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Improving Software Cost Estimating Techniques in Defense Programs

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Improving Software Cost Estimating Methods in Defense Programs

1Lt Nick Biancalana

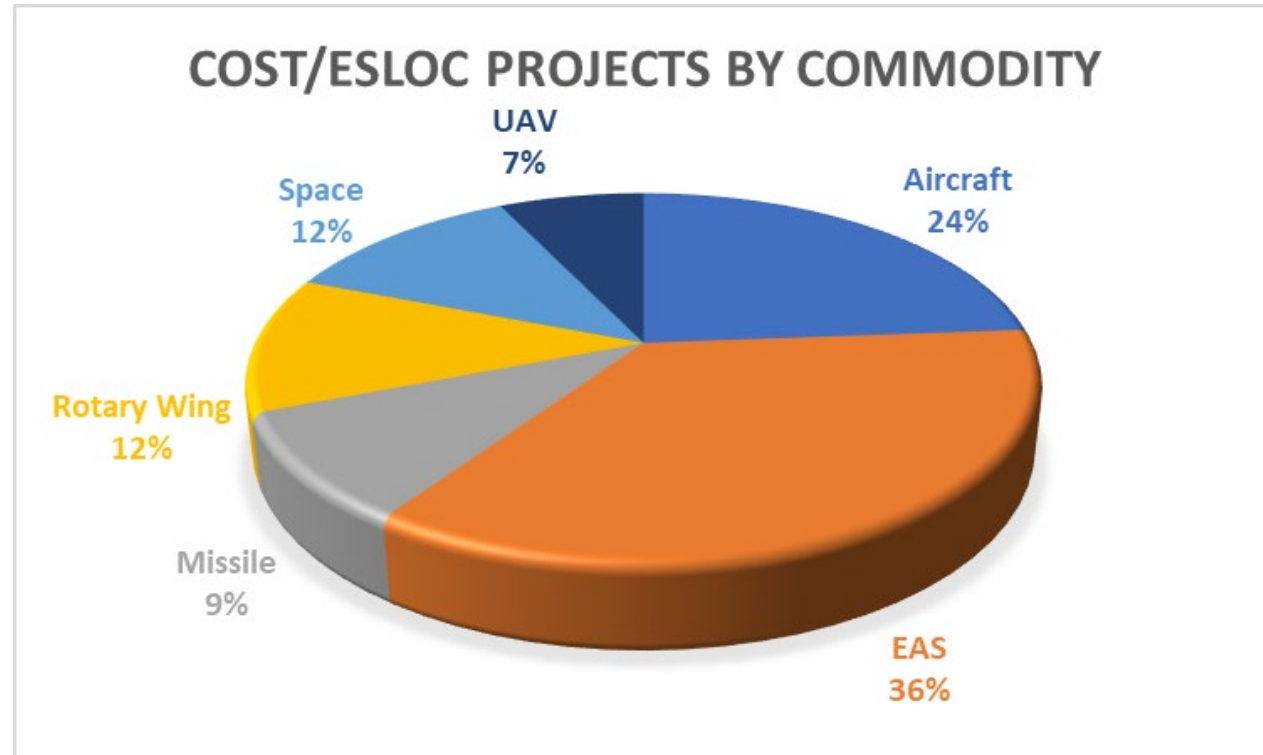
SAF/FMCS

Overview

- Main Topic
 - Using historical cost and ESLOC data to create distributions to estimate and simulate future values
 - Formulate specific distributions for combinations of characteristics
- Assumption
 - Information known at the beginning of the program
 - Commodity, system type, service, contractor, contract type
- Research Questions
 - Shapes and parameters of distributions that map each data subset
 - How does software size and cost change within characteristics?
- Methods
 - Incremental analysis
 - Compare median values
 - Statistical tests for differences

Data

- 42 projects
- 314 data points (Cost/ESLOC)
- 351 data points (ESLOC)
- Similar proportions for data points



Results (Cost/ESLOC)

Commodity/Contractor	Contractor 1	Contractor 2	Contractor 3	Contractor 4	Contractor 5
Aircraft	0.183	0.185	0.174	0.088 ^b	0.043 ^b
EAS	0.278	0.177 ^a	0.056	0.134 ^a	0.071 ^a
Missile		0.708			0.511 ^{a,b,c}
Rotary Wing	0.202	0.467	0.218	0.327	
Space	0.798	1.331 ^a	0.131	1.051 ^{a,b}	0.078
UAV			0.173		0.141 ^c
N	96	46	89	52	68
Median	0.205	0.377	0.119	0.28	0.122
KW	0.303	0.004	0.05	0.001	0.008

