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2020 Vision of Engineering Analysis and Simulation
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The Case for Simulation Lifecycle Management

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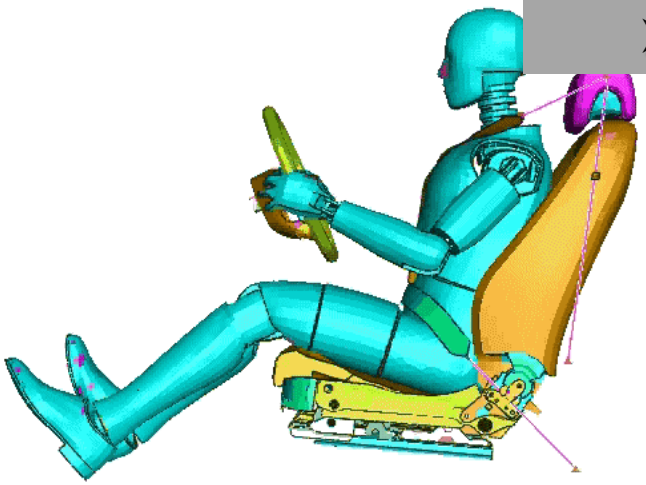
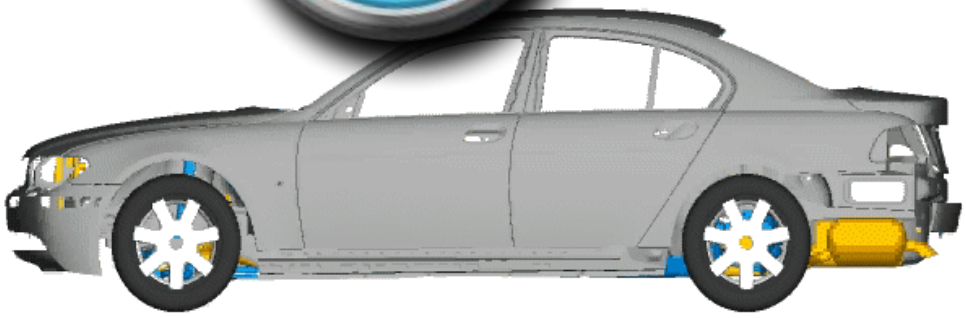
Role of Simulation in Product Development

Drive design decisions

- Reduce physical prototypes
- Provide deeper insight
- Explore design alternatives
- Increase confidence in designs

