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Systems Integration

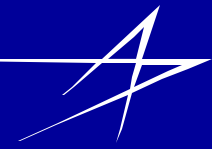


Multidimensional Performance Modeling for Advanced Embedded Signal Processors

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Multidimensional Performance Modeling



DoD missions/systems require new approaches/ tools to exploit emerging reconfigurable technologies to form polymorphous/power aware systems.

- **Problem:**

- Traditional performance modeling approaches are unable to address emerging requirements and component technologies. This is a result of an increased awareness and need for dynamically adaptive or reconfigurable systems, particularly in the area of power dissipation/performance.



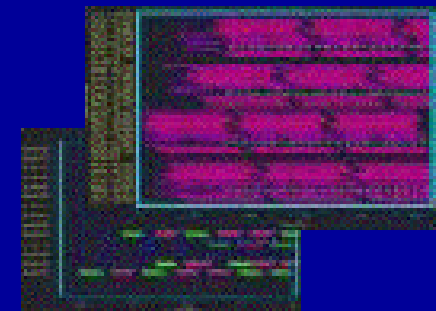
- **Goal(s)/Objectives(s)**

- Define methods/algorithms to accurately model and optimize reconfigurable architectures and functions (services) required to support multidimensional performance modeling.
- Apply ideas developed from InfoPad, ACS, PAC/C, DARES, PCA, and MSP to develop a unique new rapid prototyping/optimization capability.

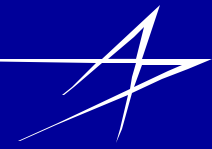


- **Approach**

- Define features required to support accurate performance and multidimensional modeling and optimization of DRAs.
- Evaluate algorithms/methods for performing intelligent, reactive dynamic scheduling.
- Evaluate algorithms/methods for performing offline analysis, data reduction, pattern recognition, and execution planning.



DARPA Tech Demo



PCA Virtual Processor
State and Activity

System State and
Task Flow

Total active
processor
count display

Stream
Processors
indicated by
filled boxes

GP Processors
indicated by
outlined boxes

Dynamic bar
chart indicating
total active
processors,
active stream
processor
active GP
processors and
active threaded
processors

Mission
Assignment

Threat
Avoidance

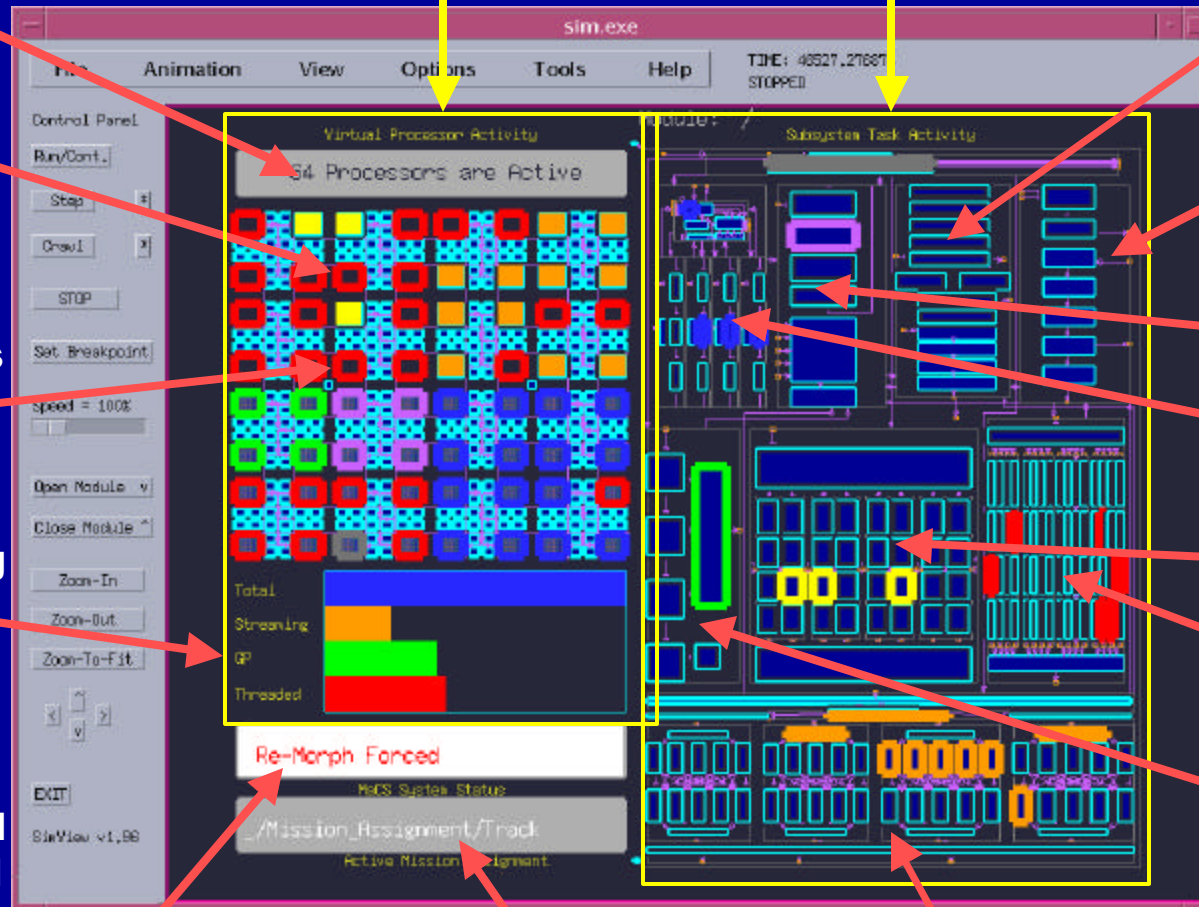
Communi-
cations

Flight
Control

Imaging

Route
Planning

Self Test
and MaCS



MaCS messages
and status

Mission status

RADAR Tasks



Real-time Systems Group, University of Pennsylvania

