

PRIMER Update

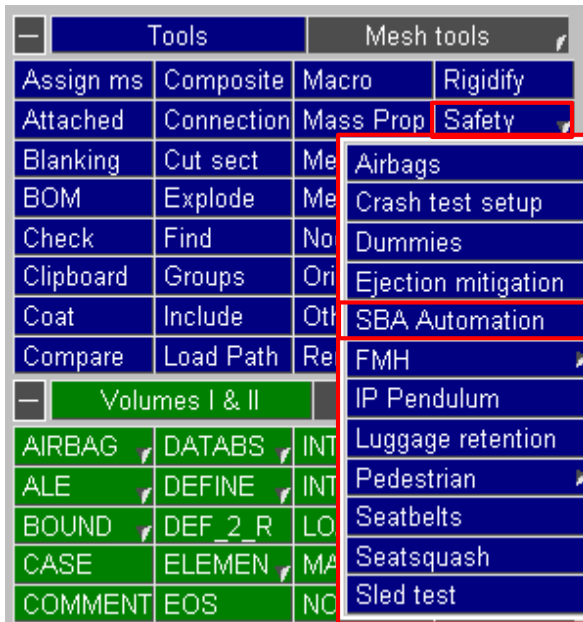
2018

Version History

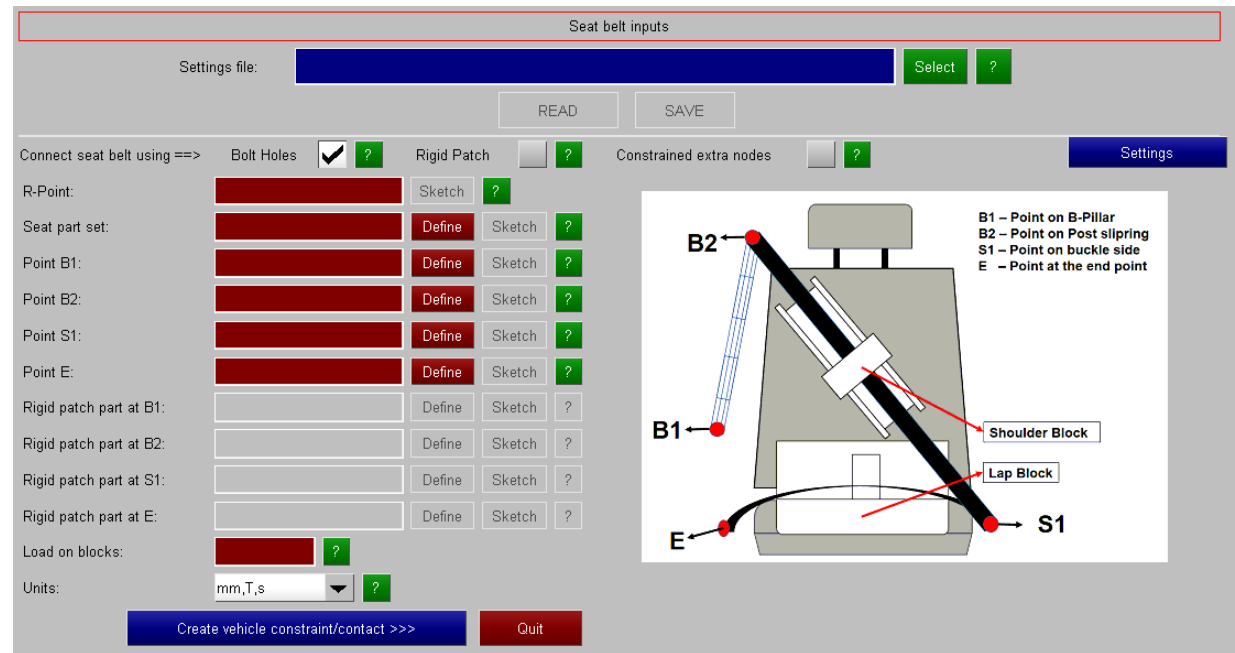
- **Version 14.0: March 2017** **First release of version 14**
- Version 14.1: August 2017 Bugfix release

- **Version 15.0: March 2018** **First release of version 15**

Seatbelt Anchorage Tool – v14.1



- Position the loading device and set up the analysis according to ECE R14
- This function is available in the Safety menu.



