4,558	$13,158	$10,349	
18	☑	1.1	1.1.1.1	$15,453			$0	$0	$0	$0	$0	$10,100	$0	$0	$0	$0	$0	$0	$10,100	53%	$5,353	$15,453	$15,453	
19	☑	1.1	1.1.1.1	$10,100			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	53%	$0	$0	$0	
20	☑	1.1	1.1.1.1	$10,100			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	53%	$0	$0	$0	
21		1.1	1.1.1.1	$7,650			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	53%	$0	$0	$0	
22		1.1	1.1.1.1	$7,650			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	53%	$0	$0	$0	
23		1.1	1.1.1.1	$40,966			$0	$0	$0	$0	$0	$0	$0	$6,400	$0	$0	$0	$0	$6,400	53%	$3,392	$9,792	$1,521	
24		1.1	1.1.2.1	$438,463	7	87	$4,463	$4,463	$4,463	$4,463	$4,463	$4,463	$4,463	$4,463	$4,463	$4,463	$4,463	$4,463	$53,557	53%	$28,385	$81,943	-$20,799	
25	☑	1.1	1.1.2.1	$618,568	3	173	$8,174	$8,174	$8,174	$8,174	$8,174	$8,174	$8,174	$8,174	$8,174	$8,174	$8,174	$8,174	$98,091	53%	$51,988	$150,079	$150,079	

Cost Workbook

2. Current Iteration – Smartsheet[tm] Cloud-based Schedule and Cost Management System



Schedule Archives

2. Current Iteration – Smartsheet[tm] Cloud-based Schedule and Cost Management System

Main Dashboard:

a) Snapshot of Project's Health

b) Shows major indicators (ex. Percentages complete etc.)

