Air Force Institute of Technology

DEVELOPING STANDARD EMD COST FACTORS FOR MAJOR DEFENSE ACQUISITION PROGRAM (MDAP) PLATFORMS

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9 May 19

Background

- **AF Cost Analysis Handbook lists 4 primary cost estimating techniques**
  - Analogy & Factor method widely utilized

- **Factors established for Level II elements of the WBS**
  - Outlined in MIL-STD-881D

- **AFLCMC Research Office publishes EMD & PROD factor tables**
  - Limited updates
  - Clean-sheet design for Aircraft programs
  - Prime contractor data only

- **Additional data available**
  - Additional Services (Army, Navy, Joint)
  - Five additional commodity types
  - Modification programs
  - Subcontractor data

- **Previous factor research limited in scope**

Research Objectives

- **Develop a suite of standard cost factors for incorporation into the current cost estimator toolkit.**

- **Create a software tool for tailoring cost factors by unique characteristics such as commodity type, contract structure, or program features.**

Methodology

- ## **Data**
  - Source
  - Collection
  - Parameters
  - Normalization

Category	Number Removed	Remaining Programs
Available Programs in CADE		189
Excluded Programs	35	154
No EMD Data	25	129
1921 File Format Not .XLS	27	102
Final Dataset for Analysis		102

Category	Total
Total Programs Included	102
Unique Factors Created	443
Commodity Type	
Aircraft	245
Electronic/Automated Software	118
Missile	22
Ordnance	12
Space	36
UAV	10
Contract Type	
CPAF	74
CPFF	39
CPIF	66
Cost-Other	135
FFP	27
FPI	20
FPIF	19
Fixed-Other	6
Unknown	57
Development Type	
Commercial Derivative	4
Modification	135
New Design	150
Prototype	9
Subsystem	105
Variant	40
Contractor Type	
Prime	308
Subcontractor	135
Service	
Air Force	196
Army	94
Multiple	24
Navy (includes Marine Corps)	129

Descriptive Statistics by WBS Element

- Exclusion criteria
  - Blank values
  - Extreme values (tail(s) of distribution)

Factor	Values Excluded	Exclusion Type	# Rows Excluded	% of Total
SEPM	>150%	Upper	18	4.06%
ST&E	>150%	Upper	5	1.13%
ST&E	<0.1%	Lower	7	1.58%
Training	>80%	Upper	2	0.45%
Training	<0.05%	Lower	14	3.16%
PSE	>59%	Upper	2	0.45%
PSE	<0.01%	Lower	6	1.35%
CSE	>22%	Upper	2	0.45%
Site Activation	>68%	Upper	3	0.68%
Other	<0	Negatives	9	2.03%
Other	>116%	Upper	6	1.35%
Spares	>115%	Upper	1	0.23%

Factor	# Blank Factors Excluded	% of Total
SEPM	19	4.29%
ST&E	57	12.87%
Training	235	53.05%
Data	176	39.73%
PSE	286	64.56%
CSE	391	88.26%
Site Activation	393	88.71%
Other	57	12.87%
Spares	358	80.81%

WBS Element	# Factors Remaining
SEPM	406
ST&E	374
Training	192
Data	267
PSE	149
CSE	50
Site Activation	47
Other	371
Spares	84