Seatbelt Anchorage Tool – v14.1

Seat belt inputs

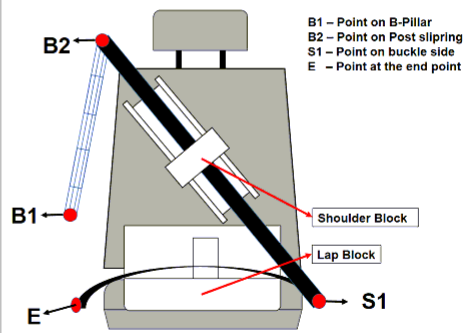
Settings file: Select ?

READ SAVE

Connect seat belt using ==> Bolt Holes ? Rigid Patch ? Constrained extra nodes ? Settings

R-Point:	-3270.4844, 826.76880, 500	Sketch	?
Seat part set:	22002	Define	Sketch ?
Point B1:	-2938.88, 1197.65, 822.10	Define	Sketch ?
Point B2:	-2894.15, 1050.57, 1168.72	Define	Sketch ?
Point S1:	-3145.93, 571.40, 354.57	Define	Sketch ?
Point E:	-3044.12, 1126.62, 272.80	Define	Sketch ?
Rigid patch part at B1:	21811	Define	Sketch ?
Rigid patch part at B2:	21812	Define	Sketch ?
Rigid patch part at S1:	21813	Define	Sketch ?
Rigid patch part at E:	21207	Define	Sketch ?
Load on blocks:	13.4	?	
Units:	mm,T,s	?	

Create vehicle constraint/contact >>> Quit



Vehicle constraint/contact

CONSTRAIN THE VEHICLE

Create *BOUNDARY_SPC card: ?

Node Set for SPC: 1040, 4081039 Define Sketch ?

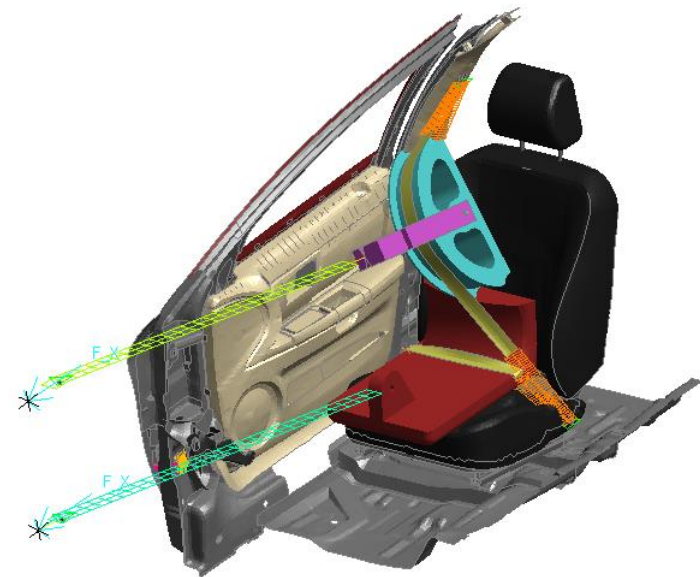
CREATE CONTACT

Create *AUTO_SINGLE_SURFACE contact: ?

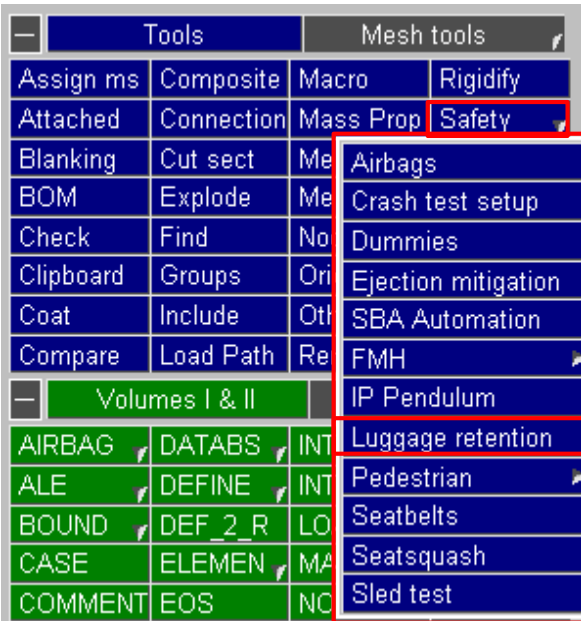
Exempted part set: 1028 Define Sketch ?