- BETTER
- FASTER
- CHEAPER

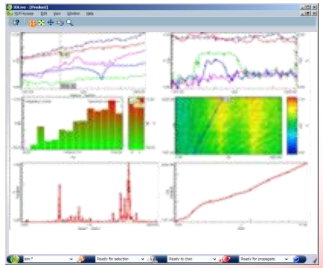


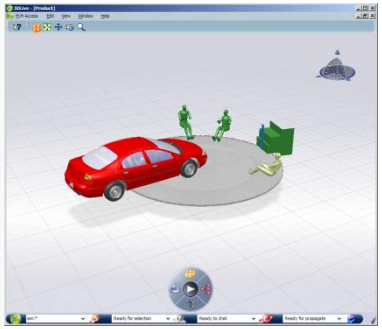


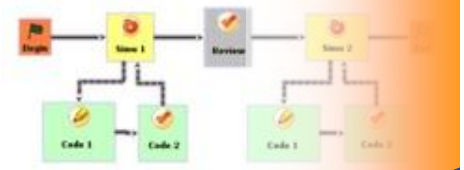
Courtesy of BMW

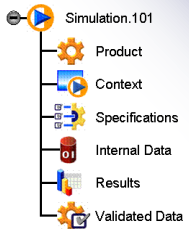
SLM Fundamentals

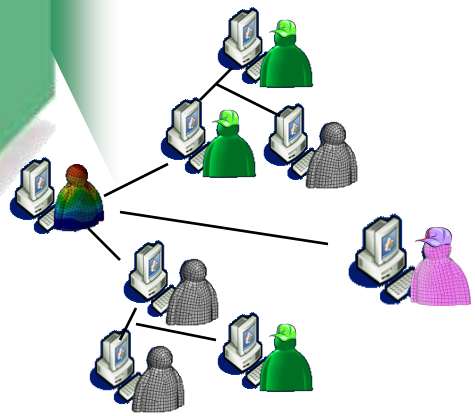
Intellectual property—capture & reuse







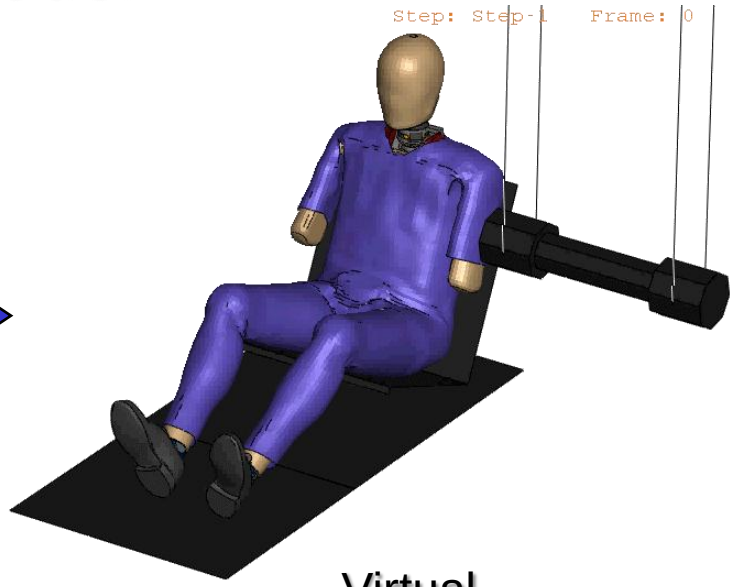




Bringing Order to Simulation: Data → Processes → Decisions

Product Objectives — WorldSID Male FE Model

Physical



Virtual

Product objective: Deliver virtual FE model of WorldSID Dummy

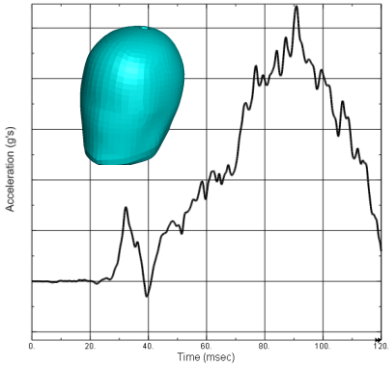
- Validated
- Accredited
- Supported
- Robust

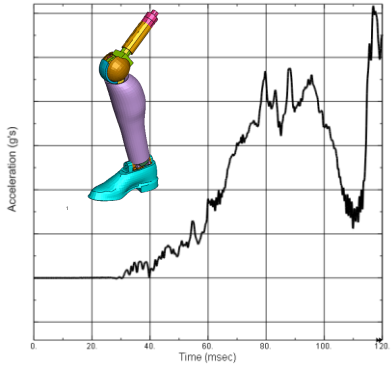
Work Data—WorldSID Male FE Model

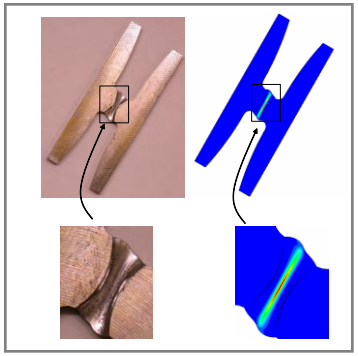
Input

Courtesy of FTSS

Examples: Material tests, drop tests, pendulum impact tests







GEOMETRY (CAD and preliminary FEA meshes)

TEST results: Material, components/subassemblies, full dummy assembly—approximately 350 different tests

