



AADL Model and Analysis

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AADL Usage at Boeing

- Past demonstrations
 - Joint Common Architecture (JCA) demonstration
 - Mission Systems Architecture Demonstration (MSAD)
- Current implementation
 - Vertical Lift programs



AADL Usage at
Boeing

AADL High Level
Arch

AADL System
Component

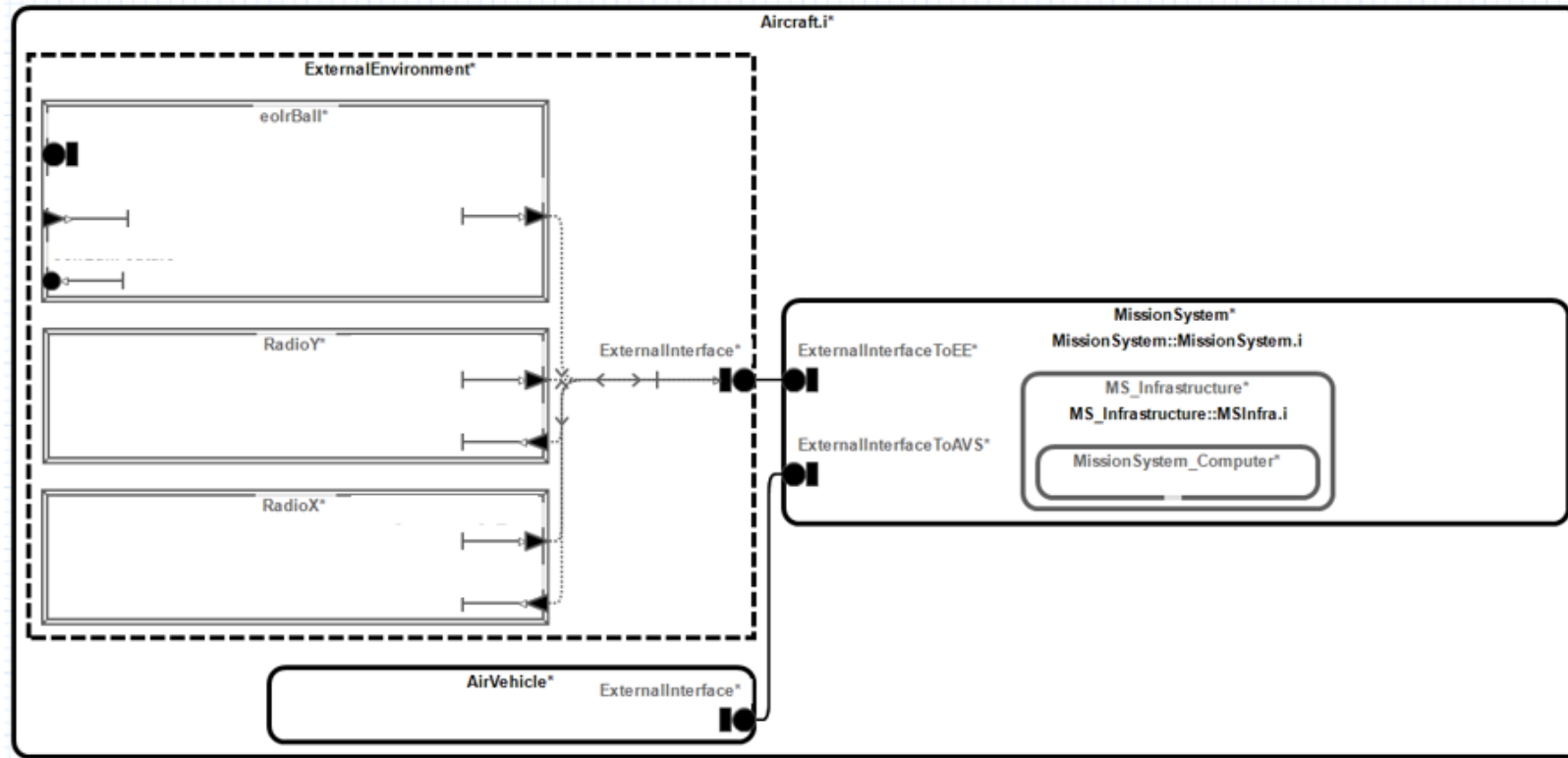
AADL Software
Component

AADL End to End
Flow

AADL Analysis

Lessons Learned

AADL Model: High Level Architecture



Components:

1. Air vehicle system
2. External environment
3. Mission System

AADL Usage at Boeing

AADL High Level Arch

AADL System Component

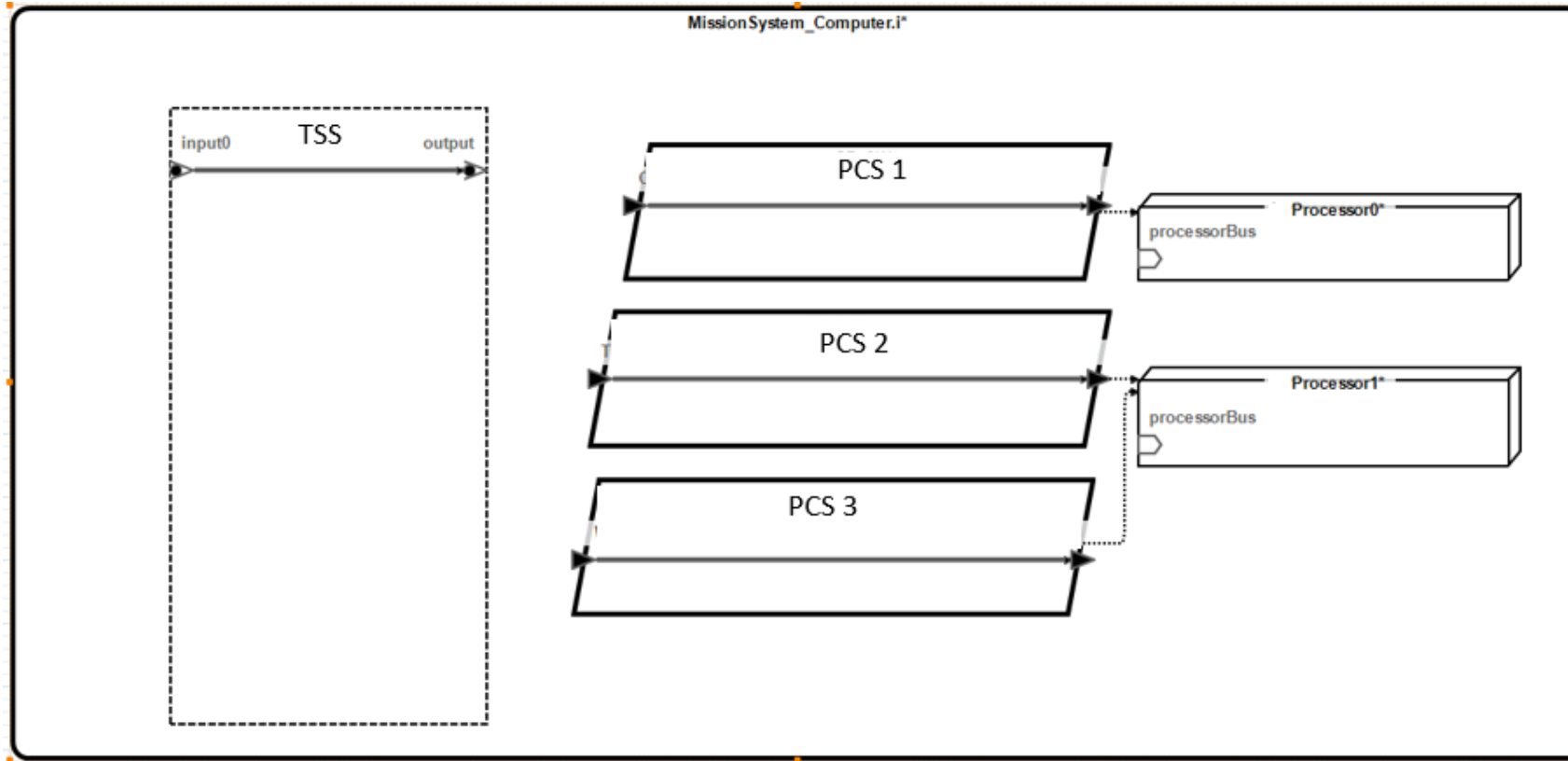
AADL Software Component

AADL End to End Flow

AADL Analysis

Lessons Learned

AADL Model: System Component



Components:

1. Future Airborne Capability Environment (FACE™) Portable Component Segment (PCS)
2. FACE Transport Services Segment (TSS)
3. Processor

AADL Usage at Boeing

AADL High Level Arch

AADL System Component

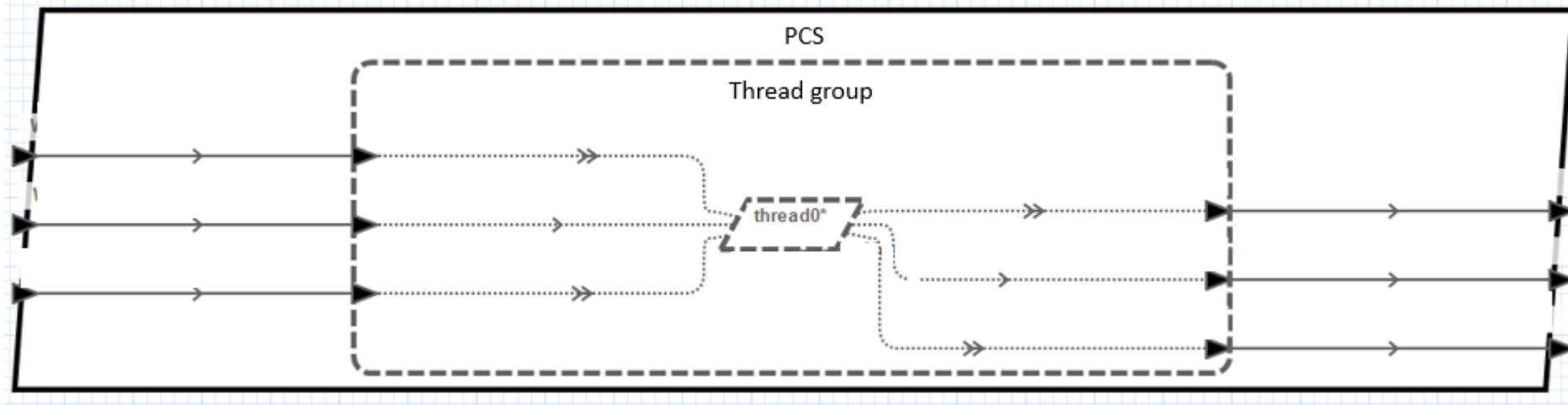
AADL Software Component

AADL End to End Flow

AADL Analysis

Lessons Learned

AADL Model: Software Component



- Components:
1. Process
 2. Thread group
 3. Thread

AADL Usage at Boeing

AADL High Level Arch

AADL System Component

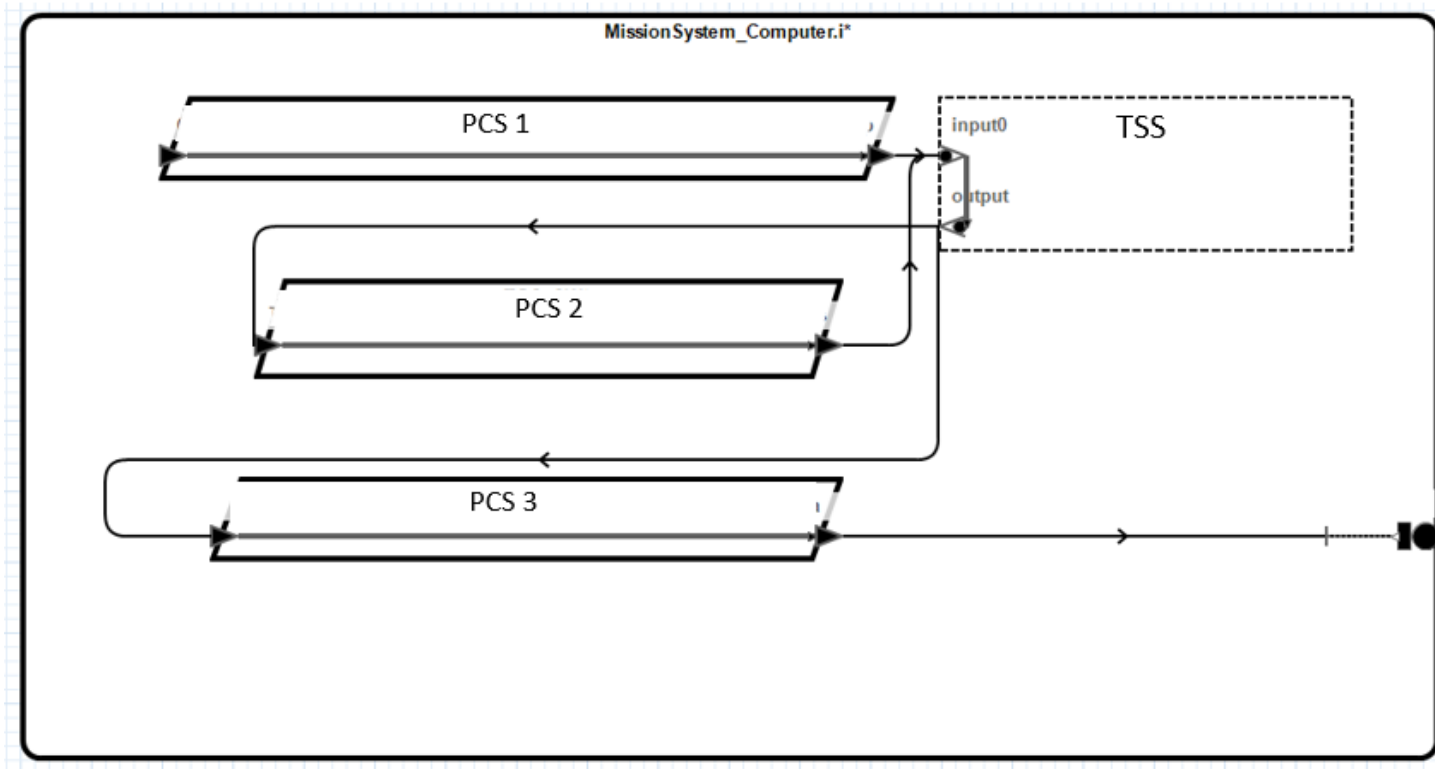
AADL Software Component

AADL End to End Flow

AADL Analysis

Lessons Learned

AADL Model: End to End Flow



The end to end flow shows each software components interact with each other via FACE TSS

AADL Usage at Boeing

AADL High Level Arch

AADL System Component

AADL Software Component

AADL End to End Flow

AADL Analysis

Lessons Learned

Analysis Covered by ACVIP

- Utilization Analysis (using Adventium's Framework for Analysis of Schedulability, Timing and Resources (FASTAR) from Adventium's Curated Access to Model-based Engineering Tools (CAMET))
- Bus Load Analysis
- Latency Analysis
- Static Consistency Analysis
- Exploring: Behavioral Consistency Analysis (using the State Linked Interface Compliance Engine for Data (SLICED) tool from Adventium's CAMET)
- Exploring: Reliability and Availability Analysis (using AADL Error Annex)



Lessons Learned

- State Linked Interface Compliance Engine for Data (SLICED) analysis discovered error in a PCS' properties: thread period is less than the deadline. SLICED perform all possible thread dispatch and found this issue.
- Adventium added capability to create composite states for SLICED analysis
- AADL Bridge should be utilized from the very start
- Adventium relaxed SysML modeling constraints so that AADL Profiles can be added to a wider SysML elements
- FACE message data size needs to be added manually for performing accurate Bus Load analysis



Q&A