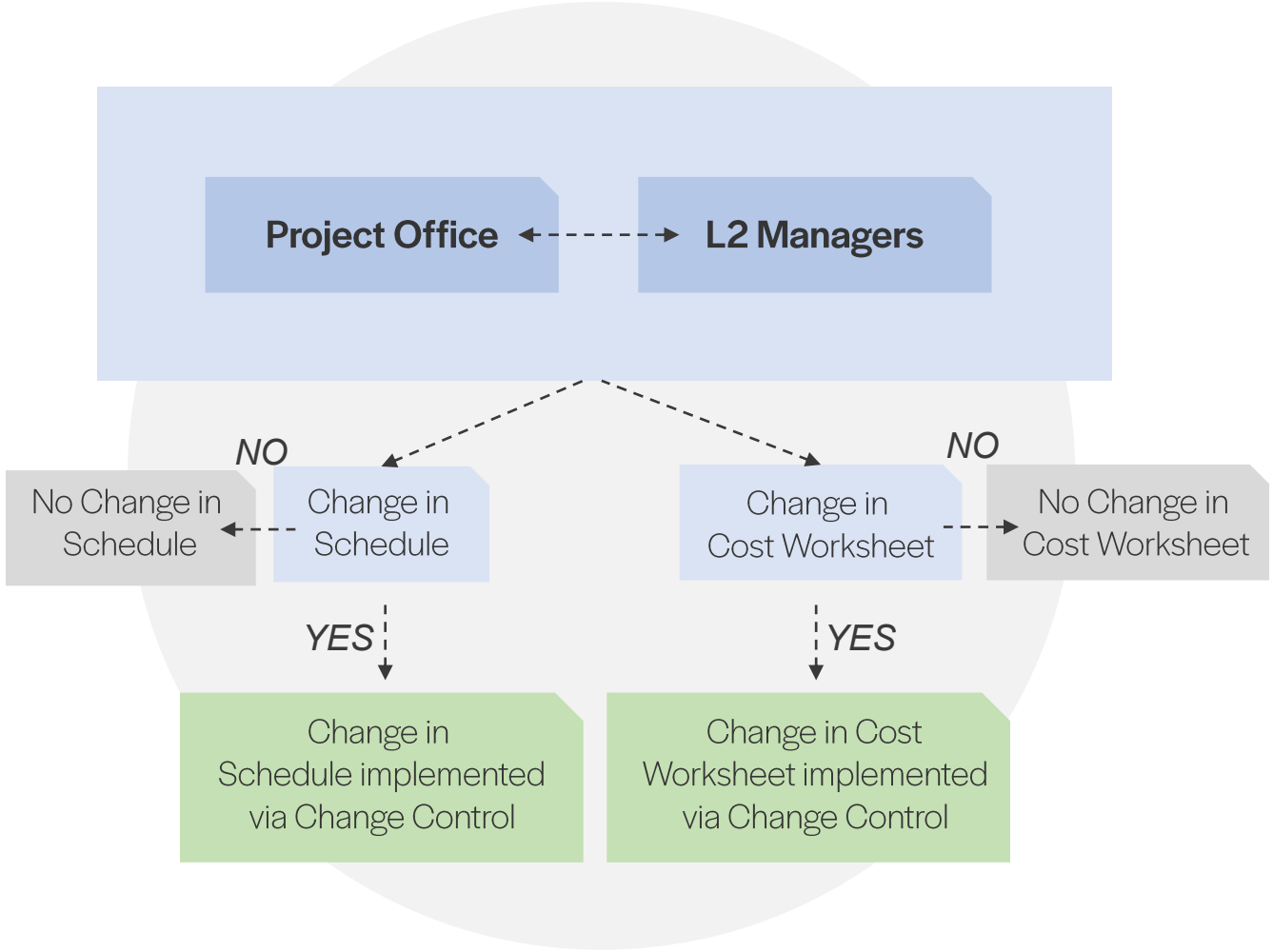
c) Intuitive

Main Dashboard

2. Current Iteration – Smartsheet^{tm} Cloud-based Schedule and Cost Management System

- Completion-to-date of every WBS task is updated by L2 Managers on Monthly basis.
- These completion percentages factor into EVMS calculation.
- In turn, EVMS metrics are then published in monthly report.

2. Current Iteration—SmartSheet™ Cloud-based Schedule and Cost Management System



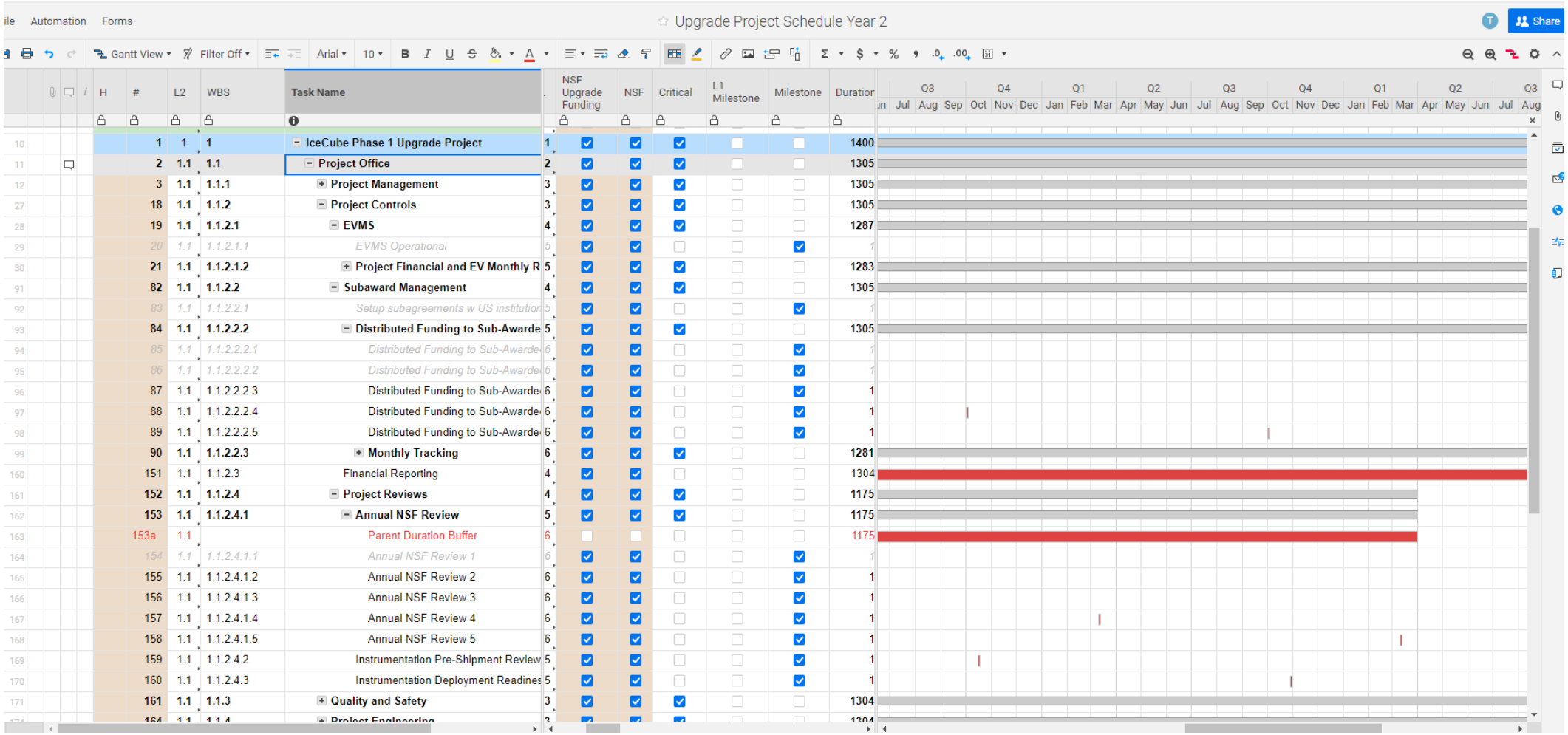
- Schedule and Cost Workbook are updated annually around September by L2s and Project Office as a part of detail plan.
- Planned Values for next Project Year are calculated using data from updated Cost Workbook.