Results & Analysis

SEPM Summary Table								
	Mean	Std Dev	N	Max	75%	Median	25%	Min
Service								
Air Force	0.3685	0.2755	177	1.324	0.4894	0.2972	0.159	0.0043
Army	0.508	0.3372	91	1.3453	0.6989	0.4426	0.2514	0.0098
Navy	0.3393	0.3039	115	1.4655	0.465	0.2551	0.1421	0.0105
Multiple	0.3142	0.2053	23	1.0007	0.4047	0.2699	0.1626	0.0903
Development Type								
Modification	0.3484	0.2555	124	1.3191	0.4954	0.2845	0.1539	0.0043
New Design	0.4738	0.3472	131	1.4655	0.6582	0.3759	0.219	0.0053
Prototype	0.1906	0.1472	8	0.39	0.3417	0.1783	0.0627	0.0126
Subsystem	0.373	0.2816	101	1.324	0.5343	0.2793	0.161	0.0105
Variant	0.3249	0.2924	39	1.3619	0.3887	0.2517	0.1154	0.0445
Commercial Derivative	0.184	0.1011	3	0.2676	0.2676	0.2128	0.0716	0.0716
Contractor Type								
Prime	0.3849	0.3068	284	1.3619	0.4896	0.2947	0.1609	0.012
Subcontractor	0.3966	0.2898	122	1.4655	0.5613	0.3336	0.1724	0.0043
Commodity Type								
Aircraft	0.3025	0.2385	227	1.3619	0.4115	0.2292	0.1421	0.0105
Electronic/Automated Software	0.5463	0.3511	107	1.4655	0.7816	0.4875	0.2568	0.0098
Missile	0.5014	0.3297	20	1.2822	0.7695	0.3897	0.2682	0.0576
Ordnance	0.3426	0.1737	11	0.6117	0.5007	0.285	0.2439	0.0811
Space	0.3825	0.3093	31	1.3191	0.4972	0.3109	0.1488	0.0043
UAV	0.4913	0.3217	10	1.324	0.5435	0.3655	0.303	0.2617
Contract Type								
CPAF	0.4128	0.2641	66	1.2792	0.5792	0.3649	0.2206	0.0337
CPFF	0.5189	0.3896	37	1.3453	0.7022	0.4233	0.2387	0.0053
CPIF	0.3905	0.2987	61	1.2924	0.522	0.2729	0.18	0.0276
Cost-Other	0.4082	0.3103	126	1.4655	0.5874	0.3175	0.1767	0.0043
FFP	0.2457	0.2531	25	1.0786	0.3494	0.156	0.0871	0.0105
FPI	0.2118	0.2232	17	1.0081	0.2349	0.1694	0.0729	0.0484
FPIF	0.4203	0.2811	19	1.2822	0.5578	0.3931	0.2218	0.0675
Fixed-Other	0.572	0.2327	4	0.8384	0.8026	0.5427	0.3707	0.3643
Unknown	0.3131	0.2573	51	1.3144	0.4426	0.243	0.1275	0.0385

Conclusion

- **Research Objectives**
  - Cost factors
  - Interactive tool

	Modification	New Design	Prototype	Subsystem	Variant	Commercial Derivative
SEPM	0.3484	0.4738	0.1906	0.373	0.3249	0.184
ST&E	0.2155	0.2143	0.2673	0.1744	0.2934	0.1804
Training	0.0245	0.0395	0.0029	0.0277	0.0543	0.0134
Data	0.0448	0.0297	0.006	0.0333	0.0441	0.024
PSE	0.0477	0.0573	0.0118	0.0485	0.0978	0.0039
CSE	0.0129	0.0148	0.0001	0.0378	0.0108	0.0018
Site Activation	0.0495	0.05	0.004	0.0046	0.0276	0.0001
Other	0.0874	0.0812	0.0328	0.0726	0.0459	0.2406
Spares	0.0222	0.0438	0.0279	0.0283	0.0504	0.0054

Conclusion

- **Significance**
  - One of the largest DoD factor studies for MDAPs

  - Compilation of EMD data from 443 Cost Data Summary Reports (CDSR) into a single location

  - Intended for wider-access distribution than past studies

  - Descriptive statistics summary tables provide ability for quick estimate creation

  - Allows for iterative process as details emerge to refine the estimate
    - Hypothetical scenarios revealed the CV is a characteristic that should be taken into account
      - The CV is defined in the context of cost estimating as "the 'average' percent estimating error when predicting subsequent observations within the representative population" (Mislick & Nussbaum, 2015)

Summary

- **Broadened utility of EMD factors**
  - 102 MDAPs
  - 443 factors
  - 50+ years of data

- **Ability to specify & refine factors**
  - Iterative process hinging upon availability of information
  - Statistical and/or practical analysis

- **Streamlined process for factor utilization**
  - Descriptive statistics summary tables
    - 5 categories
    - 26 subcategories