Deliverable

Abaqus input file of validated full dummy model

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*Heading
WorldSID Male FE Model
** ...
** ...
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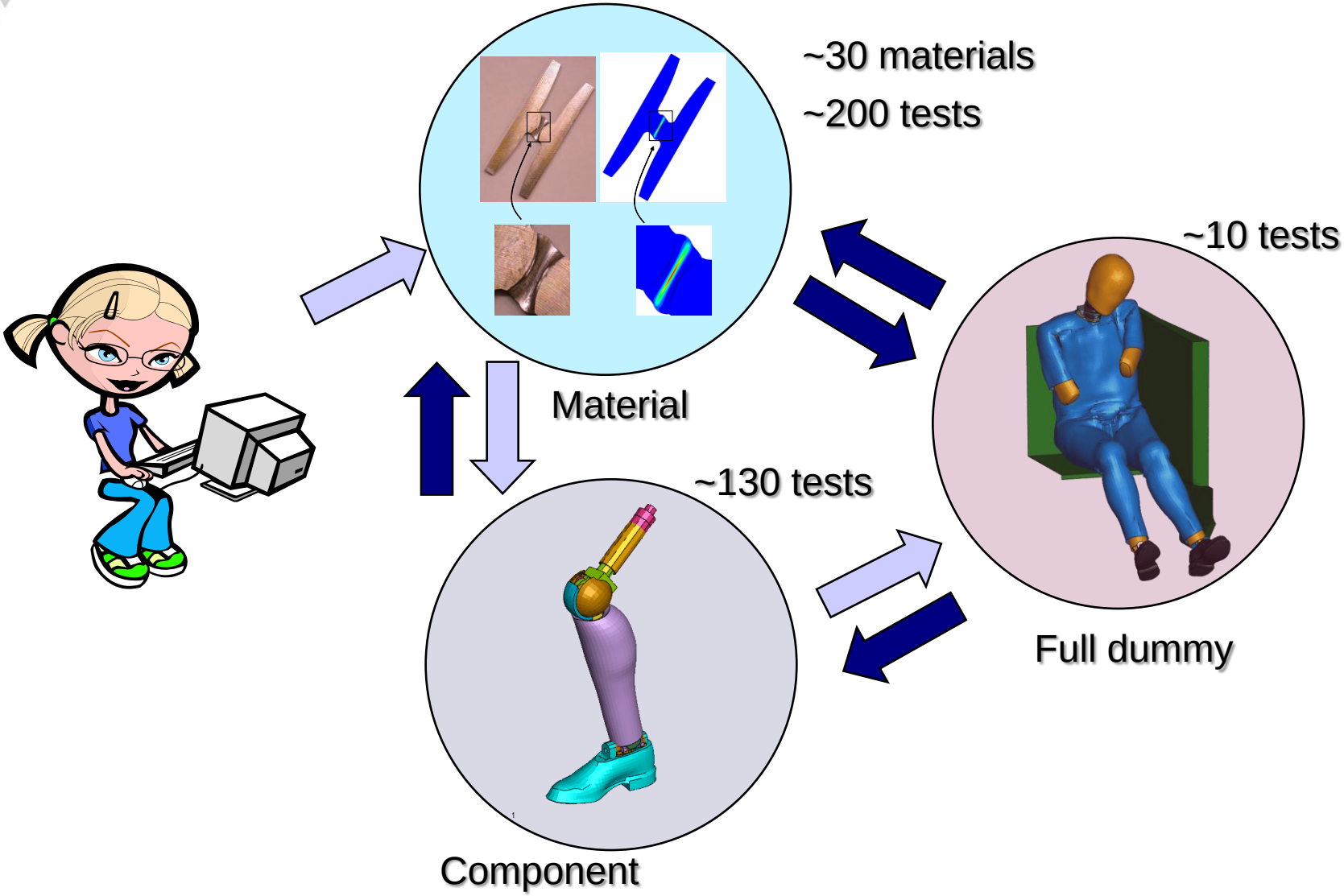
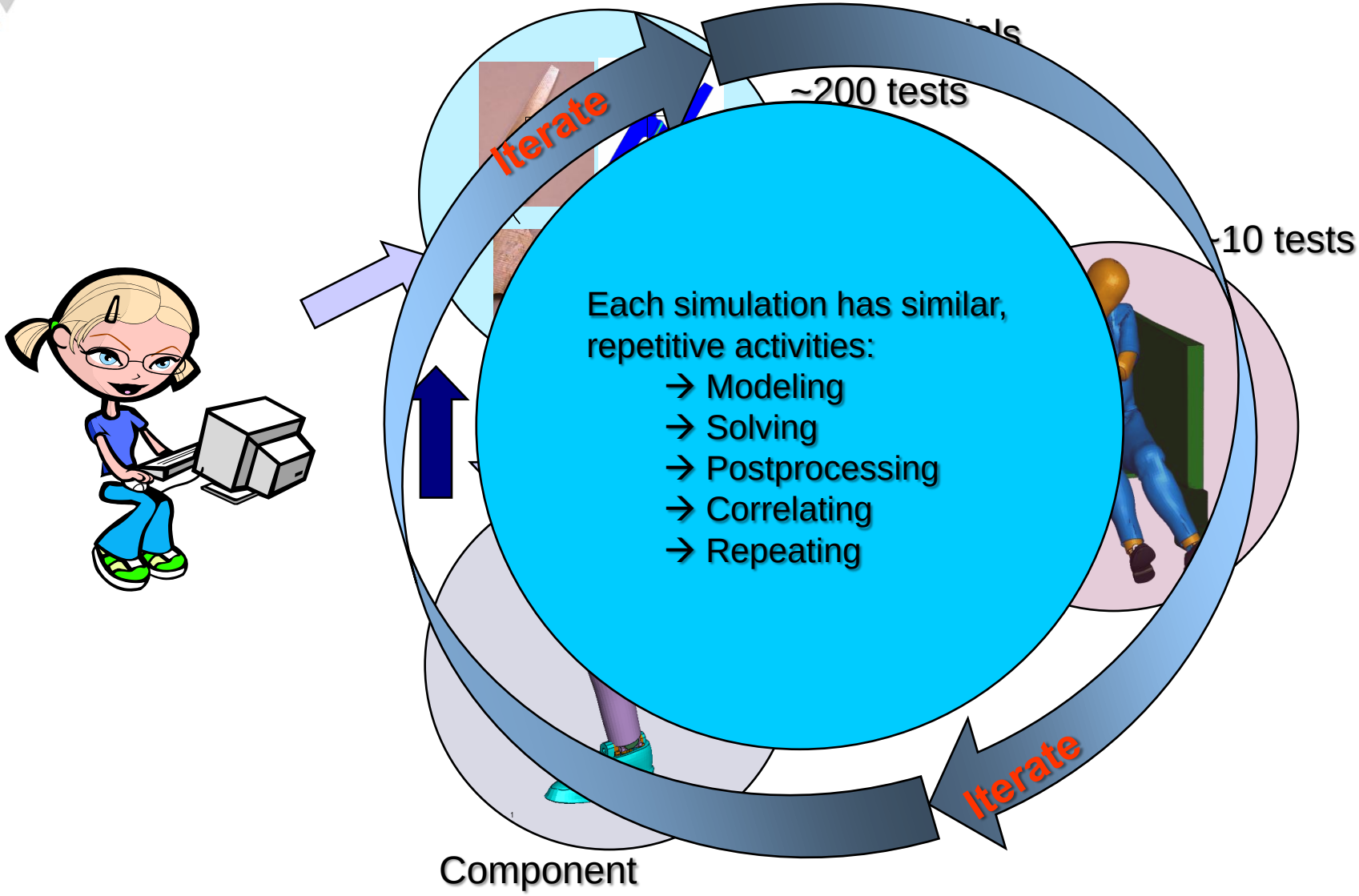
Work Process—WorldSID Male FE Model