2. Current Iteration – Smartsheet^{tm} Cloud-based Schedule and Cost Management System

1.3 Deep Ice Sensors	Project Year					
WBS L3	**Year 1* Actuals**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**WBS Total**
1.3.1 mDOM	**$37,359**	**$118,959**	**$3,222**	**$0**	**$0**	**$122,181**
Labor		$81,354	$0	$0	$0	$81,354
M & S		$4,768	$0	$0	$0	$4,768
Travel		$32,837	$3,222	$0	$0	$36,059
1.3.2 D-Egg	**$19,378**	**$77,851**	**$0**	**$0**	**$0**	**$77,851**
Labor		$66,965	$0	$0	$0	$66,965
Travel		$10,887	$0	$0	$0	$10,887
1.3.3 PDOM	**$24,177**	**$160,077**	**$102,100**	**$0**	**$0**	**$262,177**
CapEx		$36,500	$39,828	$0	$0	$76,328
Labor		$64,560	$39,755	$0	$0	$104,315
M & S		$53,509	$12,461	$0	$0	$65,971
Travel		$5,508	$10,056	$0	$0	$15,564
1.3.5 Special Devices	**$12,205**	**$88,130**	**$37,709**	**$40,829**	**$0**	**$166,668**
Labor		$72,830	$22,566	$24,432	$0	$119,828
M & S		$15,300	$0	$0	$0	$15,300
Travel		$0	$15,143	$16,397	$0	$31,540
Annual Total	**$93,119**	**$445,018**	**$143,031**	**$40,829**	**$0**	**$628,878**