■Backup

SEPM

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FPIF	0.4203	0.2811	19	1.2822	0.5578	0.3931	0.2218	0.0675
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Unknown	0.3131	0.2573	51	1.3144	0.4426	0.243	0.1275	0.0385

ST&E

ST&E Summary Table								
	Mean	Std Dev	N	Max	75%	Median	25%	Min
Service								
Air Force	0.2251	0.2074	166	0.9641	0.328	0.1672	0.0668	0.0013
Army	0.2157	0.1915	80	1.0575	0.2784	0.1992	0.0793	0.0012
Navy	0.2201	0.215	105	1.0776	0.3083	0.1582	0.0697	0.0032
Multiple	0.1059	0.1027	23	0.3312	0.1821	0.0642	0.0207	0.0021
Development Type								
Modification	0.2155	0.2193	119	1.0776	0.2986	0.1396	0.0623	0.0013
New Design	0.2143	0.188	114	1.0575	0.304	0.1817	0.0611	0.0016
Prototype	0.2673	0.1028	9	0.4561	0.325	0.282	0.1792	0.1177
Subsystem	0.1744	0.1883	89	0.8523	0.2378	0.1038	0.0428	0.0012
Variant	0.2934	0.2281	39	0.9436	0.4288	0.2456	0.0987	0.0083
Commercial Derivative	0.1804	0.1432	4	0.3659	0.328	0.1585	0.0548	0.0388
Contractor Type								
Prime	0.2294	0.2019	274	1.0776	0.3089	0.1838	0.0754	0.0012
Subcontractor	0.1733	0.2001	100	1.0575	0.2396	0.0999	0.0305	0.0016
Commodity Type								
Aircraft	0.2498	0.2139	225	1.0776	0.3515	0.2036	0.021	0.0013
Electronic/Automated Software	0.1702	0.1924	88	1.0575	0.2199	0.1038	0.0348	0.0012
Missile	0.2041	0.1772	18	0.7363	0.2615	0.1842	0.0619	0.0243
Ordnance	0.1513	0.0998	11	0.3389	0.2468	0.0961	0.0704	0.0596
Space	0.0778	0.0879	23	0.3797	0.1157	0.0448	0.021	0.003
UAV	0.2068	0.1273	9	0.3924	0.3266	0.1893	0.0887	0.0444
Contract Type								
CPAF	0.1802	0.1964	63	1.0575	0.2761	0.1072	0.038	0.0025
CPFF	0.1671	0.2095	31	0.8523	0.2213	0.0791	0.0253	0.0016
CPIF	0.2586	0.22	55	1.0677	0.3796	0.1997	0.0829	0.0021
Cost-Other	0.1824	0.1748	113	0.9641	0.2618	0.1277	0.0474	0.0012
FFP	0.1777	0.1503	20	0.4561	0.3426	0.13	0.0588	0.0118
FPI	0.3907	0.1991	20	0.9436	0.5222	0.3267	0.2803	0.1276
FPIF	0.2876	0.2168	17	0.7307	0.3371	0.2167	0.1233	0.0226
Fixed-Other	0.2714	0.2483	4	0.6104	0.5283	0.2227	0.0632	0.0298
Unknown	0.2248	0.2163	51	1.0776	0.2416	0.1608	0.0968	0.0044