Calibrate models to correlate with tests within tolerances

Work Process—WorldSID Male FE Model



Calibrate models to correlate with tests within tolerances

Pains/Challenges—WorldSID Male FE Model

Without SLM there are many challenges:

- Highly repetitive and human-error-prone process
- Organizing hundreds of simulations
  - Managing the interdependencies (relationships) between simulations
  - Keeping track of all intermediate modeling change
  - Keeping models up-to-date
- Working collaboratively and sharing workload
- Providing management insight into program status

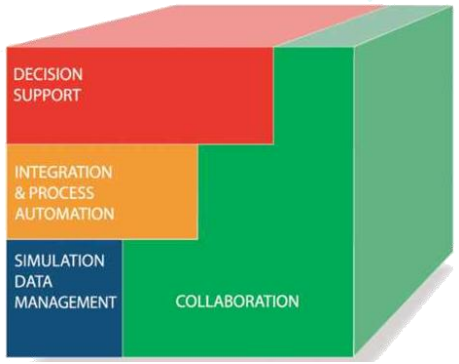
SIMULIA SLM Use case

WorldSID dummy development

SIMULIA

How Will You and Your Company Benefit from SLM?

Benefits:

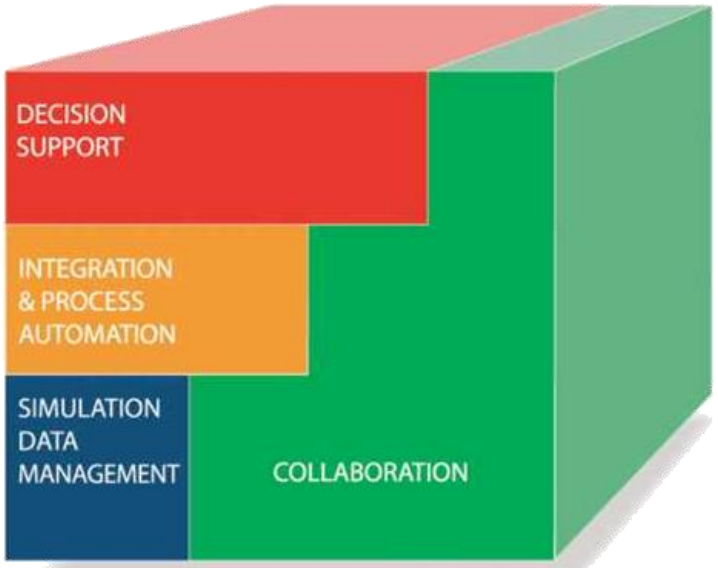


- Single source
- Traceability
- Enhanced collaboration
- Openness
- Standardization opportunities
- Framework for process automation
- Program status insight—targets and performance attributes
  - BETTER
  - FASTER
  - CHEAPER

Future Directions for SLM

- **SIMULIA SLM future began this summer**
- **DS announced the acquisition of Engineous Software**
  - Engineous becomes part of SIMULIA
    - FIPER for application integration, enterprise job execution, process automation & decision support
    - Design exploration technology for multidisciplinary optimization
    - ***Accelerates*** SLM development roadmap

