INCOSE Healthcare Working Group
5th Annual Systems Engineering in Healthcare Conference
May 1-2, 2019
Minneapolis, MN

Stakeholder Value Model and Compartmental Decision Matrix

Case Study

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About

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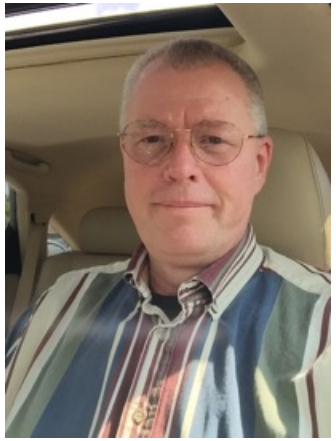

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Outline

- Project Argon-39 (2 Slides)
  - Situation, Objective, Action, Result, Aftermath
  - Stakeholder Value Map
- Program Filmore (Firewalled Competition) (5 Slides)
  - Situation, Objective, Action, Result, Aftermath
  - Stakeholder Value Maps
  - Compartmentalized Decision Matrix
- Program Tethys (Compartmental Mutual Interest)
  - Situation, Objective, Action, Result, Aftermath
  - Stakeholder Value Map
  - Compartmentalized Decision Matrix

Project Argon-39

- Situation
  - Major University Research breakthrough discovery
  - Interdiction in specific lethal bio-chemical event through direct and rapid introduction of Argon-39 counter-agent
  - Time lapse from exposure to irrecoverable condition < 60 min
  - Individual intermuscular inject required
  - Counter-agent first dose efficacy 85%
  - Initial counter-agent effects present < 90 seconds
  - Most probable operational scenario: *Industrial Accident*
- Objective (original)
  - *Create an intuitive medical device for interdiction in an Industrial Accident*
- Action: Involve stakeholders in Value Map discussion & decision
- Results: Change in design direction to deliver stakeholder value
- Aftermath: Administration following 3 events were highly effective

Argon-39 Stakeholder Value Map

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	SC-1	SC-2	SC-3	SC-4	SC-5	SC-6	SC-7	SC-8	
Val-1	78	69	22	18	21	58	50	35	8%
Val-2	89	76	4	5	9	62	6	3	5%
Val-3	**93**	**86**	68	79	66	60	56	38	12%
Val-4	**85**	**96**	55	80	65	71	67	40	12%
Val-5	52	70	41	30	46	16	37	13	7%
Val-6	92	82	26	23	33	7	45	2	7%
Val-7	81	94	36	28	31	57	1	10	7%
Val-8	90	88	42	24	14	47	11	12	7%
Val-9	53	91	19	29	43	49	34	27	7%
Val-10	**95**	**87**	83	84	73	77	54	48	13%
Val-11	72	74	15	32	17	59	51	39	8%
Val-12	75	64	8	61	25	44	63	20	8%
	21%	21%	9%	11%	10%	13%	10%	6%	

- SC-1 Industrial Accident
- SC-2 Intentional Action
- Val-3 Simplicity
- Val-4 Distribution Velocity
- Val-10 Efficacy Transparency

Lessons Learned

- Align Testing & Training to the *Stakeholder Values*
- Make sure the sponsor (agency) supports *Use Case* ownership
- *Use Case* owner leads the *value* verification
- Change in *Use Case* means re-evaluate *value* realization

Program Filmore

- Situation
  - Medical Device Design Company
  - Two customers in same patient therapeutic area need novel medical device
  - For the same patient therapeutic area
  - When does a critical patient need/risk discovery transfer across firewall?
- Objective
  - Firewalled competitive medical device design fulfillment
- Action: Develop Use Case to Value Maps determine overlaps
- Results: Two highly variant Value Maps => To different designs
- Aftermath: Design Company completed to customer satisfaction

Stakeholder Value Maps

ParmaCo

	UC-1	UC-2	UC-3	UC-4	
Val-1	25	13	3	15	14%
Val-2	9	7	16	8	10%
Val-3	27	17	18	4	16%
Val-4	26	23	20	6	18%
Val-5	28	24	22	19	23%
Val-6	21	14	11	2	12%
Val-7	5	1	10	12	7%
	35%	24%	25%	16%	