* - Year 1 is not included in totals

2. Current Iteration – Smartsheet[tm] Cloud-based Schedule and Cost Management System

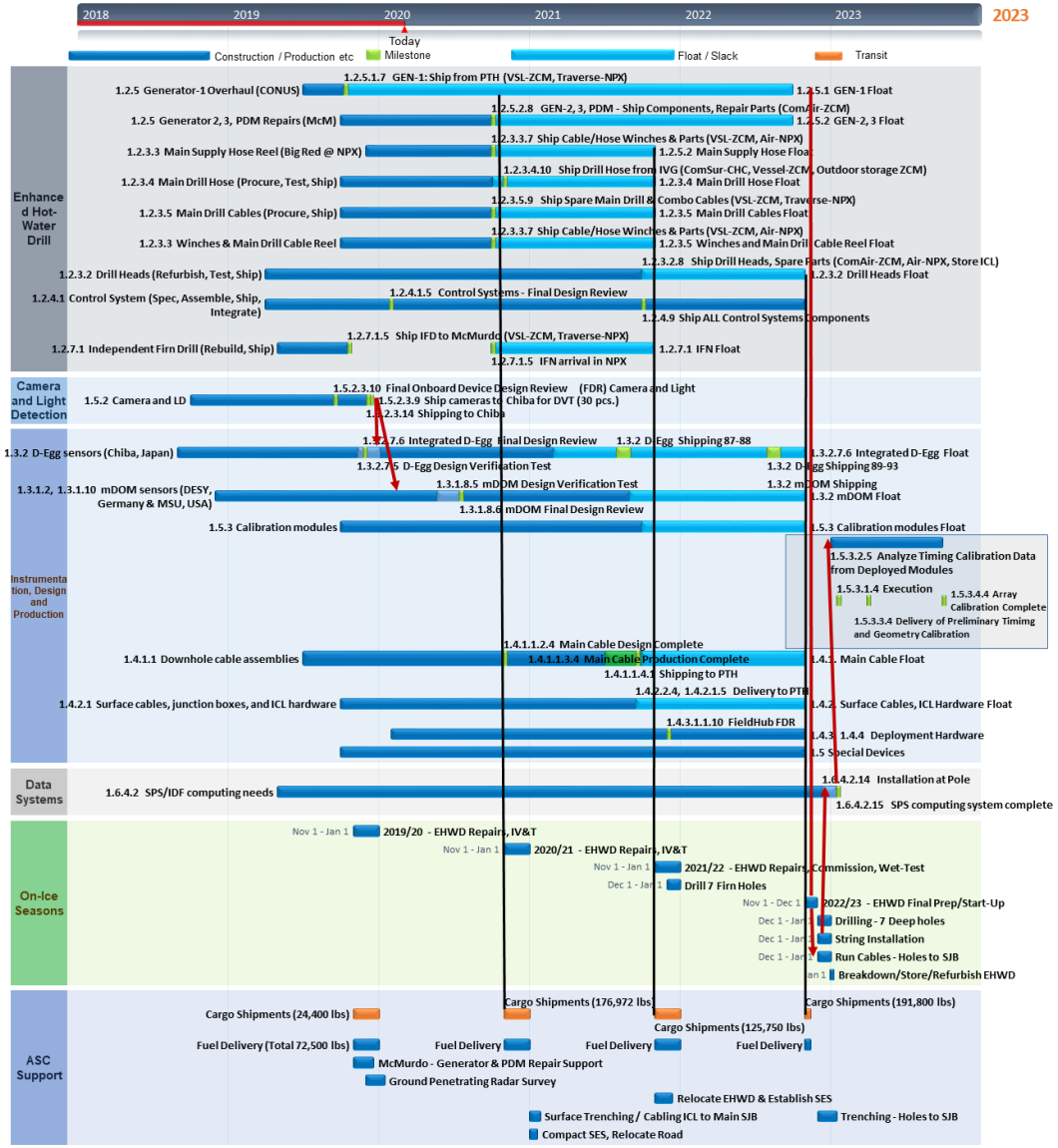


There is a need for constant evolution in toolbox to provide a better diagnostics.

2. Current Iteration – Smartsheet^{tm} Cloud-based Schedule and Cost Management System

Lack of user-friendliness of basic PM tools lead to adoption of third-party tool – Office Timeline. An add-on to Microsoft Office.

2. Current Iteration – Smartsheet™ Cloud-based Schedule and Cost Management System



3. Management of Risks associated with Cost Uncertainty

1. Cost Uncertainties were initially calculated during project planning phase and are integral part of Cost Model Workbooks.
2. The Risks based on Cost Uncertainties are tabulated and maintained throughout the whole WBS structure down to L4.
3. They are recalculated during each re-plan period to reflect cost uncertainties to project completions.
4. Many risks are retired because of
   - Task completed
   - change in risk factor due to better planning or cost approximation

