Extracted from: Requirements for Models Project

INCOSE Patterns Working Group, MBE Transformation

ASME VV50 Model Life Cycle Working Group

	A	B
1	**Model Stakeholder Type**	**Definition**
2	Model User	A person, group, or organization that directly uses a model for its agreed upon purpose. May include technical specialists, non-technical decision-makers, customers, supply chain members, regulatory authorities, or others.
3	Model Developer	A person who initially creates a model, from conceptualization through implementation, validation, and verification, including any related model documentation. Such a person may or may not be the same as one who subsequently maintains the model.
4	Model Maintainer	A person who maintains and updates a model after its initial development. In effect, the model maintainer is a model developer after the initial release of a model.
5	Model Deployer-Distributor	A person or organization that distributes and deploys a model into its intended usage environment, including transport and installation, through readiness for use.
6	Model Use Supporter	A person who supports or assists a Model User in applying a model for its intended use. This may include answering questions, providing advice, addressing problems, or other forms of support.
7	Regulatory Authority	An organization that is responsible for generating or enforcing regulations governing a domain.
8	Modeler Investor-Owner	A person or organization that invests in a model, whether through development, purchase, or otherwise, expecting a benefit from that investment.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1						Feature Stakeholder								
2	**Feature Group**	**Feature Name**	**Feature Definition**	**Feature Attribute**	**Attribute Definition**									
3	Model Identity and Focus	Modeled System of Interest	Identifies the type of system this model describes.	System of Interest	Name of system of interest, or class of systems of interest	X	X		X	X				
4		Modeled Environmental Domain	Identifies the type of external environmental domain(s) that this model includes.	Domain Type(s)	Name(s) of modeled domains (manufacturing, distribution, use, etc.)	X	X		X	X				
5	Model Content and Capability	Modeled Stakeholder Value	The capability of the model to describe fitness or value of the System of Interest, by identifying its stakeholders and modeling the related Stakeholder Features.	Stakeholder Type	Classes of covered stakeholders (may be multiple)	X	X		X	X				
6		Modeled System External (Black Box) Behavior	The capability of the model to represent the objective external ("black box") technical behavior of the system, through significant interactions with its environment, based on modeled input-output exchanges through external interfaces, quantified by technical performance measures, and varying behavioral modes.			X	X		X	X				
7		Fitness Couplings	The capability of the model to represent quantitative (parametric) couplings between stakeholder-valued measures of effectiveness and objective external black box behavior performance measures.			X	X		X	X				
8		Explanatory Decomposition	The capability of the model to represent the decomposition of its external technical behavior, as explanatory internal ("white box") internal interactions of decomposed roles, further quantified by internal technical performance measures, and varying internal behavioral modes.			X	X		X	X				
9		Physical Architecture	The capabiliy of the model to represent the physical architecture of the system of interest. This includes identification of its major physical components and their architectural relationships.			X	X		X	X				
10		Model Envelope	The capability of the model to meet its Model Fidelity requirements over a stated range (envelope) of dynamical inputs, outputs, and parameter values.	Model Application Envelope		X	X	X	X	X				
11		Model Configurability	The capability of the model to serve as a configurable framework, parameterized or otherwise configurable to different specific models	System Configuration Type	A specific configuration of the system of interest that the model can represent. More than one such value may be listed.	X	X	X	X	X				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1						Feature Stakeholder								
2	**Feature Group**	**Feature Name**	**Feature Definition**	**Feature Attribute**	**Attribute Definition**									
12		Validated Conceptual Model Fidelity	The validated capability of the conceptual portion of the model to represent the System of Interest, with acceptable fidelity.	Quantitative Accuracy Reference		X	X	X	X	X				
13				Qualitative Accuracy Reference		X	X	X	X	X				
14				Uncertainty Quantification (UQ) Reference		X	X	X	X	X				
15				Model Validation Reference		X	X	X	X	X				
16		Verified Executable Model Fidelity	The verified capability of the executable portion of the model to represent the System of Interest, with acceptable fidelity.	Quantitative Accuracy Reference		X	X	X	X	X				
17				Qualitative Accuracy Reference		X	X	X	X	X				
18				Uncertainty Quantification (UQ) Reference		X	X	X	X	X				
19				Speed		X	X	X	X	X				
20				Quantization		X	X	X	X	X				