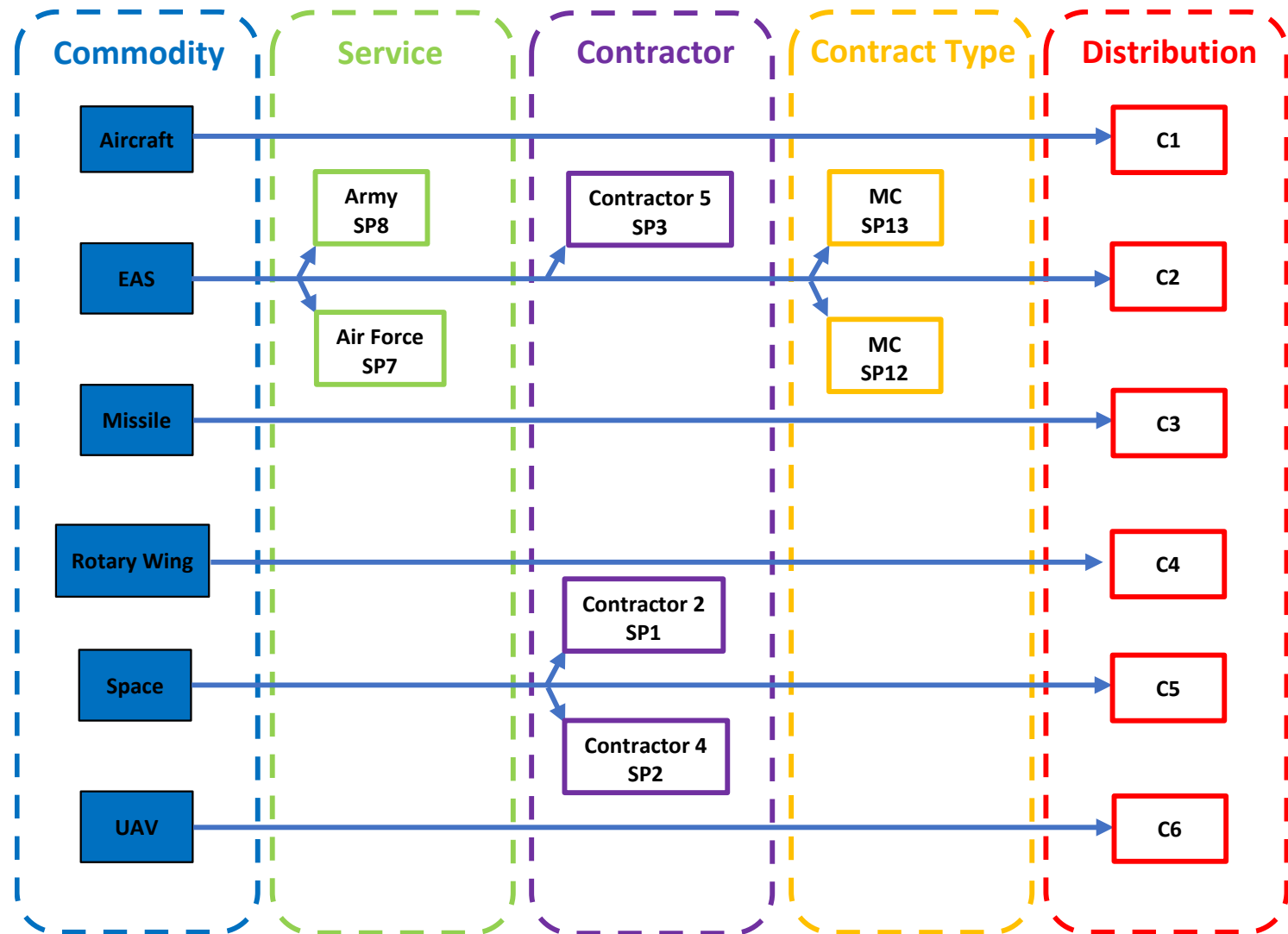
Note: Commodities that share a letter within the same contractor are members of a Steel-Dwass Pair

- Analysis performed for nearly all combinations of characteristics for both Cost/ESLOC and ESLOC

Results

- Distributions for each division of dataset
 - Space and Missile most expensive commodities, Aircraft largest
- Cost and ESLOC vary within the same program characteristics
 - Some commodities are more expensive depending on contractor
 - Fewer effects for ESLOC
 - EAS is cheapest yet also largest for the Army
 - Specific Contract Type can impact size/cost
 - Impacts mostly lost when contract type is generalized
 - EAS, Missile, and UAV experienced different ESLOC depending on service
- Arsenal of distributions for all situations
 - Decision tool

Specific Distributions – Cost/ESLOC



Questions