

# Houston: An Intelligent Requirements Advisor

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SERC AI4SE/SE4AI Workshop 2020

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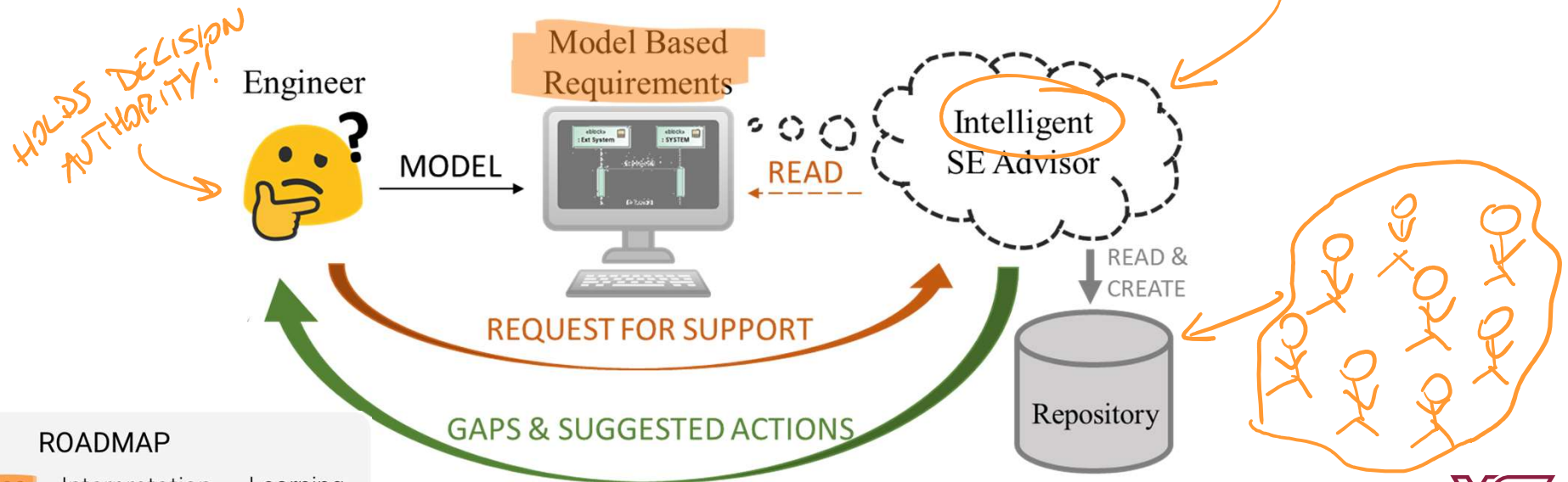
VIRGINIA TECH™

This material is based on work sponsored by the Department of the Navy, **Naval Engineering Education Consortium**, award number N00174-19-1-0012. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the Naval Engineering Education Consortium.

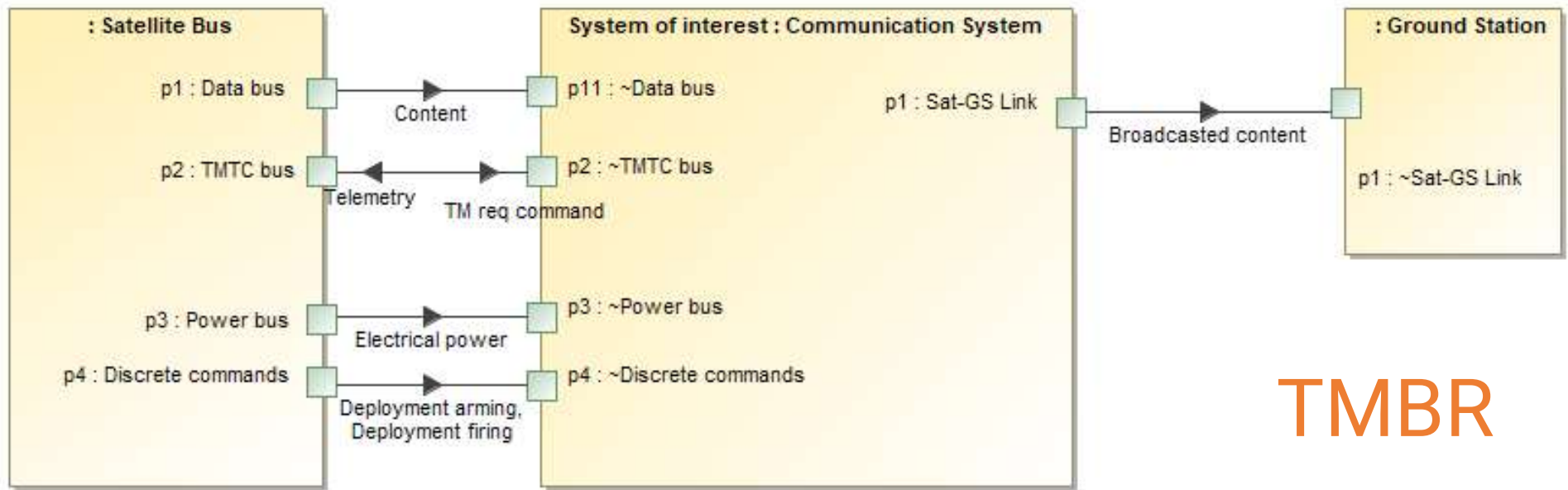
Requirements | Formulation of engineering problems → *The system shall do A.*

# COMPLETENESS

Gaps allow solutions that are **not fit for purpose**  
**Impossible** to demonstrate; can only be pursued  
Depend on resources, experience, knowledge, & talent of **engineer**