Training

Training Summary Table								
	Mean	Std Dev	N	Max	75%	Median	25%	Min
Service								
Air Force	0.0319	0.0643	95	0.3849	0.0297	0.0093	0.0034	0.0006
Army	0.0398	0.0673	45	0.5237	0.0482	0.0148	0.004	0.0006
Navy	0.0329	0.0653	50	0.3837	0.0274	0.0071	0.0021	0.0006
Multiple	0.0482	0.0647	2	0.094	0.094	0.0482	0.0024	0.0024
Development Type								
Modification	0.0245	0.0406	64	0.1746	0.028	0.0051	0.0026	0.0006
New Design	0.0395	0.0772	76	0.4237	0.0384	0.0166	0.0038	0.0008
Prototype	0.0029	0.0019	2	0.0042	0.0042	0.0029	0.0015	0.0015
Subsystem	0.0277	0.0475	23	0.2214	0.0376	0.0063	0.0021	0.0006
Variant	0.0543	0.0886	24	0.3837	0.0897	0.0166	0.0023	0.0006
Commercial Derivative	0.0134	0.0118	3	0.0253	0.0253	0.0133	0.0016	0.0016
Contractor Type								
Prime	0.0344	0.0674	163	4237	0.0318	0.01	0.0031	0.0006
Subcontractor	0.0329	0.0486	29	0.2214	0.0471	0.0109	0.0031	0.0006
Commodity Type								
Aircraft	0.0307	0.0544	111	0.3837	0.0298	0.0055	0.0022	0.0006
Electronic/Automated Software	0.0527	0.0922	53	0.4237	0.0503	0.0254	0.005	0.0006
Missile	0.0117	0.0122	7	0.0388	0.0109	0.0079	0.0042	0.0032
Ordnance	0.0081	0.0039	6	0.0148	0.0121	0.0062	0.0051	0.0051
Space	0.0142	0.0119	9	0.0344	0.0233	0.0146	0.0029	0.001
UAV	0.0176	0.018	6	0.0486	0.0335	0.0123	0.0019	0.0015
Contract Type								
CPAF	0.0468	0.0785	30	0.3849	0.0515	0.0275	0.004	0.0006
CPFF	0.0491	0.0981	18	0.4237	0.049	0.0167	0.0039	0.0013
CPIF	0.0371	0.0736	27	0.3532	0.0396	0.0079	0.0028	0.0006
Cost-Other	0.0313	0.0608	59	0.3837	0.0285	0.0065	0.0023	0.0006
FFP	0.0526	0.064	8	0.1594	0.1171	0.0178	0.002	0.0008
FPI	0.0142	0.0124	15	0.0424	0.0244	0.0159	0.0022	0.0006
FPIF	0.0266	0.0554	13	0.2086	0.0155	0.0102	0.005	0.0034
Fixed-Other	0.0016	-	1	0.0016	0.0016	0.0016	0.0016	0.0016
Unknown	0.021	0.0271	21	0.0962	0.0354	0.0047	0.0017	0.0006

Data

Data Summary Table								
	Mean	**Std Dev**	**N**	**Max**	**75%**	**Median**	**25%**	**Min**
Service								
Air Force	0.0385	0.0608	126	0.3935	0.0404	0.0217	0.0097	<0.0001
Army	0.0405	0.0646	50	0.3191	0.0514	0.018	0.0048	0.0001
Navy	0.0319	0.0473	85	0.254	0.0342	0.0148	0.0063	0.0003
Multiple	0.0194	0.0103	6	0.0322	0.0282	0.0189	0.0137	0.002
Development Type								
Modification	0.0448	0.0664	84	0.3365	0.0479	0.0243	0.0079	<0.0001
New Design	0.0297	0.0457	85	0.3022	0.0364	0.0134	0.0074	0.0001
Prototype	0.006	0.0065	6	0.0154	0.013	0.0042	0.0003	<0.0001
Subsystem	0.0333	0.0616	54	0.3935	0.03381	0.018	0.0044	<0.0001
Variant	0.0441	0.0543	34	0.254	0.0527	0.0269	0.0126	0.0016
Commercial Derivative	0.024	0.0187	4	0.0522	0.0431	0.0152	0.0139	0.0137
Contractor Type								
Prime	0.0384	0.0572	206	0.3365	0.0442	0.0205	0.0085	<0.0001
Subcontractor	0.0296	0.0555	61	0.3935	0.031	0.0175	0.0056	0.0001
Commodity Type								
Aircraft	0.0355	0.0498	174	0.3365	0.04	0.0206	0.0083	<0.0001
Electronic/Automated Software	0.0407	0.0736	59	0.3935	0.0306	0.0164	0.0077	<0.0001
Missile	0.0418	0.0861	12	0.3022	0.0212	0.0107	0.0069	0.0007
Ordnance	0.01	0.0109	4	0.0256	0.0212	0.0071	0.0017	0.0003
Space	0.024	0.0291	10	0.076	0.0564	0.0076	0.0031	<0.0001
UAV	0.0449	0.0534	8	0.1642	0.0667	0.028	0.0126	<0.0001
Contract Type								
CPAF	0.0376	0.0635	39	0.3935	0.0403	0.0217	0.0095	0.0003
CPFF	0.0362	0.0401	19	0.1389	0.0529	0.0246	0.0015	<0.0001
CPIF	0.0243	0.0409	43	0.2338	0.0269	0.0092	0.0032	<0.0001
Cost-Other	0.0351	0.0571	74	0.3348	0.032	0.0206	0.0065	<0.0001
FFP	0.0262	0.0396	18	0.1482	0.0274	0.0133	0.0032	<0.0001
FPI	0.0358	0.0251	19	0.0964	0.0598	0.0333	0.0134	0.0067
FPIF	0.0691	0.1041	16	0.3365	0.09	0.0167	0.008	0.0007
Fixed-Other	0.006	0.004	4	0.0113	0.0102	0.0049	0.0028	0.0027
Unknown	0.0468	0.0631	35	0.3191	0.0458	0.0294	0.0121	0.0024