21				Stability		X	X	X	X	X				
22				Model Validation Reference		X	X	X	X	X				
23	Model Representation	Conceptual Model Representation	The capability of the conceptual portion of the model to represent the system of interest, using a specific type of representation.	Conceptual Model Representation Type	The type of conceptual modeling language or metamodel used.	X		X	X	X				
24				Conceptual Model Interoperability	The degree of interoperability of the conceptual model, for exchange with other environments	X		X	X	X				
25		Executable Model Representation	The capability of the executable portion of the model to represent the system of interest, using a specific type of representation	Executable Model Representation Type	The type of executable modeling language or metamodel used.	X		X	X	X				
26				Executable Model Interoperability	The degree of interoperability of the executable model, for exchange with other environments	X		X	X	X				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1						Feature Stakeholder								
2	**Feature Group**	**Feature Name**	**Feature Definition**	**Feature Attribute**	**Attribute Definition**									
27	Model Utility	Model Intended Use	The intended purpose(s) or use(s) of the model.	Life Cycle Process Supported	The intended life cycle management process to be supported by the model, from the ISO15288 process list. More than one value may be listed.	X	X							
28		Perceived Model Value and Use	The relative level of value ascribed to the model, by those who use it for its stated purpose.	User Group Segment	The identify of using group segment (multiple)	X	X		X	X				
29				Level of Annual Use	The relative level of annual use by the segment	X	X		X	X				
30				Value Level	The value class associated with the model by that segment	X	X		X	X				
31		Third Party Acceptance	The degree to which the model is accepted as authoritative, by third party regulators, customers, supply chains, and other entities, for its stated purpose.	Accepting Authority	The identity (may be multiple) of regulators, agencies, customers, supply chains, accepting the model	X	X		X	X				
32		Model Ease of Use	The perceived ease with which the model can be used, as experienced by its intended users	Perceived Model Complexity	High, Medium Low	X	X		X	X				
33		Model Versioning and Configuration Management	The capability of the model to provide for version and configuration management.	CM Capability Type	The type(s) of CM capabilities included (may be multiple)	X	X	X	X	X				
34		Managed Model Datasets	The capability of the model to include managed datasets for use as inputs, parametric characterizations, or outputs	Dataset Type	The type(s) of data sets (may be multiple)	X		X	X	X				
35		Executable Model Environmental Compatibility	The capability of the model to be compatibly supported by specified information technology environment(s), indicating compatibility, portability, and interoperability.	IT Environmental Component	The type(s) of IT environments or standards supported	X	X	X	X	X				
36		Model Design Life and Retirement	The capability of the model to be sustained over an indicated design life, and retired on a planned basis.	Design Life	The planned retirement date	X	X	X	X	X				
37		Model Maintainability	The relative ease with which the model can be maintained over its intended life cycle and use, based on capable maintainers, availability of effective model documentation, and degree of complexity of the model	Maintenance Method				X						
38	Model Life Cycle	Model Deployability	The capability of the model to support deployment into service on behalf of intended users, in its original or subsequent updated versions	Deployment Method		X	X							

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1						Feature Stakeholder								
2	**Feature Group**	**Feature Name**	**Feature Definition**	**Feature Attribute**	**Attribute Definition**									
39	Management	Model Cost	The financial cost of the model, including development, operating, and maintenance cost	Development Cost	The cost to develop the model, including its validation and verification, to its first availability for service date	X								
40				Operational Cost	The cost to execute and otherwise operate the model, in standardized execution load units	X								
41				Maintenance Cost	The cost to maintain the model		X	X						
42				Deployment Cost	The cost to deploy, and redeploy updates, per cycle	X	X							
43				Retirement Cost	The cost to retire the model from service, in a planned fashion		X							
44				Life Cycle Financial Risk	Risk to the overall life cycle cost of the model		X							
45		Model Availability	The degree and timing of availability of the model for its intended use, including date of its first availability and the degree of ongoing availability thereafter.	First Availability Date	Date when version will first be available	X	X	X	X	X				
46				First Availability Risk	Risk to the scheduled date of first availability	X	X							
47				Life Cycle Availability Risk	Risk to ongoing availability after introduction	X	X	X	X	X				
48														
49														