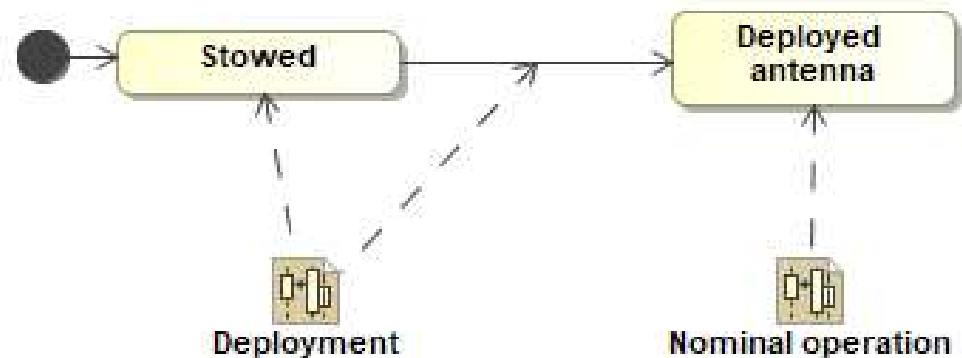


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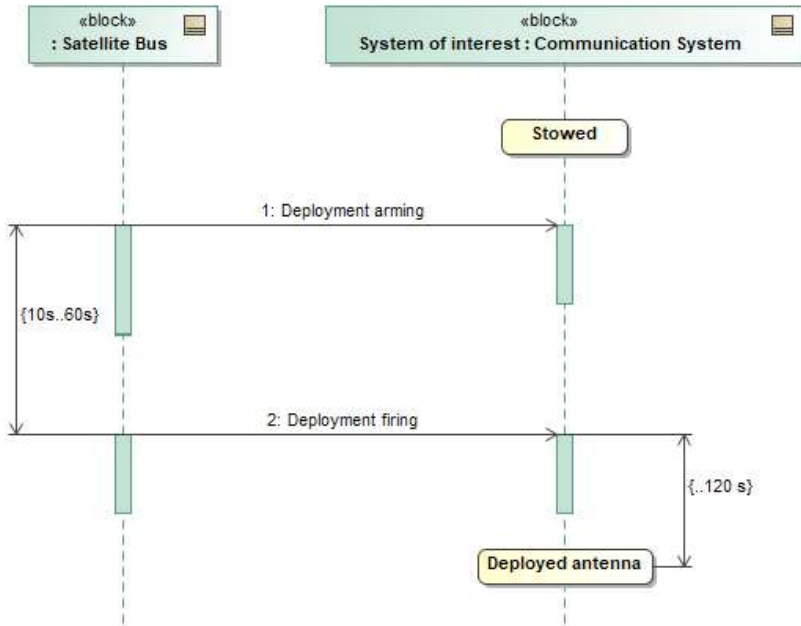


TMBR

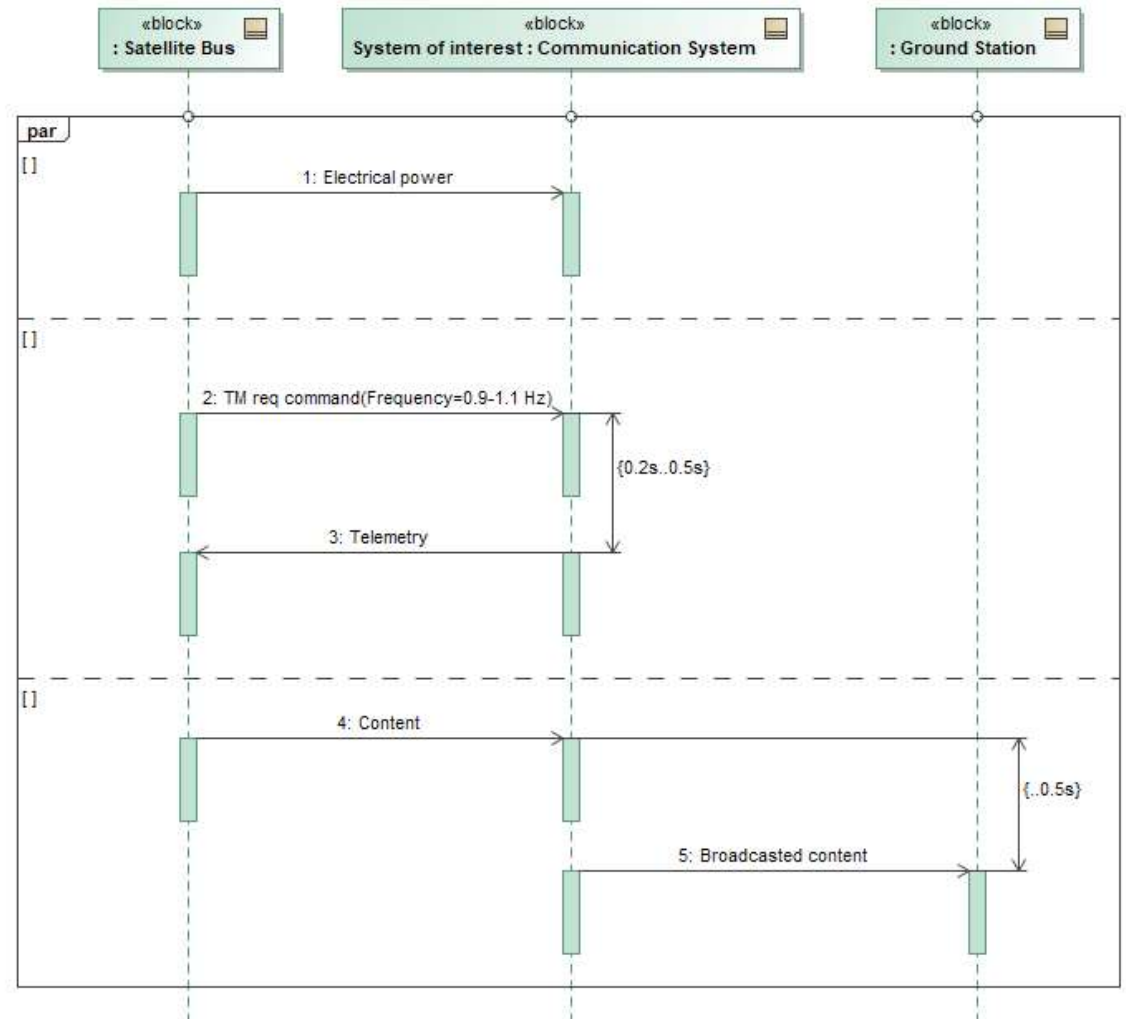
Deploy antenna  
 Broadcast content  
 Provide health status