<<< Seat belt input Calculate Quit

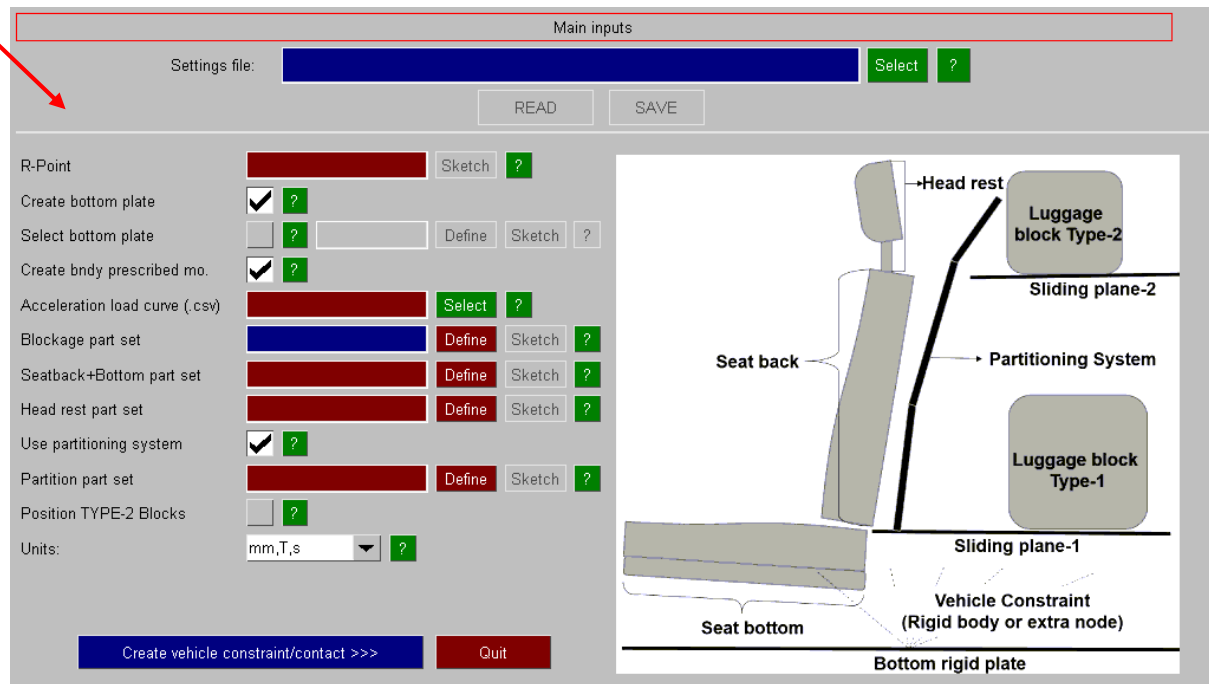
Output



Luggage Retention Tool – v14.1



- Position the luggage blocks and set up the analysis according to ECE R17
- This function is available in the Safety menu.



Luggage Retention Tool – v14.1

Main inputs

Settings file: Select ?

READ SAVE

R-Point: 23.0659, 240.18085, 450 Sketch ?

Create bottom plate: ?

Select bottom plate: Define Sketch ?

Create body prescribed mo.: ?

Acceleration load curve (.csv): Retention/head_curve.csv Select ?

Blockage part set: Define Sketch ?

Seatback+Bottom part set: 12002 Define Sketch ?

Head rest part set: 12003 Define Sketch ?

Use partitioning system: ?

Partition part set: Define Sketch ?

Position TYPE-2 Blocks: ?