IceCube Upgrade Cost Uncertainty calculated values, based on Replan Y2

	Planned					Cost Uncertainty				
WBS	Y2	Y3	Y4	Y5		Y2	Y3	Y4	Y5	Total
1.1.1.1	$625,249	$592,089	$633,728	$605,499	0.05	$1,121	$29,604	$31,686	$30,275	$92,687
1.1.2.1	$154,975	$161,517	$164,748	$168,042	0.06	$0	$9,691	$9,885	$10,083	$29,658
1.1.3.1	$166,005	$175,633	$182,637	$186,289	0.05	$0	$8,782	$9,132	$9,314	$27,228
1.1.4.1	$92,698	$98,573	$100,528	$102,523	0.10	$18	$9,857	$10,053	$10,252	$30,181
1.1.5.1	$278,961	$228,056	$239,197	$243,965	0.10	$18	$22,806	$23,920	$24,397	$71,140
1.2.1.1	$222,653	$226,405	$230,842	$133,453	0.07	$321	$15,848	$16,159	$9,342	$41,670
1.2.1.2	$144,900	$144,900	$172,500	$178,250	0.07	$0	$10,143	$12,075	$12,478	$34,696
1.2.1.3	$13,770	$10,710	$13,770	$4,590	0.07	$964	$750	$964	$321	$2,999
1.2.1.4	$35,496	$16,200	$19,700	$0	0.07	$0	$1,134	$1,379	$0	$2,513
1.2.2.1	$57,814	$0	$0	$0	0.08	$3,589	$0	$0	$0	$3,589
1.2.2.2	$28,426	$0	$0	$0	0.08	$884	$0	$0	$0	$884
1.2.2.3	$78,181	$0	$0	$0	0.12	$2,236	$0	$0	$0	$2,236
1.2.3.1	$142,596	$11,302	$0	$0	0.20	$16,128	$2,260	$0	$0	$18,388
1.2.3.2	$90,191	$26,761	$0	$0	0.20	$5,708	$5,351	$0	$0	$11,060
1.2.3.3	$274,588	$21,758	$0	$0	0.18	$25,654	$3,916	$0	$0	$29,571
1.2.3.4	$0	$0	$0	$0	0.20	$0	$0	$0	$0	$0
1.2.3.5	$237,729	$0	$0	$0	0.14	$27,152	$0	$0	$0	$27,152
1.2.4.1	$37,616	$0	$0	$0	0.20	$0	$0	$0	$0	$0
1.2.4.2	$323,333	$121,412	$108,500	$38,525	0.12	$19,009	$14,569	$12,420	$4,623	$50,621
1.2.4.3	$0	$370,562	$108,500	$38,525	0.12	$0	$44,467	$12,420	$4,623	$61,510
1.2.4.4	$64,372	$288,961	$0	$0	0.14	$0	$40,455	$0	$0	$40,455
1.2.4.5	$61,785	$0	$0	$0	0.14	$767	$0	$0	$0	$767
1.2.4.6	$83,039	$46,708	$0	$0	0.14	$1,120	$6,539	$0	$0	$7,659
1.2.4.7	$79,917	$25,601	$0	$0	0.14	$3,803	$3,584	$0	$0	$7,387
1.2.4.8	$0	$15,120	$0	$0	0.14	$0	$2,117	$0	$0	$2,117
1.2.4.9	$0	$0	$0	$0	0.14	$0	$0	$0	$0	$0
1.2.5.1	$1,702	$0	$0	$0	0.14	$236	$0	$0	$0	$236
1.2.5.2	$161	$5,049	$0	$0	0.16	$0	$808	$0	$0	$808
1.2.5.4	$93,336	$0	$0	$0	0.18	$11,422	$0	$0	$0	$11,422
1.2.6.1	$16,558	$0	$0	$0	0.12	$1,194	$0	$0	$0	$1,194
1.2.6.2	$48,158	$1,683	$0	$0	0.12	$3,860	$202	$0	$0	$4,062
1.2.6.3	$52,362	$1,983	$0	$0	0.12	$3,426	$238	$0	$0	$3,664
1.2.6.4	$160,193	$3,845	$0	$0	0.12	$12,481	$461	$0	$0	$12,943
1.2.6.5	$3,366	$0	$0	$0	0.12	$404	$0	$0	$0	$404
1.2.6.6	$59,294	$0	$0	$0	0.12	$2,317	$0	$0	$0	$2,317
1.2.7.1	$18,813	$0	$0	$0	0.12	$1,285	$0	$0	$0	$1,285
1.2.7.2	$22,648	$22,763	$22,945	$1,353	0.12	$1,657	$2,732	$2,753	$162	$7,305
1.2.7.3	$29,360	$0	$0	$0	0.12	$1,604	$0	$0	$0	$1,604
1.2.7.4	$26,370	$27,577	$28,140	$1,977	0.12	$368	$3,309	$3,377	$237	$7,291
1.2.7.5	$0	$0	$0	$0	0.12	$1,854	$0	$0	$0	$1,854
1.2.8.1	$59,178	$121,537	$271,488	$0	0.07	$0	$8,508	$19,004	$0	$27,512