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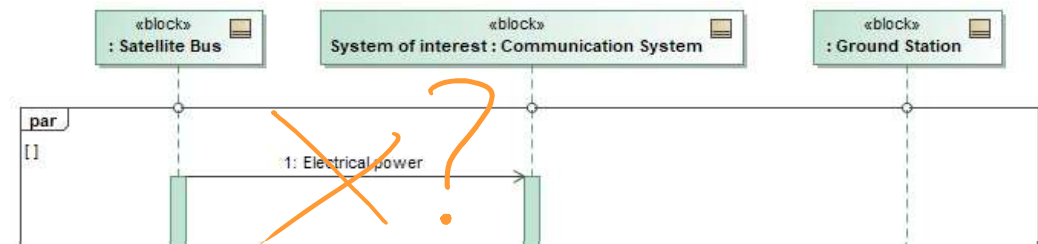


This is only a  
proof-of-  
**CONCEPT!**



# RULE 1

No reception of expected input



Input

Do you want to prescribe a behavior in case 'Electrical power' is lost while other inputs in 'Nominal Operation' are received?

Options: [Y/N]

OK

Cancel

No

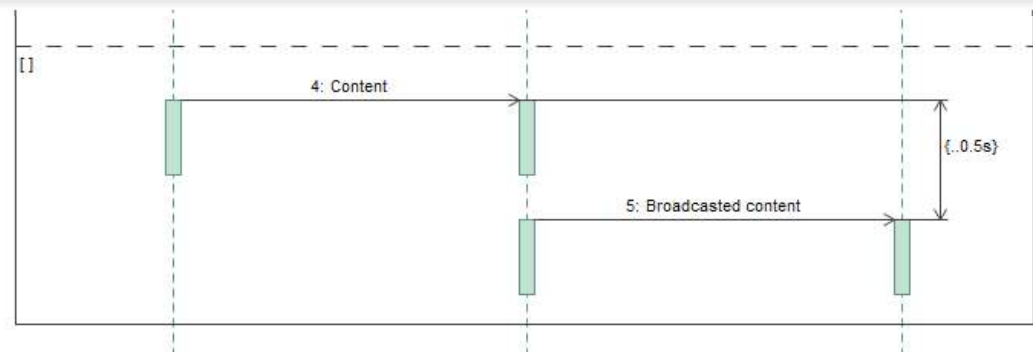
Yes

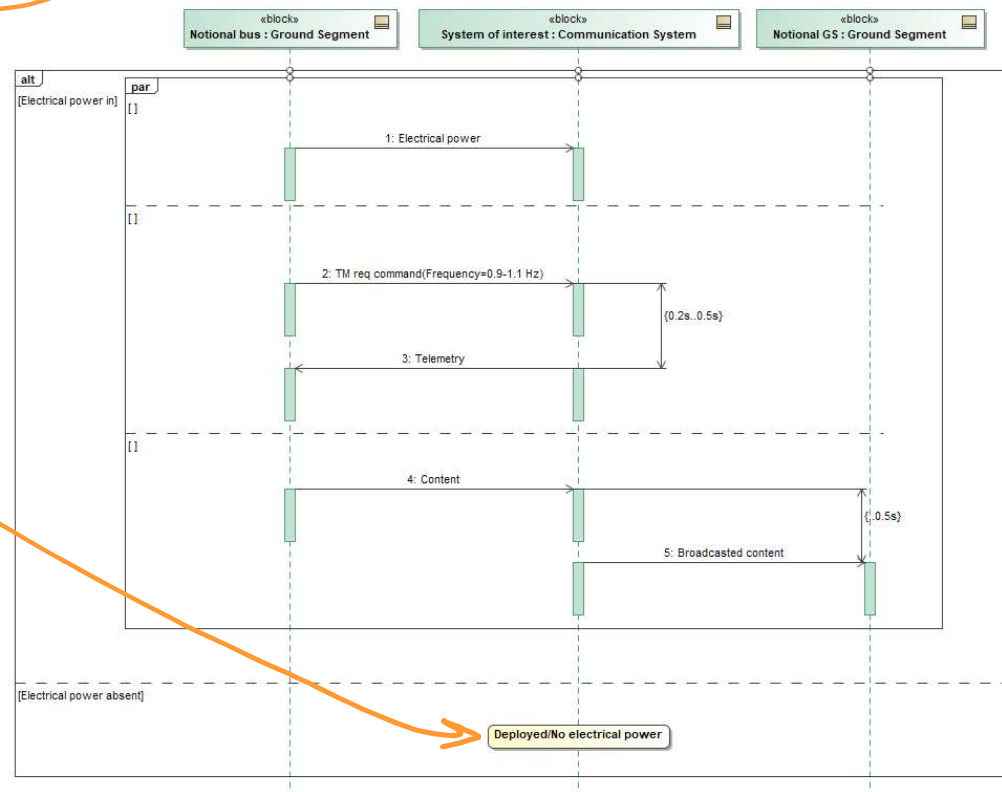
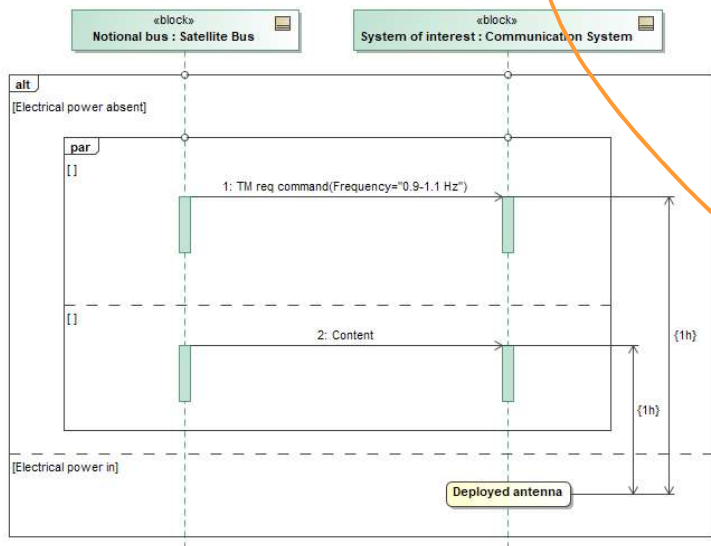
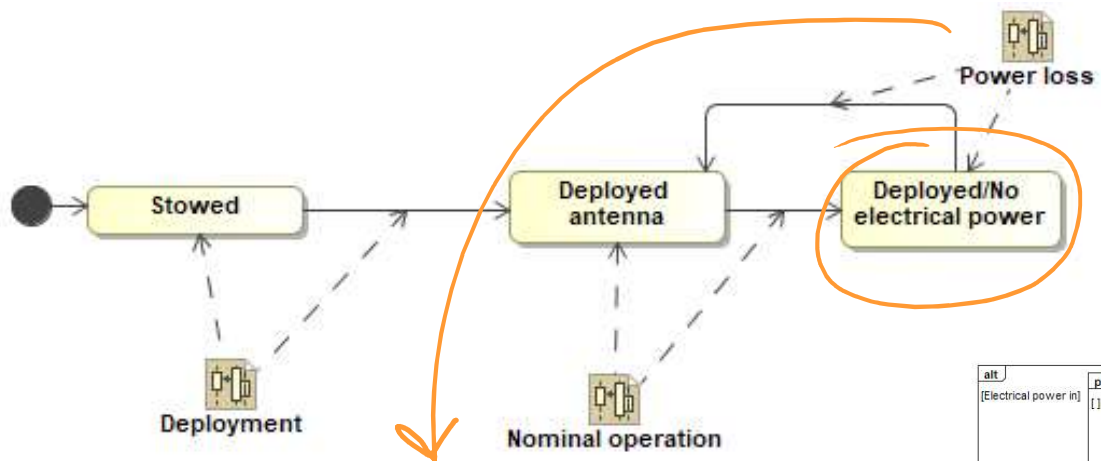
Do same