PSE

PSE Summary Table								
	Mean	Std Dev	N	Max	75%	Median	25%	Min
Service								
Air Force	0.0646	0.0922	79	0.44	0.0775	0.0282	0.0112	0.0003
Army	0.0399	0.0626	28	0.2929	0.0535	0.0115	0.0071	0.0023
Navy	0.0592	0.0917	40	0.3846	0.0636	0.0177	0.0057	0.0001
Multiple	0.0593	0.0565	2	0.0993	0.0993	0.0593	0.0194	0.0194
Development Type								
Modification	0.0477	0.088	60	0.44	0.0465	0.0177	0.0035	0.0001
New Design	0.0573	0.077	46	0.3054	0.0626	0.0286	0.0084	0.0001
Prototype	0.0118	0.0049	3	0.0175	0.0175	0.009	0.0088	0.0088
Subsystem	0.0485	0.0609	13	0.1836	0.1025	0.0194	0.0047	0.0005
Variant	0.0978	0.107	26	0.3846	0.1906	0.0481	0.0167	0.0026
Commercial Derivative	0.0039	-	1	0.0039	0.0039	0.0039	0.0039	0.0039
Contractor Type								
Prime	0.0497	0.0778	120	0.3846	0.0513	0.0186	0.007	0.0001
Subcontractor	0.0945	0.111	29	0.44	0.1502	0.0545	0.0134	0.0006
Commodity Type								
Aircraft	0.0549	0.0789	98	0.3846	0.0618	0.0216	0.0076	0.0001
Electronic/Automated Software	0.0468	0.0565	12	0.1644	0.0948	0.0094	0.0038	0.0004
Missile	0.0716	0.0993	11	0.2929	0.1707	0.0085	0.007	0.0001
Ordnance	0.0235	0.0193	9	0.0624	0.0373	0.0182	0.0081	0.0023
Space	0.1247	0.1673	11	0.44	0.3195	0.0477	0.0079	0.0003
UAV	0.0496	0.0632	8	0.1934	0.0693	0.0213	0.0094	0.0063
Contract Type								
CPAF	0.054	0.0637	14	0.1934	0.069	0.0347	0.0111	0.0006
CPFF	0.0203	0.0279	13	0.0973	0.0265	0.0092	0.0009	0.0003
CPIF	0.0398	0.0542	28	0.2351	0.0412	0.0214	0.0065	0.0001
Cost-Other	0.0699	0.1099	44	0.44	0.0636	0.0186	0.0094	0.0004
FFP	0.0238	0.0249	11	0.0775	0.0414	0.0175	0.0026	0.0006
FPI	0.1098	0.1167	14	0.3846	0.1906	0.0619	0.0199	0.0018
FPIF	0.0338	0.0686	9	0.2133	0.0341	0.0042	0.0034	0.0004
Fixed-Other	0.0041	-	1	0.0041	0.0041	0.0041	0.0041	0.0041
Unknown	0.0929	0.0925	15	0.3221	0.1686	0.0798	0.0194	0.0001