1.2.8.2	$0	$0	$0	$0	0.07	$0	$0	$0	$0	$0
1.2.8.3	$670,498	$0	$0	$0	0.20	$28,053	$0	$0	$0	$28,053
1.2.8.4	$0	$283,265	$0	$0	0.20	$0	$56,653	$0	$0	$56,653
1.2.8.5	$0	$0	$613,287	$0	0.07	$0	$0	$42,930	$0	$42,930
1.2.8.6	$0	$0	$0	$1,130,736	0.14	$0	$0	$0	$158,303	$158,303
1.2.9.1	$0	$0	$0	$0	0.12	$0	$0	$0	$0	$0
1.2.9.2	$37,923	$0	$0	$0	0.12	$0	$0	$0	$0	$0
1.2.9.3	$81,939	$56,688	$0	$0	0.12	$5,534	$6,803	$0	$0	$12,337
1.2.9.4	$0	$0	$81,821	$0	0.12	$0	$0	$9,819	$0	$9,819
1.2.9.5	$0	$0	$0	$70,357	0.12	$0	$0	$0	$8,443	$8,443
1.3.1.0	$7,536	$0	$0	$0	0.04	$0	$0	$0	$0	$0
1.3.1.1	$0	$11,047	$0	$0	0.20	$0	$2,209	$0	$0	$2,209
1.3.1.3	$74,688	$0	$0	$0	0.20	$158	$0	$0	$0	$158
1.3.3.0	$0	$0	$0	$0	0.04	$0	$0	$0	$0	$0
1.3.3.1	$83,720	$0	$0	$0	0.16	$1,601	$0	$0	$0	$1,601
1.3.3.2	$38,807	$26,000	$0	$0	0.14	$3,476	$3,640	$0	$0	$7,116
1.3.3.3	$124,729	$58,077	$0	$0	0.12	$7,098	$6,969	$0	$0	$14,067
1.3.5.0	$0	$0	$13,321	$0	0.04	$0	$0	$533	$0	$533
1.4.0.0	$54,743	$0	$9,524	$0	0.07	$3,500	$0	$667	$0	$4,167
1.4.1.1	$214,569	$94,743	$38,822	$27,797	0.22	$8,564	$20,843	$8,541	$6,115	$44,063
1.4.1.2	$67,921	$30,727	$0	$0	0.26	$2,620	$7,989	$0	$0	$10,609
1.4.1.3	$26,071	$87,699	$0	$0	0.16	$124	$14,032	$0	$0	$14,156
1.4.1.4	$86,955	$0	$0	$0	0.16	$0	$0	$0	$0	$0
1.4.2.1	$44,020	$9,517	$5,580	$0	0.20	$7,130	$1,903	$1,116	$0	$10,149
1.4.2.2	$58,497	$0	$0	$0	0.24	$0	$0	$0	$0	$0
1.4.4.1	$31,825	$377,675	$765	$0	0.16	$370	$60,428	$122	$0	$60,921
1.4.4.2	$37,828	$9,127	$765	$0	0.40	$546	$3,651	$306	$0	$4,503
1.4.4.3	$0	$0	$0	$0	0.20	$0	$0	$0	$0	$0
1.4.5.1	$0	$4,173	$0	$0	0.08	$0	$334	$0	$0	$334
1.4.5.2	$18,961	$0	$0	$0	0.14	$0	$0	$0	$0	$0
1.4.5.3	$24,949	$0	$0	$0	0.08	$771	$0	$0	$0	$771
1.4.5.4	$2,250	$0	$0	$0	0.08	$180	$0	$0	$0	$180
1.5.3.2	$10,679	$21,370	$0	$0	0.30	$0	$6,411	$0	$0	$6,411
1.5.3.3	$0	$17,233	$0	$0	0.30	$0	$5,170	$0	$0	$5,170
1.5.3.4	$0	$2,250	$0	$0	0.30	$0	$675	$0	$0	$675
1.5.4.1	$2,754	$0	$1,107	$0	0.30	$0	$0	$332	$0	$332
1.5.4.2	$0	$500	$0	$0	0.30	$0	$150	$0	$0	$150
1.6.0.0	$0	$0	$1,836	$0	0.04	$2,344	$0	$73	$0	$2,417
1.6.1.1	$7,874	$775	$775	$775	0.28	$337	$217	$217	$217	$988
1.6.1.2	$57,154	$15,520	$111,231	$113,495	0.28	$5,887	$4,346	$31,145	$31,779	$73,156
1.6.1.3	$91,247	$81,655	$82,560	$74,976	0.21	$0	$17,148	$17,338	$15,745	$50,230
1.6.1.4	$12,792	$14,297	$13,115	$11,854	0.44	$0	$6,291	$5,771	$5,233	$17,295
1.6.2.1	$0	$0	$0	$0	0.14	$0	$0	$0	$0	$0
1.6.2.3	$0	$0	$0	$0	0.20	$0	$0	$0	$0	$0
1.6.4.1	$0	$0	$0	$0	0.14	$14,790	$0	$0	$0	$14,790
1.6.4.2	$109,150	$765	$2,219	$2,752	0.18	$13,734	$138	$399	$495	$14,767
1.6.4.3	$30,105	$0	$0	$0	0.14	$4,215	$0	$0	$0	$4,215
EQ-RETR	$0	$0	$0	$25,000	1.00	$0	$0	$0	$25,000	$25,000
TOTALS	$5,995,923	$3,969,808	$3,263,950	$3,135,775		$223,884	$474,132	$284,535	$342,438	$1,363,636

