

# RAPID RMA™

for Rational Rose® RealTime



*"Our systems need to meet explicit quantitative performance goals. If you miss a timing sequence when designing a satellite, it falls out of the sky. RMA-based tools are the only ones that can perform the sophisticated technical analysis we need to assure quality real-time system design."*

*Lockheed Martin*



Combining the Rate Monotonic Analysis (RMA) of RapidRMA™ with the visual modeling environment of Rational Rose® RealTime, RapidRMA for Rational Rose RealTime allows real-time software developers to prevent costly design mistakes and accelerate their development schedules. Through the industry standard Unified Modeling Language™ (UML), plus real-time design constructs, code generation, and model execution, Rose RealTime addresses the complete lifecycle of a project – from early use case analysis, through design, implementation, and testing. By providing timing extensions to the UML language, RapidRMA for Rose RealTime verifies the performance of the design throughout this cycle. RapidRMA for Rose RealTime maintains timing analysis results in the UML model, and allows designers to test software models against various design scenarios and evaluate how different implementations might optimize the performance of their systems. By isolating and identifying potential bottlenecks in both soft and hard real-time systems, RapidRMA for Rose RealTime can reduce development costs and avoid many hours of wasted manpower.

## What is Rate Monotonic Analysis:

Rate Monotonic Analysis (RMA) is a collection of quantitative methods and algorithms used to analyze real-time systems. The analysis determines whether your system is schedulable. In other words, RMA determines whether all tasks will execute by the appropriate deadlines using the resources specified.

## RapidRMA™ for Rational Rose® RealTime Benefits:

- Provides one model for both development and timing analysis
- Allows cost effective testing and modeling of systems

Software Requirements Analysis	Preliminary Design	Detailed Design	Implementation
Discrete Event Simulator Historical Data	Prototyping	Device Simulation	Actual Measurements
<b>Rate Monotonic Analysis</b>			
Rough Model	Tasking Architecture Defined	Detailed Model	Full Model
RapidRMA RapidSim Rose RealTime	RapidRMA RapidBuild RapidSim WindView IF Rose RealTime OSE Illuminator IF	RapidRMA RapidBuild WindView IF Rose RealTime OSE Illuminator IF	RapidRMA WindView IF OSE Illuminator IF

- Guarantees schedulability under "worst-case" conditions
- Isolates and identifies timing problems
- Reduces development time and cost
- Provides "what if" support to identify bottlenecks and performance issues
- Provides "worst-case" schedulability analysis

## RapidRMA for Rational Rose RealTime Features:

- Seamless integration with Rational Rose RealTime
- Language extensions to the UML
- Maintain timing analysis information directly back in UML model
- Powerful Rate Monotonic Analysis (RMA) Methodology
- Deadline Monotonic Analysis (DMA)
- Earliest Deadline First (EDF)
- Cyclic Executive Analysis
- Aperiodic Simulation
- Interface to Wind River Systems' WindView GUI tool
- Probabilistic analysis in RapidRMA Scheduler
- Additional job completion time algorithms
- DASPCP (Distributed Affected Set Priority Ceiling Protocol) used for object oriented resource contention
- End-to-end analysis for single-node and multiple-node architectures
- Improved license management with FLEXlm
- Priority mapping to RTOS specific local priority

## Hardware and Software Requirements:

- Microsoft Windows 2000 or NT
- Rational Rose RealTime

**Rational**  
unified partner



**OSE**

**OMG**  
OBJECT MANAGEMENT GROUP



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