CSE

CSE Summary Table								
	Mean	**Std Dev**	**N**	**Max**	**75%**	**Median**	**25%**	**Min**
Service								
Air Force	0.0136	0.0313	22	0.1272	0.0043	0.0014	0.0008	<0.0001
Army	0.0211	0.0331	14	0.1237	0.0317	0.0088	0.0009	<0.0001
Navy	0.01186	0.0224	13	0.0767	0.0096	0.0011	0.0006	0.0002
Multiple	0.0063	-	1	0.0063	0.0063	0.0063	0.0063	0.0063
Development Type								
Modification	0.0129	0.0319	19	0.1272	0.0049	0.0013	0.0008	<0.0001
New Design	0.0148	0.0206	18	0.0767	0.0218	0.0067	0.0013	<0.0001
Prototype	0.0001	0.0001	2	0.0002	0.0002	0.0001	0.0001	0.0001
Subsystem	0.0378	0.0537	5	0.1237	0.0908	0.0063	0.0006	0.0006
Variant	0.0108	0.0171	5	0.0411	0.0242	0.0038	0.0008	0.0006
Commercial Derivative	0.0018	-	1	0.0018	0.0018	0.0018	0.0018	0.0018
Contractor Type								
Prime	0.0133	0.0268	41	0.1272	0.0082	0.0015	0.0006	<0.0001
Subcontractor	0.0235	0.039	9	0.1237	0.0259	0.0095	0.0008	0.0005
Commodity Type								
Aircraft	0.0125	0.0309	31	0.1272	0.0081	0.0018	0.0008	<0.0001
Electronic/Automated Software	0.0149	0.028	7	0.0767	0.0186	0.0015	0.0006	<0.0001
Missile	0.0218	0.0212	6	0.0486	0.0429	0.0202	0.0005	0.0004
Ordnance	0.0353	0.0493	2	0.0702	0.0702	0.0353	0.0004	0.0004
Space	0.0013	-	1	0.0013	0.0013	0.0013	0.0013	0.0013
UAV	0.0209	0.0327	3	0.0578	0.0578	0.0021	0.0002	0.0002
Contract Type								
CPAF	0.0069	0.0103	10	0.0332	0.0089	0.0024	0.0009	0.0005
CPFF	0.0365	0.0301	2	0.0578	0.0578	0.0365	0.0152	0.0152
CPIF	0.0215	0.0404	9	0.1237	0.0253	0.0081	0.0005	<0.0001
Cost-Other	0.0103	0.0193	14	0.0702	0.0102	0.0017	0.0008	<0.0001
FFP	0.0004	0.0002	3	0.0006	0.0006	0.0006	0.0001	0.0001
FPI	0.0028	-	1	0.0028	0.0028	0.0028	0.0028	0.0028
FPIF	0.029	0.0459	9	0.1272	0.0627	0.0018	0.0005	0.0004
Fixed-Other	-	-	-	-	-	-	-	-
Unknown	0.0057	0.0064	2	0.0102	0.0102	0.0057	0.0011	0.0011