New behavior

Withstand prior w/o degradation

Withstand prior w/ degradation

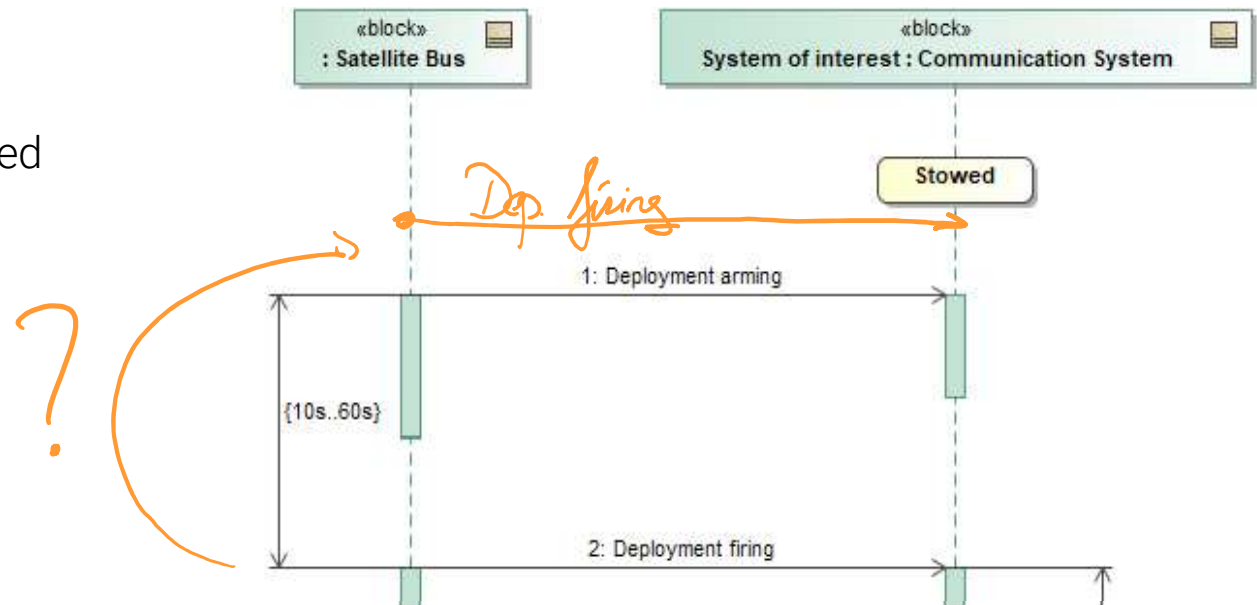




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## RULE 2

Inputs received in unexpected sequence



Input ×

Do you want to prescribe a behavior in case 'Deployment arming' and 'Deployment firing' are received in reverse sequence?  
Options: [Y/N]



