MODEL BASED SYSTEMS ENGINEERING VALUE

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Research has shown a MBSE ROI between **3.5-7x** for programs which have medium to no current systems engineering effort [7]

One case study detailed a MBSE ROI estimate up to **144%** per year over 10 years [3]

Other studies found the total development cost was reduced by **13-55%** by switching from traditional SE to MBSE [3][4][8][9]

Research shows the optimal percentage of Systems Engineering budget on a project is between **8-19%** [6] with factors like system complexity and lifespan

One study reported a productivity increases of **150-700%** for programs which transitioned to MBSE [11]

[8] Multiple studies found a project with MBSE was delivered up to **3x** faster than a similiar project without MBSE

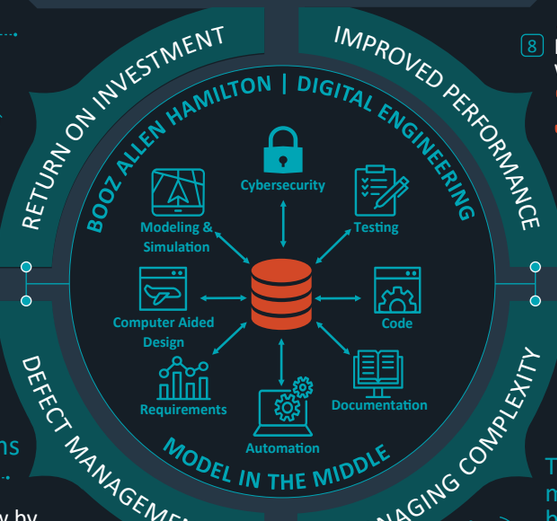
One study found an **80%** [7] confidence interval that cost and schedule are impacted by MBSE

One study found switching to MBSE increased the probability of making successful design decisions by **20-33%** [3]

VERIFICATION & VALIDATION

One case study found that verification costs were reduced by **70%** by using MBSE with a test automation tool [10]

Another case study found that validation costs were reduced by **75%** by implementing MBSE on a safety critical project [9]



Study showed implementing MBSE saw a **68%** reduction in defects [2][3]

One study showed how MBSE improved defect detection rates by **10-50%** for the same teams [11]

One study showed how the cost to fix defects can be **100x** higher in late SDLC phases [3]

Another study showed traditional approach to fix defects cost **20x** more than with MBSE [4]

One case study detailed how by implementing MBSE **70%** of defects were now captured in the simulation stage of project compared to past projects which reach 70% in flight-test stage [3]

One study showed by switching to MBSE, the number of integrated system components increased by **60%**

The average number of monthly baselines increased by **30%**

The complexity of these baselines increased by **7.5%**

The number of discrete systems engineering products produced by the team increased by **60%** [14]

One study showed that volatility equates to schedule delays and handling volitility after development stage can result in a **5-10x** increase in effort [12]

One study showed the average cost to develop a MBSE model dropped by **83.3%** over a 5 year period [13]

MBSE BENEFIT BY SECTOR

[1] System Complexity (C) | Enviornment Complexity (E) | Lifespan (L)

MBSE benefits complexity	(C)	(E)	(L)
Aerospace & Defense	9.8	9.9	9.8
Transportation	9.5	9.8	9.8
Energy	9.5	9.9	9.8
Natural Resources	9.5	9.5	9.8
Marine & Offshore	7.5	7.5	9.8
Industrial	8.2	3.5	9.0
Life Sciences	7.0	4.5	8.5
High-Tech	6.5	2.8	2.0
Financial Services	6.5	1.5	7.0
Consumer Goods	2.0	1.0	1.0

BOOZ ALLEN DIGITAL ENGINEERING

BOOZ ALLEN HAMILTON DIGITAL ENGINEERING TEAM

Digital Engineering at Booz Allen spans the integration of Model-Based Systems Engineering (MBSE) and traditional Model-Based Engineering (MBE). Booz Allen is striving to become the premier organization in the digital engineering space. Our clients span all Booz Allen markets across the United States.

ABOUT BOOZ ALLEN HAMILTON

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