Contribution ID: **263** Contribution code: **WECG001** Type: **Contributed Oral Presentation**

Behavior tree sequencing and automation framework at LCLS

Wednesday 24 September 2025 14:15 (15 minutes)

BEAMS is a sequencing framework in development at the Linac Coherent Light Source (LCLS) that uses behavior trees to meet diverse automation goals.

LCLS is implemented with a distributed array of control systems operating in concert to deliver bright, coherent x-ray lasers to a variety of experimental endstations. The automation systems at these endstations have different goals and maturity levels, which has resulted in a diverse set of sequencing and automation needs. In order to optimize uptime and flexibility, we are leveraging behavior trees as an automation framework. Proven in industry, behavior trees provide a comprehensive, shared no-code language that invested parties can communicate and iterate upon. This system concretizes operator experience in a formalized, version controlled document, and gives system owners a structured way to induce state transformation or react to off nominal events.

Footnotes

Funding Agency

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Session Classification: WECG MC12 Software Development and Management Tools

Track Classification: MC12: Software Development and Management Tools