

# 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

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

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

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

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

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### Works Cited

None.

### Primary References

None.

### Additional References

None.

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