HealthCo

	UC-1	UC-2	UC-3	UC-4	
Val-1	23	24	27	20	23%
Val-2	3	25	16	5	12%
Val-3	4	28	2	13	12%
Val-4	10	6	17	19	13%
Val-5	18	26	7	1	13%
Val-6	11	21	8	15	14%
Val-7	9	12	22	14	14%
	19%	35%	24%	21%	

Lessons Learned

- Variation in Stakeholder Values creates variation in design decisions.
- Decision velocity is a direct correlation to Stakeholder Value visibility.

Program Tethys

- Situation
  - Agency stakeholders – 16
  - Supplier stakeholders – 24
  - Strategic systems impacted – 8
  - Tactical systems impacted – 43
  - Conflicting compartmentalized requirements/attributes – **168**
  - Compartmentalized system raw data elements – **4000+**
  - Probability of system critical failure HIGH
- Objective: Identify Critical Path to scope realization
- Action
  - Prioritized reduction: 39 Use Cases to 9 Use Cases to **2 Primary Use Cases**
  - Prioritized alignment: 58 Value Statements to 15 Base Case to **3 Primary Value Statements**
- Results: Project decision matrix accelerated, schedule recovery and scope delivered
- Aftermath: First stage integration performed flawlessly on second execution

Stakeholder Value Map

- UC-7 Dynamic Acquisition
- UC-8 Escalated Response
- Val-12 Accuracy
- Val-13 Security
- Val-14 Availability

	UC-1	UC-2	UC-3	UC-4	UC-5	UC-6	**UC-7**	**UC-8**	UC-9	
Val-1	25	86	91	105	21	102	113	108	15	7%
Val-2	9	76	4	75	84	89	106	109	3	6%
Val-3	68	55	74	78	35	71	85	123	38	7%
Val-4	60	62	45	82	65	59	92	132	27	7%
Val-5	37	48	41	30	46	16	52	117	13	4%
Val-6	42	73	26	23	33	14	116	101	96	6%
Val-7	90	1	36	28	31	18	100	103	61	5%
Val-8	40	56	7	24	93	47	119	99	12	5%
Val-9	34	67	19	53	43	49	88	135	10	5%
Val-10	70	57	112	32	50	54	77	114	2	6%
Val-11	51	29	58	22	17	39	79	80	6	4%
Val-12	66	69	98	126	94	72	**133**	**128**	110	10%
Val-13	81	83	95	111	124	104	**125**	**129**	107	10%
Val-14	87	121	127	97	115	122	**134**	**131**	118	11%
Val-15	63	44	8	5	11	64	120	130	20	5%
	9%	10%	9%	10%	9%	10%	17%	19%	7%	

Lessons Learned

- Generating *Use Case* may not **realize** highest *Stakeholder Value*
- *Stakeholder Values* inform MVP and Lifecycle Options
- Precision and Accuracy not well understood at leadership
- Scope **ownership** *does not equal* **accountability**
- Highly sensitive **time / data security** issues resolved
  - Rationale and priority established and documented
  - Encoding / encryption sequences prioritized appropriately
- *Stakeholder Value* conflicts can be prioritized and resolved
  - Research targets (clear the known-unknowns)
  - Anticipate but **do not require** technological advance

Ex Nihilo Systems, LLC

Established in 1998 as a technology transfer function, Ex Nihilo Systems evolved into a systems engineering consulting organization for startups, not-profits, public agencies, and entrepreneurs. Ex Nihilo Systems draws on pragmatic applications of Systems Science and Engineering, harnessing the accelerations of Lean, Agile, and Six Sigma approaches resulting in stakeholder value.

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Thank you for attending!

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Stakeholder Value Map Process

- Define *Use Cases*
- Identify *Stakeholder Value* for entire scope
- Prioritize *Use Cases*
- Prioritize *Stakeholder Value* produced for each Use Case
- Overlay *Use Case* to *Stakeholder Value* Impact