# RULE 3

Out-of-range inputs

Input

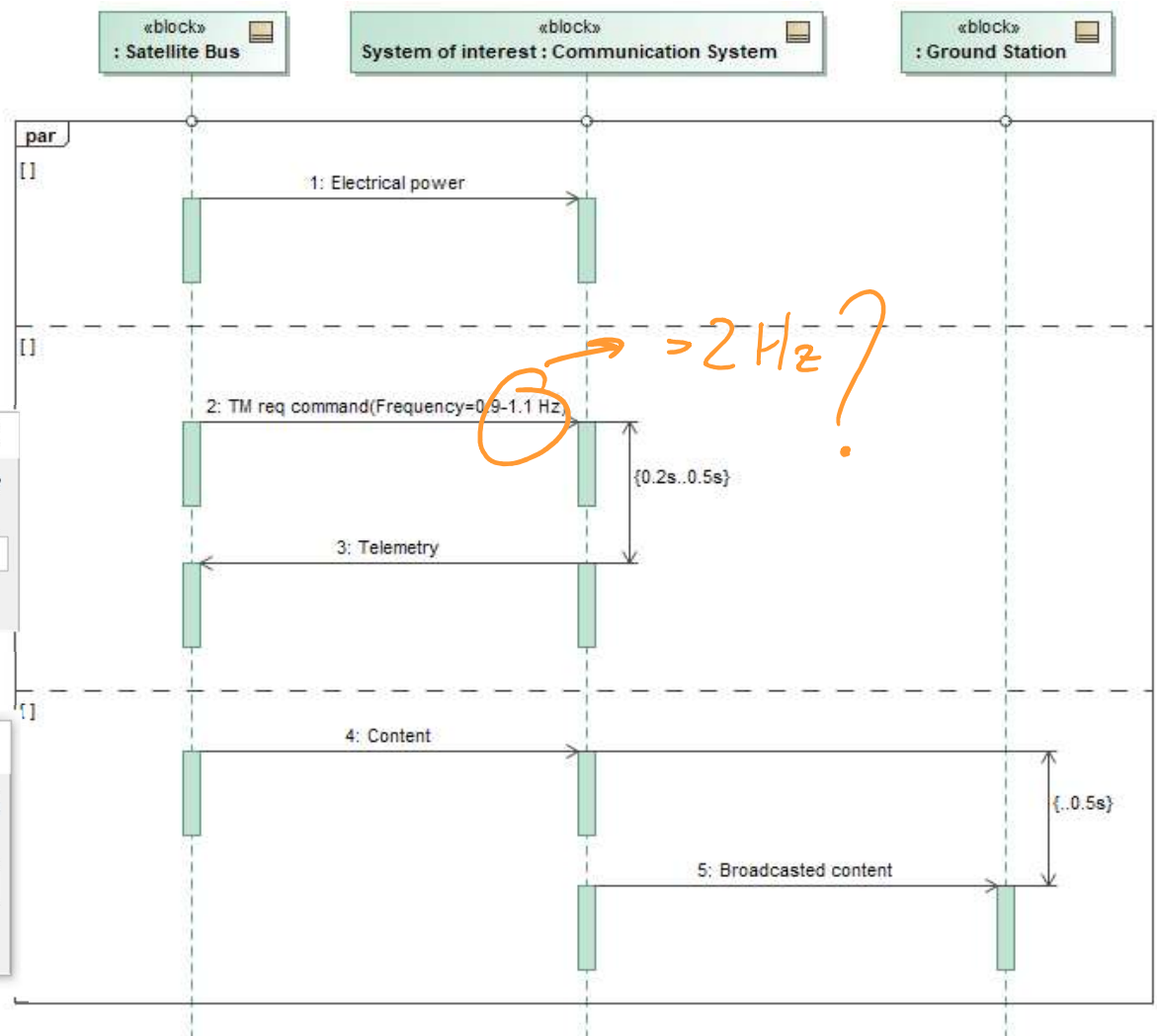
Do you care about ranges outside Signal TM req command?  
Options: [Y/N]

OK Cancel

Input

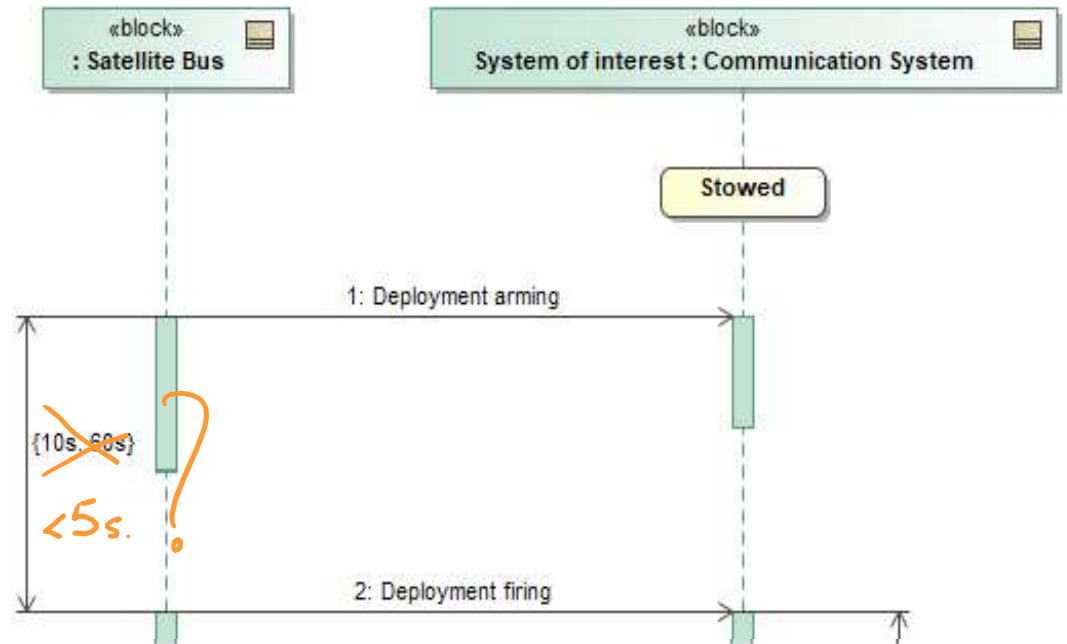
Please define a range for Signal TM req command  
Format: [property\_name],[min],[max],[units]

OK Cancel



# RULE 4

Unexpected time intervals



Input



Do you want to prescribe a behavior in case an instance of 'Deployment firing' is received in less than 10s after receiving 'Deployment arming'?