Site Activation

Site Activation Summary Table								
	Mean	**Std Dev**	**N**	**Max**	**75%**	**Median**	**25%**	**Min**
Service								
Air Force	0.049	0.0798	23	0.3464	0.0654	0.0235	0.0004	<0.0001
Army	0.0299	0.0319	4	0.0687	0.0623	0.025	0.0024	0.0009
Navy	0.0309	0.0686	18	0.2378	0.0057	0.002	0.0005	0.0001
Multiple	0.0065	0.0049	2	0.01	0.01	0.0065	0.003	0.003
Development Type								
Modification	0.0495	0.0968	12	0.3464	0.059	0.0141	0.001	<0.0001
New Design	0.05	0.059	19	0.1595	0.1168	0.0241	0.0009	0.0001
Prototype	0.004	-	1	0.004	0.004	0.004	0.004	0.004
Subsystem	0.0046	0.004	4	0.01	0.0088	0.041	0.0011	0.0005
Variant	0.0276	0.0788	9	0.2378	0.0032	0.0013	0.0003	0.0001
Commercial Derivative	0.0001	<0.0001	2	0.0001	0.0001	0.0001	0.0001	0.0001
Contractor Type								
Prime	0.0405	0.0737	40	0.3464	0.059	0.0042	0.0005	<0.0001
Subcontractor	0.0277	0.0519	7	0.1424	0.0345	0.003	0.0009	0.0005
Commodity Type								
Aircraft	0.0168	0.0476	26	2378	0.0088	0.0015	0.0004	<0.0001
Electronic/Automated Software	0.0917	0.1018	11	0.3464	0.143	0.0687	0.0069	0.0005
Missile	0.0009	-	1	0.0009	0.0009	0.0009	0.0009	0.0009
Ordnance	-	-	-	-	-	-	-	-
Space	0.0602	0.0591	6	0.1424	0.1232	0.0494	0.0023	0.0005
UAV	0.0024	0.0017	3	0.004	0.004	0.0028	0.0005	0.0005
Contract Type								
CPAF	0.0498	0.0511	5	0.1168	0.1014	0.0426	0.0017	0.0005
CPFF	0.0277	0.0316	6	0.0687	0.0662	0.0152	0.0013	<0.0001
CPIF	0.0723	0.0777	6	0.1595	0.1471	0.0649	0.0008	0.0005
Cost-Other	0.0355	0.0675	15	0.2378	0.0345	0.004	0.0013	0.0005
FFP	0.0008	0.0009	3	0.0018	0.0018	0.0005	0.0001	0.0001
FPI	0.0023	0.004	4	0.0084	0.0064	0.0004	0.0002	0.0001
FPIF	0.009	0.0152	3	0.0267	0.0267	0.0002	0.0001	0.0001
Fixed-Other	-	-	-	-	-	-	-	-
Unknown	0.079	0.1505	5	0.3464	0.1948	0.0044	0.0006	0.0001

Other

Other Summary Table								
	Mean	**Std Dev**	**N**	**Max**	**75%**	**Median**	**25%**	**Min**
Service								
Air Force	0.072	0.133	160	0.6989	0.062	0.022	0.0079	<0.0001
Army	0.0928	0.1386	86	0.7394	0.1189	0.0374	0.0094	<0.0001
Navy	0.0714	0.1567	105	0.8796	0.0544	0.014	0.0068	0.0001
Multiple	0.1268	0.202	20	0.7897	0.1535	0.0526	0.0182	0.0032
Development Type								
Modification	0.0874	0.1569	117	0.8089	0.0868	0.0241	0.009	<0.0001
New Design	0.0812	0.1384	132	0.7394	0.0813	0.0269	0.01	0.0002
Prototype	0.0328	0.0373	6	0.0993	0.0634	0.0214	0.0018	0.001
Subsystem	0.0726	0.1365	86	0.6989	0.063	0.0199	0.0062	0.0002
Variant	0.0459	0.087	26	0.4216	0.0502	0.0113	0.0084	0.0001
Commercial Derivative	0.2406	0.4264	4	0.8796	0.673	0.0408	0.0081	0.0013
Contractor Type								
Prime	0.0864	0.1544	245	0.8796	0.0807	0.0241	0.0085	<0.0001
Subcontractor	0.0665	0.1264	126	8089	0.0627	0.0187	0.0078	<0.0001
Commodity Type								
Aircraft	0.0762	0.1415	186	0.8796	0.0689	0.0239	0.0086	<0.0001
Electronic/Automated Software	0.0727	0.1365	107	0.7394	0.0766	0.0157	0.0065	0.0004
Missile	0.1434	0.2227	21	0.7897	0.1941	0.0449	0.0107	0.0002
Ordnance	0.0779	0.1823	12	0.6425	0.0871	0.0086	0.0032	<0.0001
Space	0.0962	0.14	35	0.5061	0.1198	0.0343	0.0119	0.003
UAV	0.0274	0.0418	10	0.1401	0.0266	0.0103	0.0086	0.0056
Contract Type								
CPAF	0.0963	0.1627	66	0.8796	.09.9	0.0387	0.0126	0.0015
CPFF	0.0625	0.127	36	0.5154	0.0487	0.0124	0.0049	<0.0001
CPIF	0.083	0.1402	58	0.8089	0.0969	0.0256	0.0093	0.0005
Cost-Other	0.0919	0.1688	125	0.7897	0.0868	0.0215	0.009	<0.0001
FFP	0.044	0.0853	22	0.2991	0.0304	0.0062	0.0022	0.0002
FPI	0.0245	0.017	7	0.0483	0.0451	0.022	0.0056	0.0054
FPIF	0.0747	0.1294	18	0.5318	0.0782	0.0287	0.0087	0.0005
Fixed-Other	0.0176	0.0229	6	0.0504	0.0452	0.0043	0.0018	0.001
Unknown	0.0617	0.1025	33	0.5677	0.0679	0.0338	0.0113	0.0002

