

Matrix of Implementation Examples

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The following matrix maps the Systems Engineering Implementation Examples to topics in the Systems Engineering Body of Knowledge (SEBoK). It provides both a list of systems engineering implementation examples for topics of interest, and a list of relevant topics for each implementation example. Since the number of topics in the SEBoK is extensive, only a subset is included here for clarity. For additional information, see the example of interest and the corresponding SEBoK topic.



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Organization and Mapping of Examples to the SEBoK

The following short titles shown in Table 1 are used for the implementation examples:

Table 1. Short Titles for the SEBoK Examples. (SEBoK Original)

Case Studies	
BT	Business Transformation
ATC	NextGen Air Traffic Control
NASA	NASA's Mission to Saturn
HST	Hubble Space Telescope
GPS	Global Positioning System
GPS II	Global Positioning System II
Radiation	Medical Radiation
FBI VCF	FBI Virtual Case File System
MSTI	Miniature Seeker Technology Integration
Infusion Pump	Next Generation Medical Infusion Pump
DfM	Design for Maintainability
CAS	Complex Adaptive Operating System
PM	Project Management
TS	Taxi Service
SWFTS	SWFTS MBSE
Bag Handling	Denver Airport Baggage Handling System
VA Sub	Virginia Class Submarine
Route Mod	UK West Coast Route Modernisation Project
Water Mgmt	Singapore Water Management
FAA AAS	FAA Advanced Automation System
Light Rail	Standard Korean Light Transit System
TMT	Thirty-Meter Telescope

Table 2 shows how the topics (each row) align with the first set of implementation examples (each column):

Table 2. Implementation Examples based on published case studies. (SEBoK Original)

SEBoK Topic	BT	ATC	NASA	HST	GPS II	Radiation	FBI VCF	MSTI	Infusion Pump	DfM	CAS	PM	TS	SWFTS	NHS
Systems Thinking					X		X	X	X	X	X	X	X		
Models and Simulation		X	X		X								X	X	X
Product Systems Engineering				X	X	X	X								X
Service Systems Engineering			X		X								X		X
Enterprise Systems Engineering	X	X	X		X							X	X		X
Systems of Systems (SoS)	X	X			X								X		X
Life Cycle Models	X			X	X			X	X	X	X			X	
Business or Mission Analysis	X	X			X		X		X			X	X		
Stakeholder Needs and Requirements	X	X		X	X		X		X			X	X	X	
System Requirements				X	X		X		X			X	X	X	
System Architecture	X	X			X	X		X	X						

System Analysis		X		X						X	X	X
System Implementation				X						X		X
System Integration	X	X	X	X	X			X		X	X	X
System Verification		X		X		X		X	X			
System Validation	X			X	X	X		X	X			
System Deployment				X	X					X		
Operation of the System				X	X				X	X		X
System Maintenance												X
Logistics Planning	X	X		X			X		X		X	
Assessment and Control						X	X	X			X	X
Risk Management			X	X	X	X	X		X		X	X
Measurement								X				
Decision Management	X							X			X	X
Configuration Management				X	X			X		X	X	
Information Management		X									X	X
Quality Management												X
Enabling Systems Engineering		X		X	X			X	X	X	X	X
Related Disciplines				X		X	X		X		X	

Table 3 shows how the topics (each row) align with the second set of implementation examples (each column):

Table 3. Implementation Examples Developed for SEBoK. (SEBoK Original)

SEBoK Topic (Part 3)	Bag Handling	VA Sub	Route Mod	Water Mgmt	FAA AAS	Light Rail
Business or Mission Analysis			X	X		X
Stakeholder Needs and Requirements			X	X		X
System Requirements			X		X	X
System Architecture	X	X		X	X	X
System Analysis	X			X	X	X
System Implementation						X
System Integration	X			X		X
System Verification	X				X	X
System Validation	X				X	X
System Deployment						X
Operation of the System				X		X

System Maintenance						X
Logistics	X					
Planning	X	X	X	X	X	
Assessment and Control					X	X
Risk Management	X	X	X	X		X
Measurement						X
Decision Management	X	X	X			
Configuration Management	X	X			X	
Information Management		X				
Quality Management			X			

References

Works Cited

None.

Primary References

None.

Additional References

None.

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