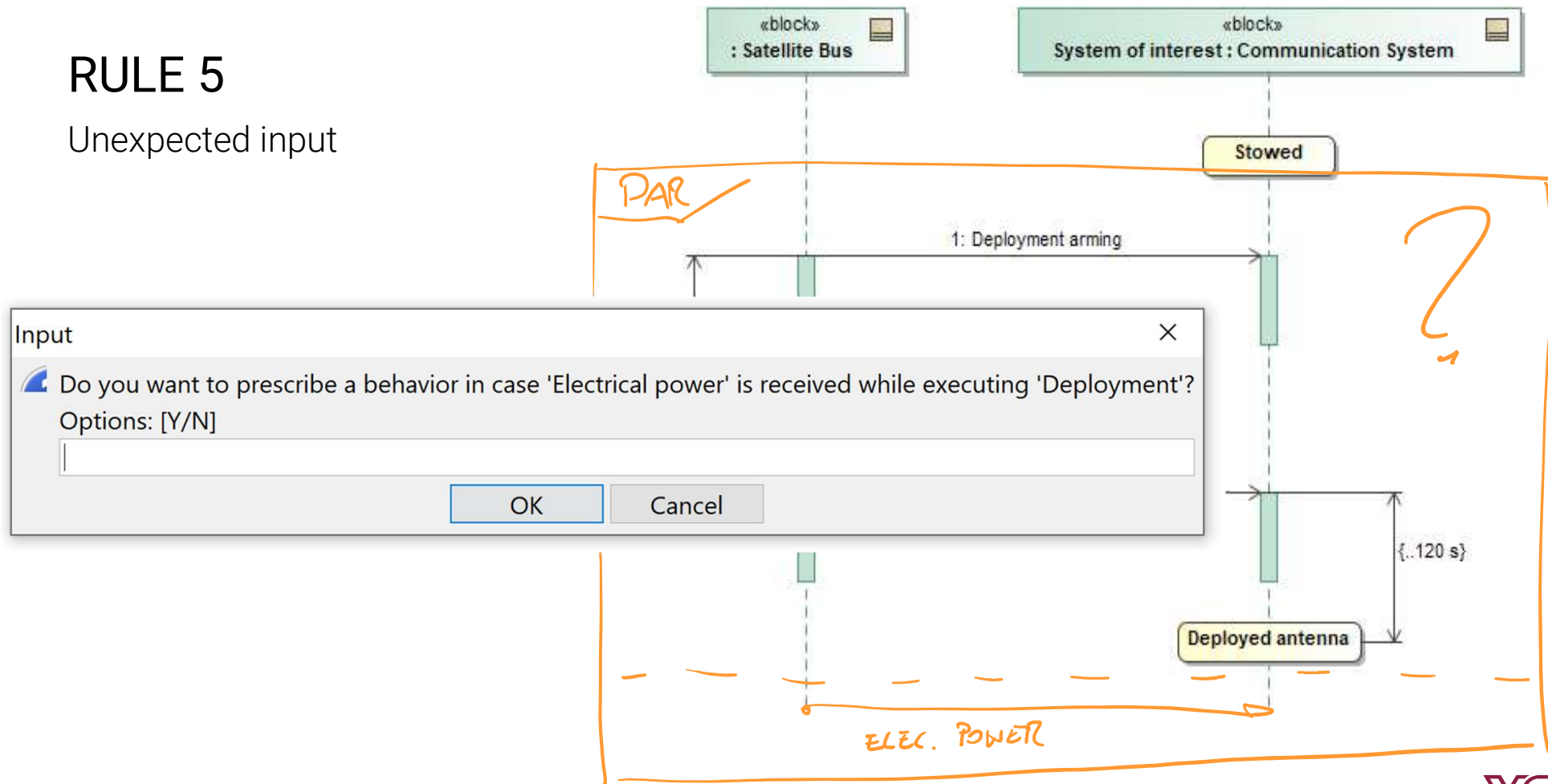
Options: [Y/N]