Spares

Spares Summary Table								
	Mean	**Std Dev**	**N**	**Max**	**75%**	**Median**	**25%**	**Min**
Service								
Air Force	0.043	0.0558	33	0.226	0.0846	0.0113	0.0018	<0.0001
Army	0.0221	0.0259	10	0.0644	0.0538	0.0107	0.0016	0.0006
Navy	0.0341	0.0347	41	0.1134	0.0434	0.0225	0.0047	<0.0001
Multiple	-	-	-	-	-	-	-	-
Development Type								
Modification	0.0222	0.0479	25	0.226	0.0177	0.0046	0.0014	<0.0001
New Design	0.0438	0.0394	34	0.1319	0.0779	0.0332	0.0091	0.0001
Prototype	0.0279	-	1	0.0279	0.0279	0.0279	0.0279	0.0279
Subsystem	0.0283	0.0288	7	0.0884	0.0368	0.0225	0.0101	0.0004
Variant	0.0504	0.0493	15	0.1418	0.1117	0.0303	0.0069	0.0008
Commercial Derivative	0.0054	0.0069	2	0.0103	0.0103	0.0054	0.0005	0.0005
Contractor Type								
Prime	0.0372	0.0468	62	0.226	0.0536	0.0174	0.0034	<0.0001
Subcontractor	0.0331	0.0336	22	0.1073	0.0623	0.0195	0.0046	0.0004
Commodity Type								
Aircraft	0.0397	0.0498	52	0.226	0.0781	0.0168	0.0035	<0.0001
Electronic/Automated Software	0.0239	0.0284	21	0.1073	0.0434	0.0152	0.0015	0.0001
Missile	-	-	-	-	-	-	-	-
Ordnance	-	-	-	-	-	-	-	-
Space	0.0356	0.0304	6	0.0757	0.0703	0.025	0.0098	0.0091
UAV	0.0519	0.0353	5	0.092	0.0905	0.0302	0.0242	0.0205
Contract Type								
CPAF	0.0255	0.0298	17	0.0943	0.036	0.0113	0.0034	0.0012
CPFF	0.0045	0.0074	4	0.0156	0.0121	0.0012	0.0002	0.0001
CPIF	0.0255	0.0192	11	0.0516	0.0449	0.0275	0.0048	0.0001
Cost-Other	0.0439	0.0438	18	0.1167	0.0897	0.0226	0.0065	0.0002
FFP	0.041	0.0824	7	0.226	0.034	0.0047	0.0014	<0.0001
FPI	0.0593	0.0545	10	0.1418	0.1168	0.0432	0.0127	<0.0001
FPIF	0.0152	0.0195	4	0.0419	0.0359	0.0092	0.0006	0.0005
Fixed-Other	-	-	-	-	-	-	-	-
Unknown	0.044	0.0428	13	0.1134	0.0927	0.0236	0.0072	0.0006