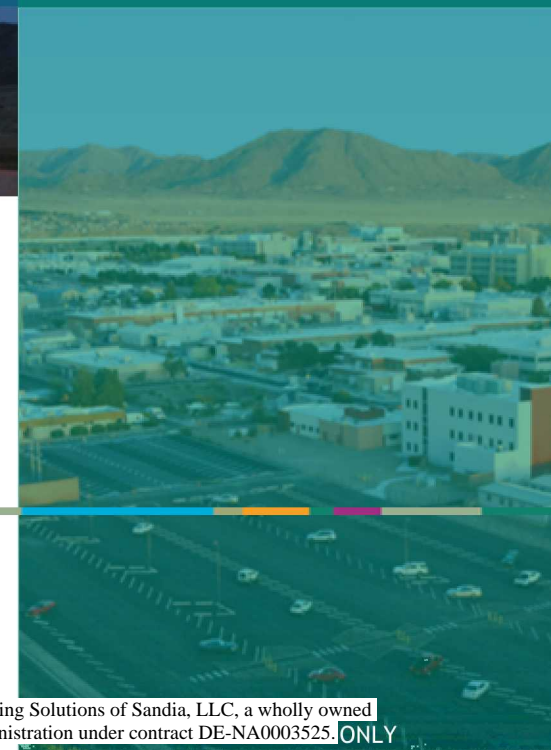
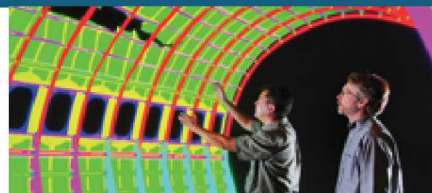
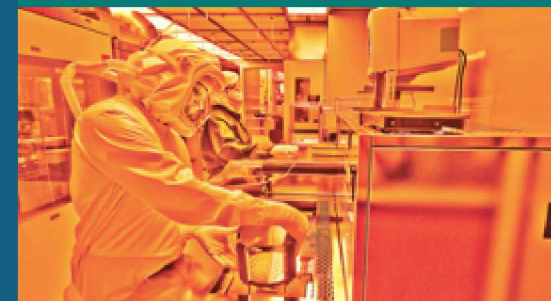


Tri-Lab 2019 ASC L2 Milestone ATS-I Goal for Weapon Simulation Codes



PRESENTED BY

O. Erik Strack

SC18 ASC Execs Meeting
Dallas, TX
November 14, 2018

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FY2019 Tri-Lab L2 Milestone

Description: Demonstrate agile weapon simulation code development by running simulations of relevance to DSW on at least 50% of the Knights Landing portion of the ATS-1 platform Trinity

Completion Criteria:

- DSW or related simulation(s) from each Lab
- Simulation on at least 50% of Trinity/KNL
- Report performance, e.g., scaling, runtime, I/O

Review Committee

Milestone Lead: Curtis Ober (SNL)

Reviewers

- Mostly complete (finalizing a few of the reviewers)

Tentative Review Committee Schedule

- Initial meeting JOWOG34 Jan. 28-30, 2019 at LANL (initial plans started)
- Mid-year meeting? ~April (ASC PI meeting or Skype?)
- Final review August 2019 SNL

ATS-1 Goal for Weapon Simulation Codes – SNL

Simulations (leveraging LSCI efforts)

- SPARTA – Direct Simulation Monte Carlo (DSMC) for exo-atmospheric dynamics
 - Leads: Michael Gallis and Stan Moore
 - To date: successful “science” runs across both partitions (Haswell + KNL)
 - Stretch goal – make comparison runs on ATS-2 in FY2019
- SPARC – Wall-Modeled Large Eddy Simulation (WMLES) simulations to determine pressure and temperature fluctuations on reentry systems (forebody and base region)
 - Leads: Micah Howard, Justin Smith and Ross Wagnild
 - To date: good performance on KNL for FY17 & FY18 L2 milestones

2019 ASC L2 Milestone #6767: ATS-1 Goal for Weapon Simulation Codes

FY19Q4 Tri-Lab L2 Milestone

- IC IDC or Weapons-Simulation Code(s)
- DSW Simulation(s) (Lab Unique)
- Simulations Run On At Least ½ Trinity/KNL
- Code Assessments: Scaling, Runtime, etc.

LANL Demonstrations/Assessments

- EAP & LAP Integrated Design Code (IDC)
Large-Scale Run to Completion, Plus
Assess Performance On Simulation 'Slice'
- EAP: 3D Halfbeak UGT
All Simulations Complete
- LAP: 3D W76 Pre-Shot Calculation
Target Runs Completed in CY18

LANL Leads:

Galen Shipman

Gabe Rockefeller

LANL Reviewers:

David Daniel

Ben Bergan

Milestone Description: “Demonstrate agile weapon simulation code development by running simulations of relevance to DSW on at least 50% of the Knights Landing portion of the ATS-1 platform Trinity.”

2019 ASC L2 Milestone #6767: ATS-1 Goal for Weapon Simulation Codes

- LLNL lead: Patrick Brantley
 - Mike Pozulp will be executing the simulation
- Criteria: Must run a weapons relevant simulation on at least 50% of the KNL partition of Trinity
 - Monte Carlo simulation of a survivability assessment
 - Simulation will represent a scaled up version of previous assessments made by the Survivability Team at LLNL

ASC ATDM Target: Performance & Physics Assessments of ATDM/CDA Codes

FY20Q4 Tri-Lab L1 Milestone

- ATDM/CDA Codes
- 3D DSW Simulation(s) (Lab Unique)
 - Run On At Least $\frac{1}{2}$ Trinity/KNL & $\frac{1}{4}$ Sierra

Milestone Code Assessments

- Machine Performance: Use Tri-Lab & Lab-Unique Criteria
 - Plus Code Portability & Productivity (User & Developer)
- Physics Readiness: Assess Capability & Fidelity
 - Relative to Existing Production Codes

Current L1 Milestone Efforts

- Ongoing ATDM Code Development
- Updating Target Language (~Dec 18)
- Initial Discussions on Review Panel
 - Two SMEs Per-Lab, Plus 1-2 ECP Reps

LANL Leads:
Aimee Hungerford
David Daniel
LANL Reviewers:
Galen Shipman
Jimmy Fung

“The new codes developed as part of ATDM are intended to mitigate the risk that existing application codes may not provide the requisite performance on future computer architectures.” ATDM Target December 2014