OK

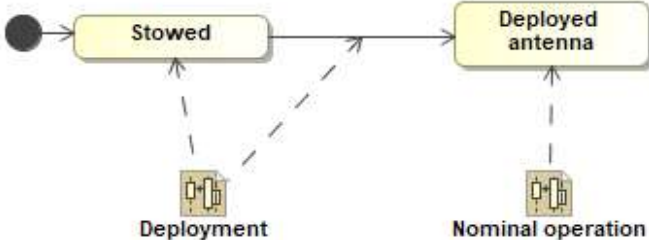
Cancel

# RULE 5

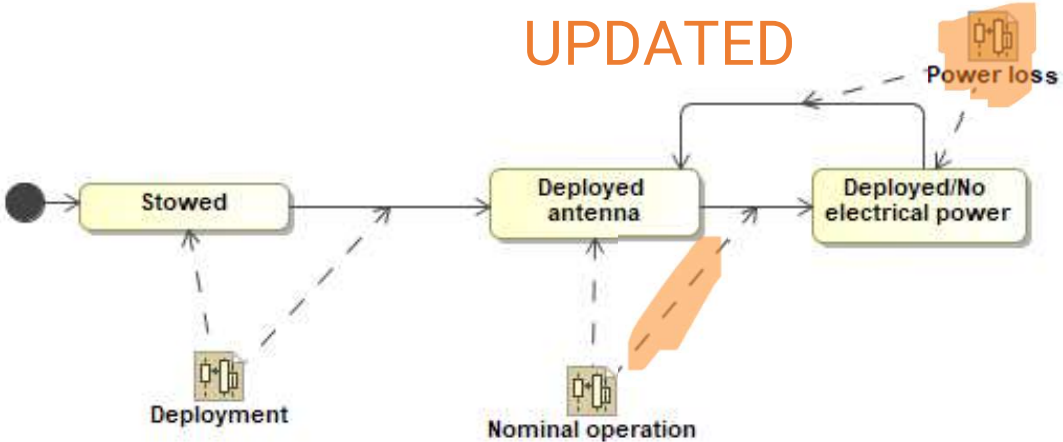
Unexpected input



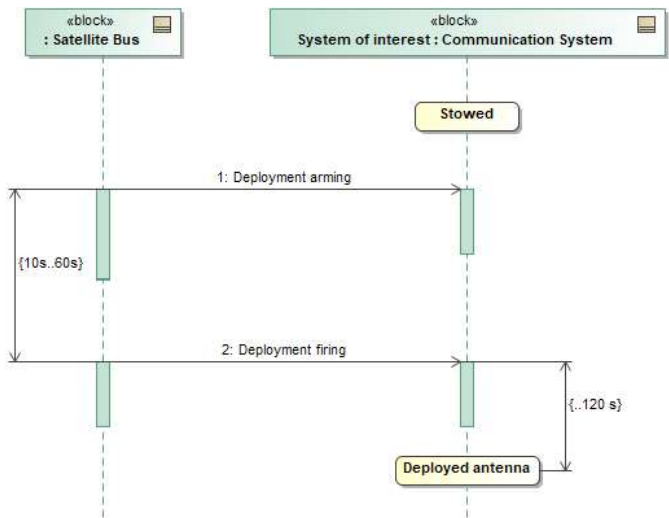
# INITIAL



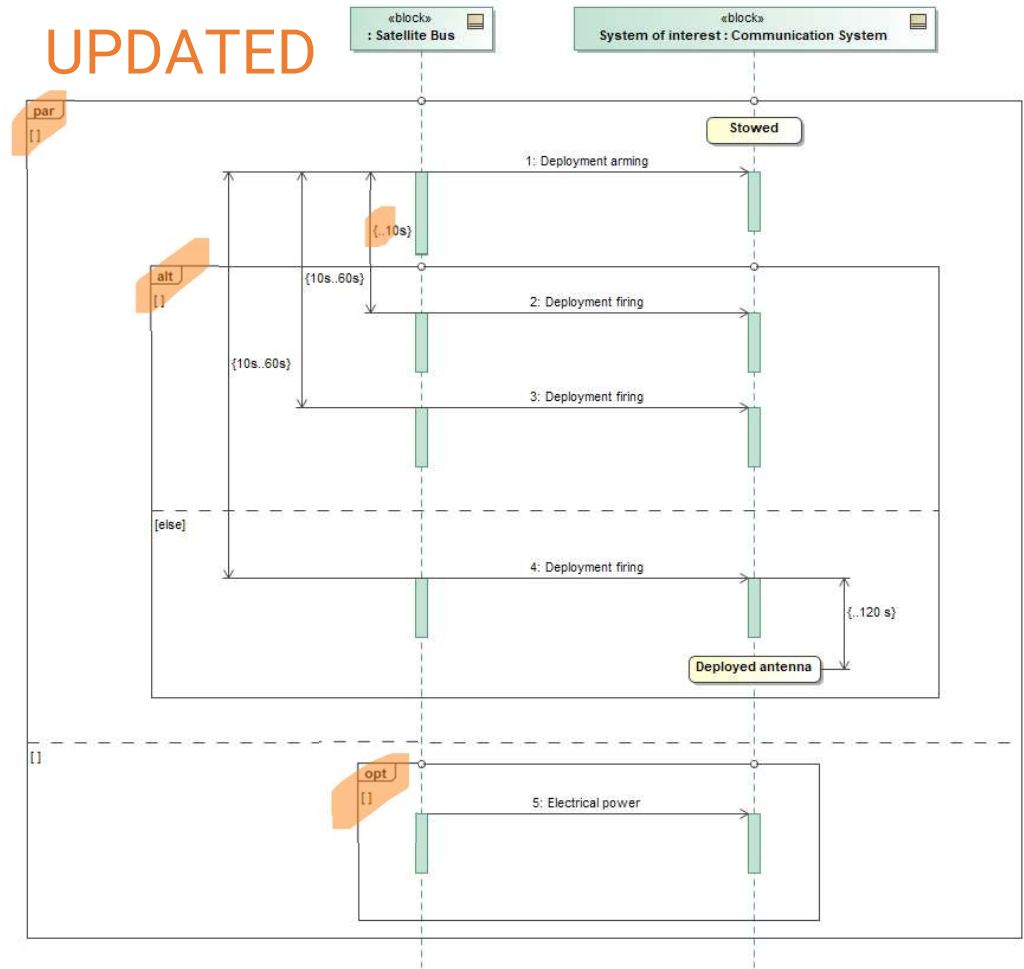
# UPDATED



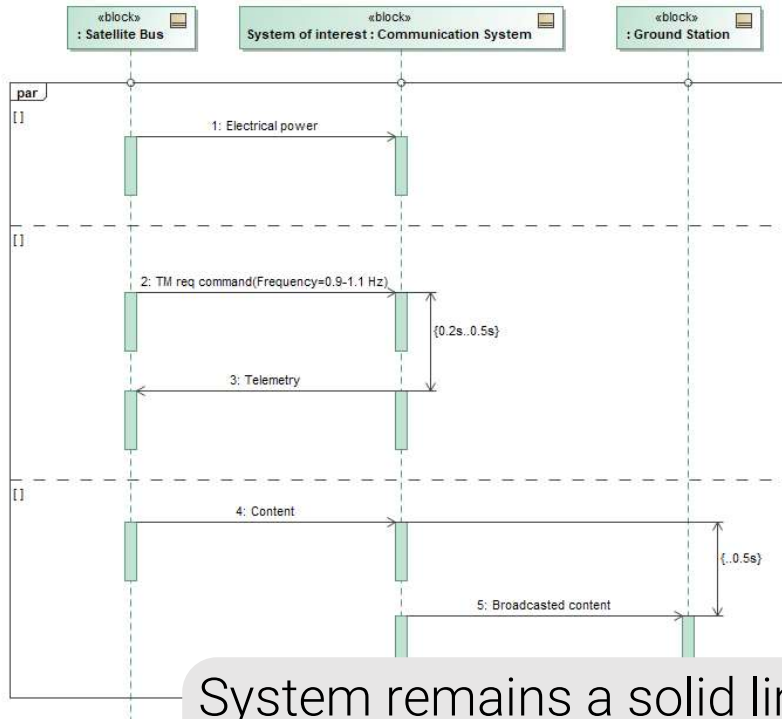
# INITIAL



# UPDATED

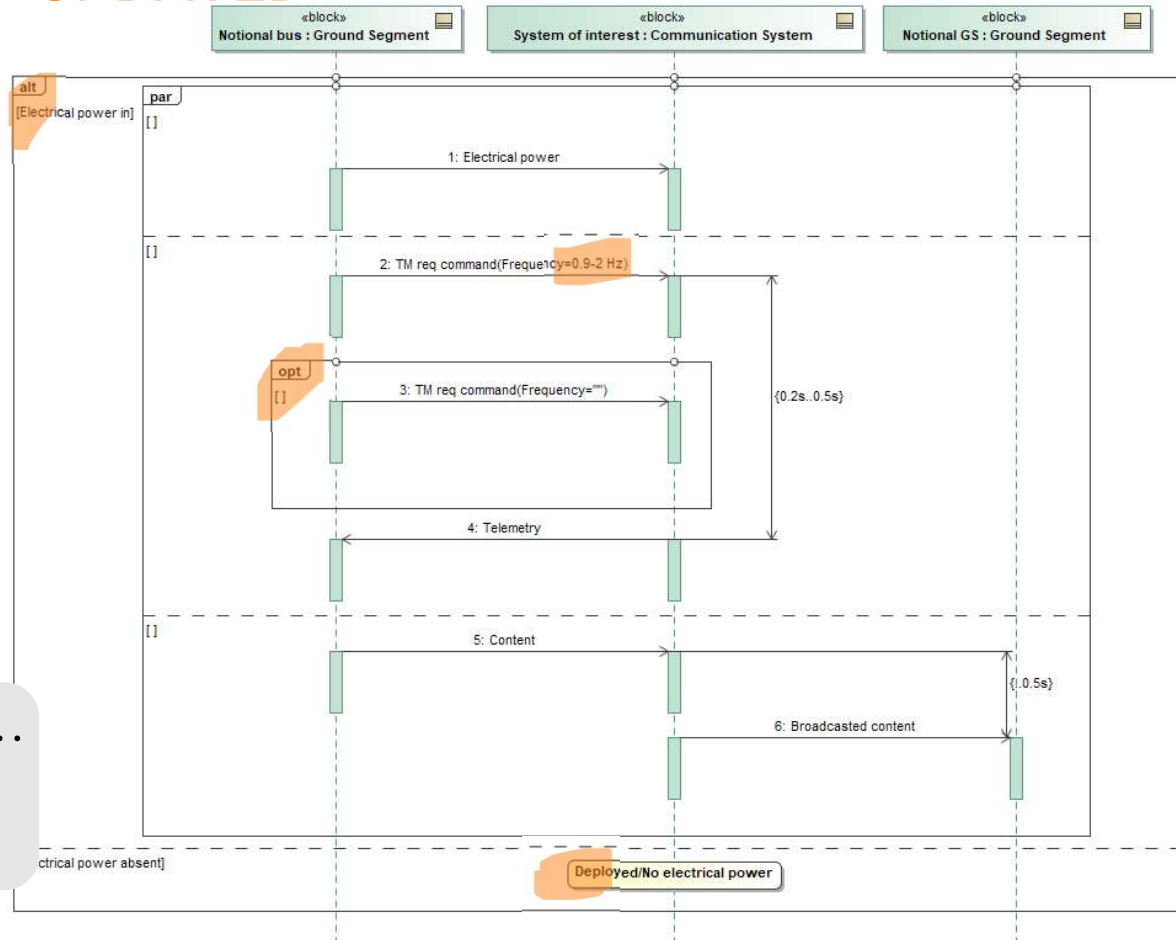


