Computational Weapons Science and Simulation:

Targets to address Nuclear Weapons Issues

Advanced Simulation & Computing™

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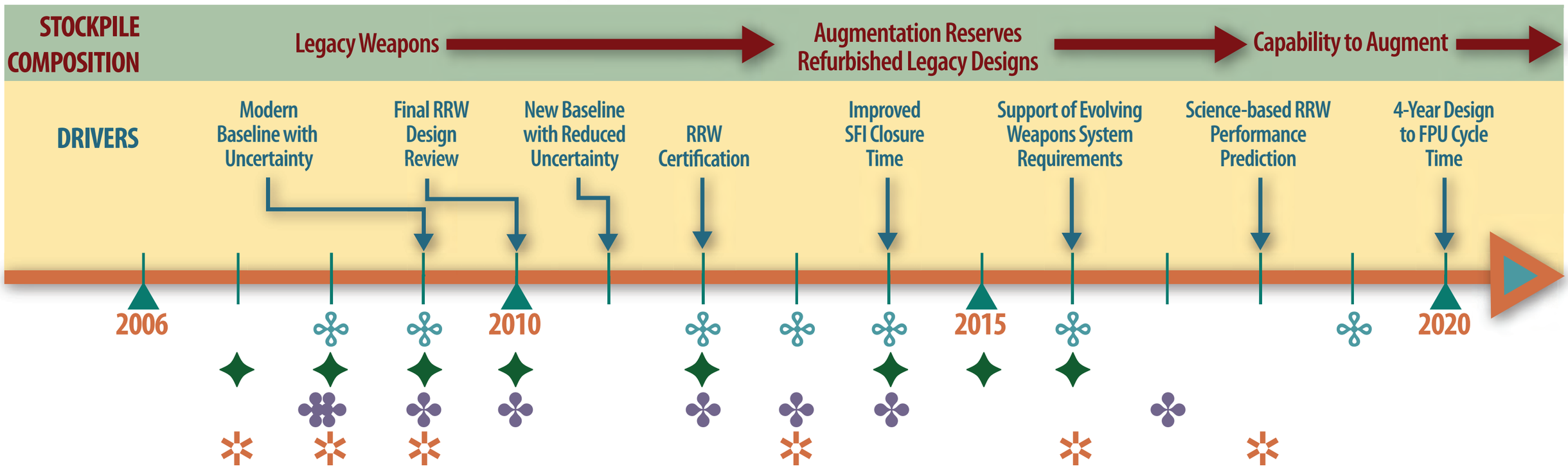

ASC Targets

FOCUS AREA 1: ADDRESS NATIONAL SECURITY SIMULATION NEEDS

- 2008: National code strategy
- 2009: Modular physics and engineering packages for national weapons codes
- 2012: Tested capability to address emerging threats, effects, and attribution
- 2013: 50% improvement in setup-to-solution time for SFI simulations (with respect to 2007)
- 2014: Full-system engineering and physics simulation capability
- 2016: Capability to certify fire safety for an unfielded weapon
- 2019: 50% improvement in setup-to-solution time for SFI simulations (with respect to 2013)

FOCUS AREA 2: ESTABLISH A VALIDATED PREDICTIVE CAPABILITY FOR KEY PHYSICAL PHENOMENA

- 2007: Launch Thermonuclear Burn Initiative collaboration
- 2008: Realistic plutonium aging simulations
- 2009: Science-based replacement for Knob (ad hoc model) #1
- 2010: Science-based models for neutron tube simulations
- 2012: Validated science-based replacement for Knob (ad hoc model) #2
- 2014: Science-based models for fire-excitation simulations
- 2015: NIF-validated simulations supporting replacement of Knob #3
- 2016: Predictive model for Knob (ad hoc model) #4

FOCUS AREA 3: QUANTIFY AND AGGREGATE UNCERTAINTIES IN SIMULATION TOOLS

- 2008: National verification & validation strategy
- 2008: Assessment of major simulation uncertainties
- 2009: Shared weapons physical databases
- 2010: Uncertainty Quantification (UQ) methodology for QMU
- 2012: 20% reduction in overall prediction error bars (with respect to 2006)
- 2013: Re-assessment of major simulation uncertainties
- 2014: Demonstrated uncertainty aggregation for QMU
- 2017: 20% reduction in overall prediction error bars (with respect to 2012)

FOCUS AREA 4 : PROVIDE MISSION-RESPONSIVE COMPUTATIONAL ENVIRONMENTS

- 2007: Initiate new National User Facility model for capability supercomputing
- 2008: Seamless user environments for capacity computing
- 2009: Petascale computing
- 2013: Seamless user environments for capability computing
- 2016: 100x petascale computing
- 2018: Exascale computing