

01 DIAGRAM PICK

WHICH DIAGRAM ANSWERS THE QUESTION I'M TRYING TO ANSWER?

\$	QUESTION	DIAGRAM	PRODUCES	WHY
	BDD What is the system made of?	Block Definition	Block	Types and decomposition of things.
	IBD How do parts connect at runtime?	Internal Block	Internal Block	Parts in context, connectors, ports.
	UC Who uses the system, for what?	Use Case	Use Case	Actors and the goals they pursue.
	ACT What happens, step by step?	Activity	Activity	Control + object flow; swimlanes.
	SD What messages flow between parts?	Sequence	Interaction	Lifelines + ordered messages.
	STM How does a part behave by mode?	State Machine	State Machine	Discrete states, transitions, guards.
	REQ What shall the system do?	Requirements	Requirement	Text-shall + traceable links.
	PAR How do values relate by equation?	Parametric	Constraint Block	Bind values to constraint expressions.
	PKG How is the model organized?	Package	Package	Containment hierarchy and imports.
	BDD Which block owns which capability?	Block Definition	Operation on Block	Capabilities live on the type.
	STM What signals drive a transition?	State Machine	Signal · Trigger	Signals + events advance state.
	ACT Hardware mapped to software?	Activity + bdd	«allocate»	Cross-domain mapping.
	IBD What flows across a port?	Internal Block	Item Flow	Flow properties type the items.
	REQ Where does a requirement live?	Requirements	Containment	Show ownership; satisfy elsewhere.

02 NOTATION

LINE · ARROWHEAD · STEREOTYPE

STRUCTURAL RELATIONSHIPS



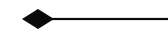
Generalization

"is a kind of"; hollow triangle at the parent end.



Association

Plain solid line; no arrow. Optional multiplicity at ends.



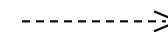
Composition — filled diamond

Parent owns the part; delete parent → part is destroyed.



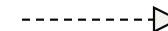
Aggregation — hollow diamond

Common miss: drew aggregation when ownership is exclusive.



Dependency

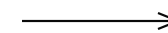
Dashed line, open arrow. "Uses" without ownership.



Realize

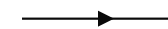
Dashed line, hollow triangle. Implementation realizes a spec.

END DECORATIONS



Navigability — open arrow

Open arrowhead marks the end you can reach; the opposite end is not navigable.



Item flow — filled triangle

Filled triangle on a connector, naming the matter or data that flows along it.



Port — small square

Small square on a block edge — a typed point where interactions cross the boundary.

MULTIPLICITY AT ENDS

1

Exactly one instance at this end — the implicit default when no value is shown.

0..1

Optional — zero or one instance; the link may be absent entirely.

1..*

One or more required — at least one instance must exist at this end.

*

Any number, including zero — an unbounded, optional collection.

04 CLICK-PATH

18 CLICK-PATHS

PROJECT

Start new SysML project File > New Project > Systems Engineering

Attach a used project File > Use Project > Local > pick .mdzip

ELEMENTS

Create a Block Containment > Package > Create Element > Block

Add a value property select Block > Properties > + > Value Property

Add a part property select Block > Properties > + > Part Property > type

Add a proxy port select Block > Ports > + > Proxy Port > type

Create a Requirement Package > Create Element > Requirement

DIAGRAMS

New BDD under package Package > Create Diagram > SysML BDD

New IBD on a Block Block > Create Diagram > SysML IBD

Place element on canvas tree item > canvas (symbol, not copy)

Display all parts in IBD canvas > Display > Display Parts...

Auto-layout diagram Diagrams > Layout > Auto-layout Ctrl+Q

RELATIONSHIPS

Draw a composition palette > Composition tool > parent > child

Allocate one to another source > Tools > Allocate To... > target

Satisfy a requirement requirement > Tools > Satisfy > target

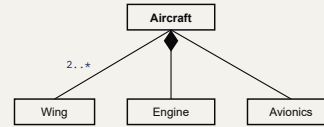
Show existing relations symbol > Related Elements > Display Paths...

VALIDATION & USAGE

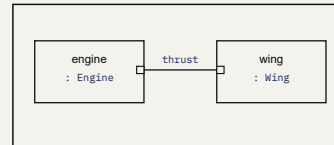
Run validation Analyze > Validation > Validate

Find usages of element element > Go To > Used By

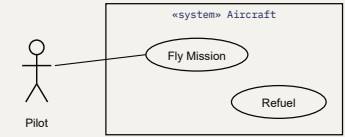
bdd [Package] Aircraft [Structur...]



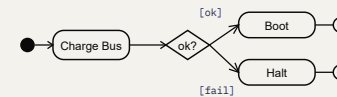
ibd [Block] Aircraft



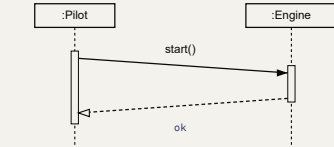
uc [Package] Operations



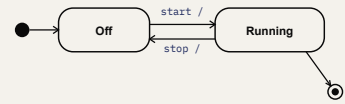
act [Activity] Power-On



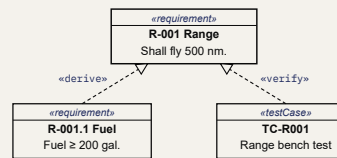
sd [Interaction] Engine Start



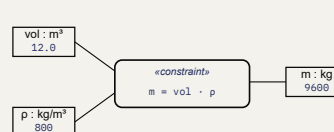
stm [Block] Engine



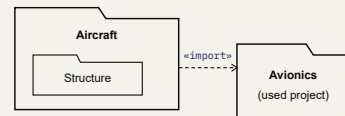
req [Package] Mission Reqs



par [Block] Fuel Tank



pkg [Model] Aircraft System



06 STEREOTYPE

STEREOTYPE REFERENCE

STRUCTURAL

«block»	Structural classifier; type of a thing.
«valueType»	Data type with optional unit + dimension.
«proxyPort»	Exposes a part's behavior.
«requirement»	Text-shall statement with id.

«interfaceBlock»	Feature set offered at a port.
«flowProperty»	Direction-tagged port property.
«fullPort»	Port with its own behavior.

RELATIONSHIP

«satisfy»	Design element fulfills a requirement.
«derive»	Lower-level req from a higher one.
«trace»	Generic traceability link.

«verify»	Test case verifies a requirement.
«refine»	Adds precision or context.
«allocate»	Map element across domains.