Summary

- Current setup allows for collaborative approach and full ownership of the schedule and costs by L2 Managers
- Main components of Time and Cost Management System are built using one platform (smartsheet.com), with virtually unlimited availability
- Schedule and Cost Workbooks interact with each other allowing for better tracking
- Cloud-based components participate in our EVMS system providing data for reporting and project health monitoring
- IceCube's PMCS tools are adaptable to provide better information and support for Project Managers.

Backups and auxiliaries.

3. Management of Risks associated with Cost Uncertainty

Example for Cost Model Workbooks

Example estimated cost 20,000$				
	Risk Factors	(See "Risk Analysis Sheet")		
Technical	3			
Cost	2			
Schedule	4			
Multipliers				
Technical Multiplier	0.04			
Cost Multiplier	0.02	Contingency for this Task		
Calculated Contingency	20%		$ 4,000	

Table 1: Risk Factors

Risk Factor	Technical	Cost	Schedule
1	Existing design and off-the-shelf hardware	Off the shelf or catalog item	not used
2	Minor modifications to an existing design	Vendor quote from established drawings	No schedule impact on any other item
3	Extensive modifications to an existing design	Vendor quote with some design sketches	not used
4	New design within established product line	In-house estimate for item within current production line	Delays completion of non-critical path subsystem item
6	New design different from established product line	Existing technology In-house estimate for item with minimal company experience but related to existing capabilities	not used
8	New design. Requires some R&D development but does not advance the state-of-the-art	In-house estimate for item with minimal company experience and minimal in-house capability	Delays completion of critical path subsystem item
10	New design. Development of new technology which advances the state-of-the-art	Top down estimate from analogous programs	not used
15	New design way beyond the current state-of-the-art	Engineering judgment	not used

Table 2: Risk Percentage

	Condition	Risk Percentage
Technical	Design or manufacturing concerns only	2%
	Design and manufacturing concerns	4%
Cost	Cost Material cost or labor rate concern	1%
	Material and labor rate concern	2%
Schedule		1%