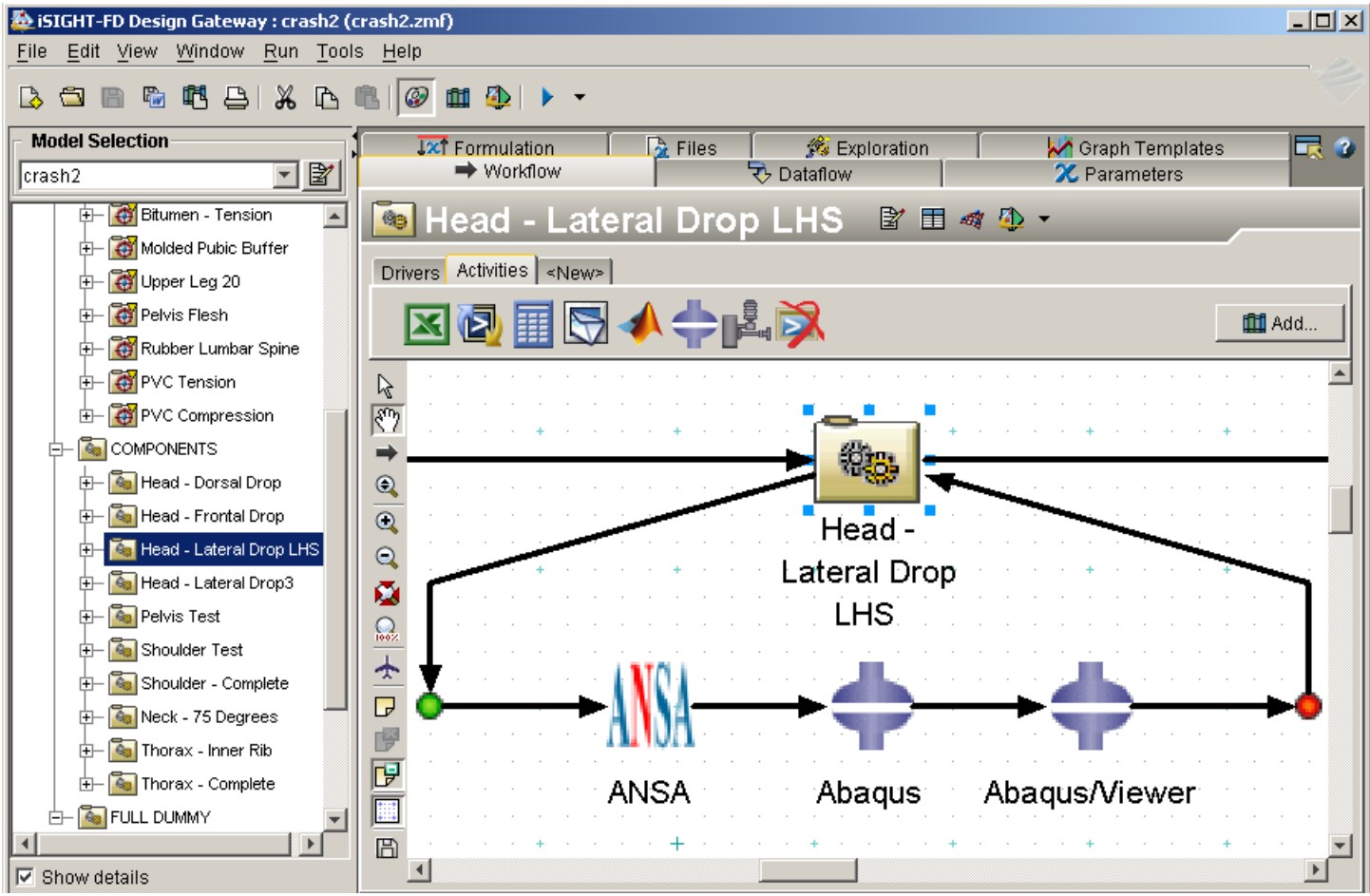
Fiper Strengths



Future Directions for SLM - Process

Drag and Drop Palette Process Definition and Execution

- **Application Components**
- **Parameter Management (extract and map)**
- **Optimization and DOE**
- **Distributed and Parallelized Execution on HPC**



Future Directions for SLM - Data

- **Connect SLM data management to process definition**
- **Manage data flow across simulations**
- **Impact of upstream data changes**
- **Rerun impacted analyses**
- **Program status tracking**