

Users	Software and hardware developers
Key Features	Develop a new piece of software or hardware that needs to integrate with other components that may or may not exist yet
Benefits for the User	Java simulation environment provides a fast, and extensible implementation for model based design
Inputs	DynAA receives as input three models (views) of the system, the task model, the physical model, and the function to task allocation ($F \rightarrow T$ mapping model).
Outputs	A system simulated in DynAA produces a simulation log that can be post processed to extract system Key Performance Indicators (KPIs) and their evolution during the simulation time. Typical plots that can be extracted from DynAA are energy consumption profile, communication latency and throughput for each channel, task activation rate profiles, reliability of the system, etc.
Block Design	<p>The diagram illustrates the DynAA architecture. At the top is the DynAA user API, which includes components like <i>GNode, DesktopPC, etc.</i>, <i>Fading Channel, etc.</i>, and <i>SamplingTask, FFT, etc.</i>. Below this is the DynAA Library, which contains the Environment, Communication Link, Connection, Port, and Task classes. The DynAA core – a discrete event simulation engine is at the bottom. Relationships are shown with multiplicity: Environment maps to Communication Link (1 to 1) and Connection (1 to 1). Node lives in Environment (1 to 0..*) and executes Task (0..* to 0..*). Port runs in Task (0..* to 0..*1).</p>
Example of Usage	<p>Example where DynAA is used to implement both the dataflow model, the tasks model and the physical model, which are then interfaces using a mapping model to create complete system simulation.</p> <p>The diagram shows three interconnected models. The dataflow model (top) consists of functions F_1 through F_8 connected in a network. The task model (bottom left) consists of tasks T_1 through T_4. The physical model (bottom right) consists of processors P_1, P_2, P_3 and channels C_{12}, C_{13}. Arrows indicate the $F \rightarrow T$ mapping and the $T \rightarrow P$ mapping.</p>
Role in the Toolchain	Within CERBERO, DynAA is used to model, analyse, and simulate aspects of the CPSs under design in early stages of the development.