# INITIAL

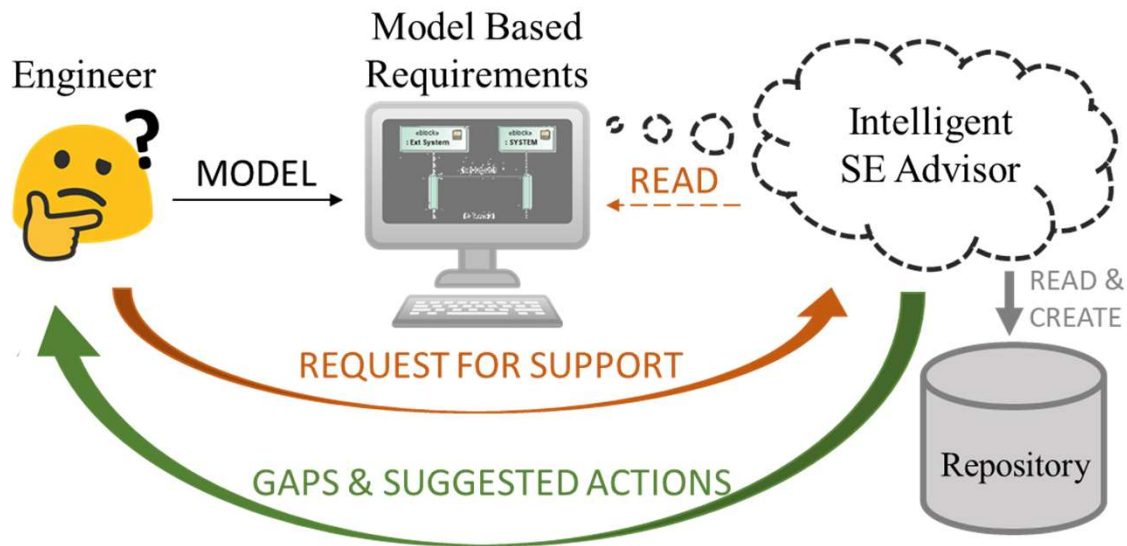


System remains a solid line...  
no design decisions just  
requirement identification!

# UPDATED



# PURPOSE is to aid the engineer



This was only a proof-of-CONCEPT!

Requirements  
**COMPLETENESS**

ROADMAP  
Structural rules Interpretation Learning

# THANK YOU

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