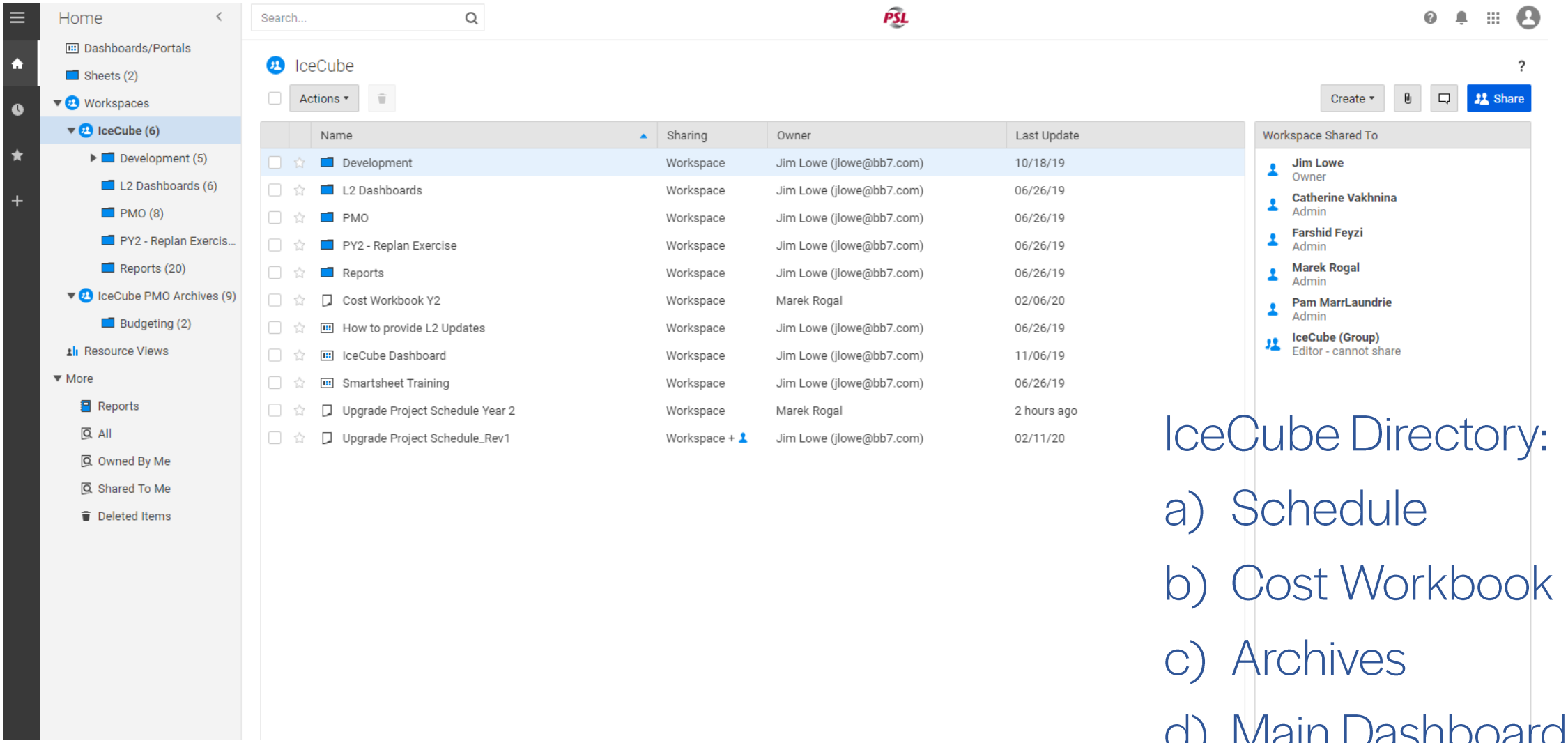
Calculated Contingency =

Technical Risk Factor X Technical Multiplier +

Cost Risk Factor X Cost Multiplier +

Schedule Risk Factor X Schedule Multiplier = 3x0.04+2x0.02+4x0.01=20%

2. Current Iteration – Smartsheet™ Cloud-based Time and Cost Management System



IceCube Directory:

a) Schedule

b) Cost Workbook

c) Archives

d) Main Dashboard

Main IceCube Directory

IceCube Upgrade Project Controls Overview

Scope Management (Smartsheet.com)

- WBS Structure maintenance. (smartsheet.com => Upgrade Project Schedule Year 2)
- Cost Breakdown Structure (CBS) maintenance. (smartsheet.com => Cost Workbook Y2)

Cost Management Tools

(smartsheet, excel, python etc)

- **Cost estimation** (smartsheet.com => Cost Workbook Y2, excel => in-house developed spreadsheets)
- **Cost Risk Estimation**. (excel and python-based Monte Carlo simulators and other in-house developed tools)
- **Cost Control** using **EVMS** system built in excel and used for reporting and diagnostics.

Time Management

- Schedule Updating (annual re-planning), Maintenance & Reporting, smartsheet.com => Upgrade Project Schedule Year 2, data fed into EVMS system and live dashboard (in smartsheet.com for L2 Managers).

Change Management

- Assistance in Change Assessment
- Schedule Change Assessment & Implementation
- Cost Change Assessment and Implementation