Units: mm,T,s ?

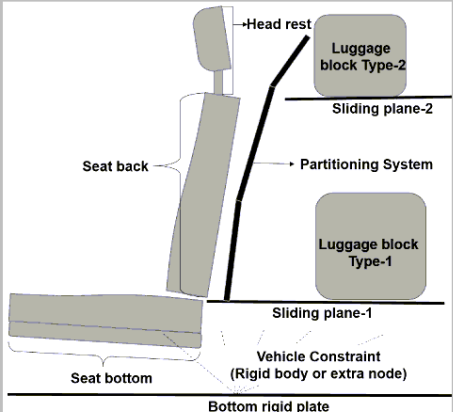


Diagram labels: Head rest, Luggage block Type-2, Sliding plane-2, Partitioning System, Luggage block Type-1, Sliding plane-1, Vehicle Constraint (Rigid body or extra node), Bottom rigid plate, Seat bottom, Seat back.

Create vehicle constraint/contact >>> Quit

Output



Vehicle constraint/contact

CONSTRAIN THE VEHICLE

Constrain bottom rigid plate: ?

Create *CONSTRAINED_EXTRA_NODES: ?

Constrained extra node set: Define Sketch ?

create *CONSTRAINED_RIGID_BODIES: ?

Const. rigid body parts: 12386, 12387 Define Sketch ?

CREATE CONTACT

Create *AUTO_SINGLE_SURFACE contact: ?

Exempted part set: 12004 Define Sketch ?

<<< Main input panel Calculate Quit

V15 – Due for Release March 2018

- **PRIMER v15:**

- Keywords: LS-DYNA up to **R10** fully supported.
- Volumes I, II and III of the Keyword Manual.
- Some development “R11” new keywords/fields also included.

✓ R10 Vol I Keywords

✓ R10 Vol II Materials

✓ R10 Vol III New solvers

Getting Started – Tools to Help New Users

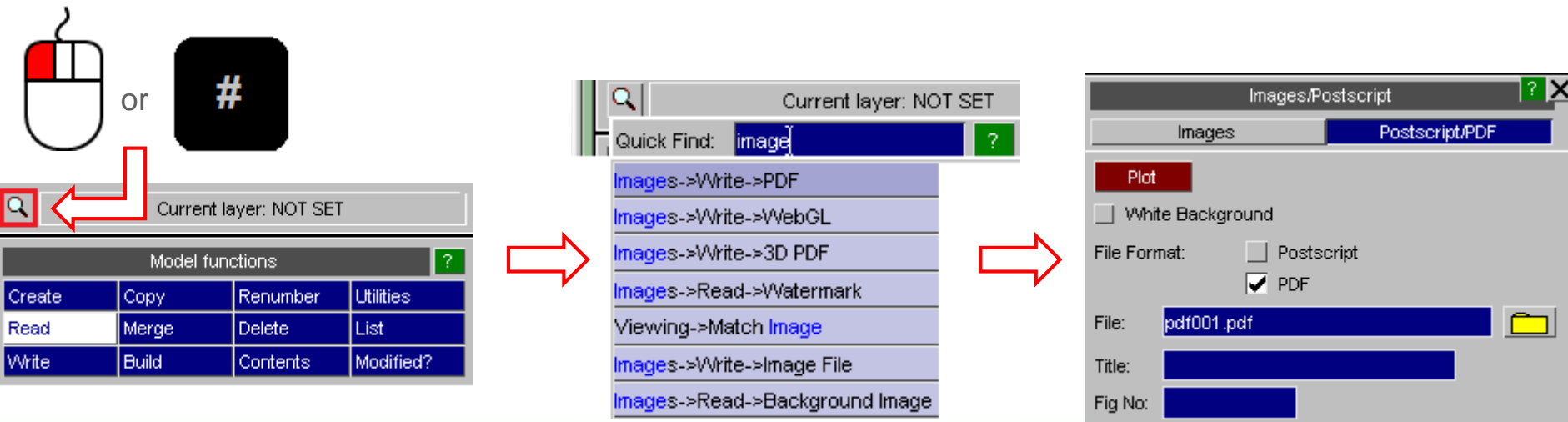
Quick Find

Quick Find

A 'Quick Find' feature has been added to allow users to search for and then quickly:

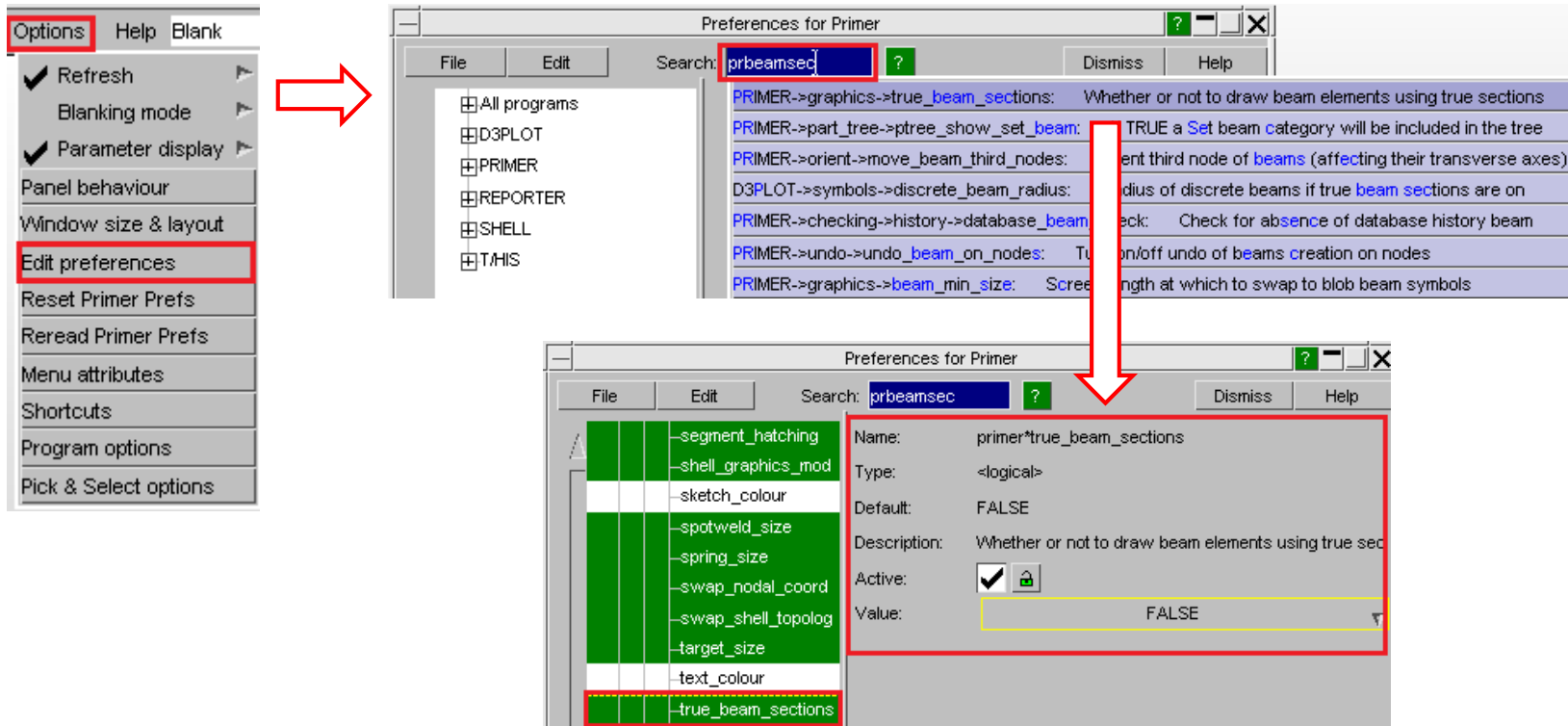
- Go to menus / functionality in PRIMER
- Open model entity edit panels
- Blank / Unblank / Only Include files
- Open specific pages in the LS-DYNA keyword PDF manual

It can be accessed by clicking on the magnifying glass below the tabs list or by pressing the '#' key.



Quick Find

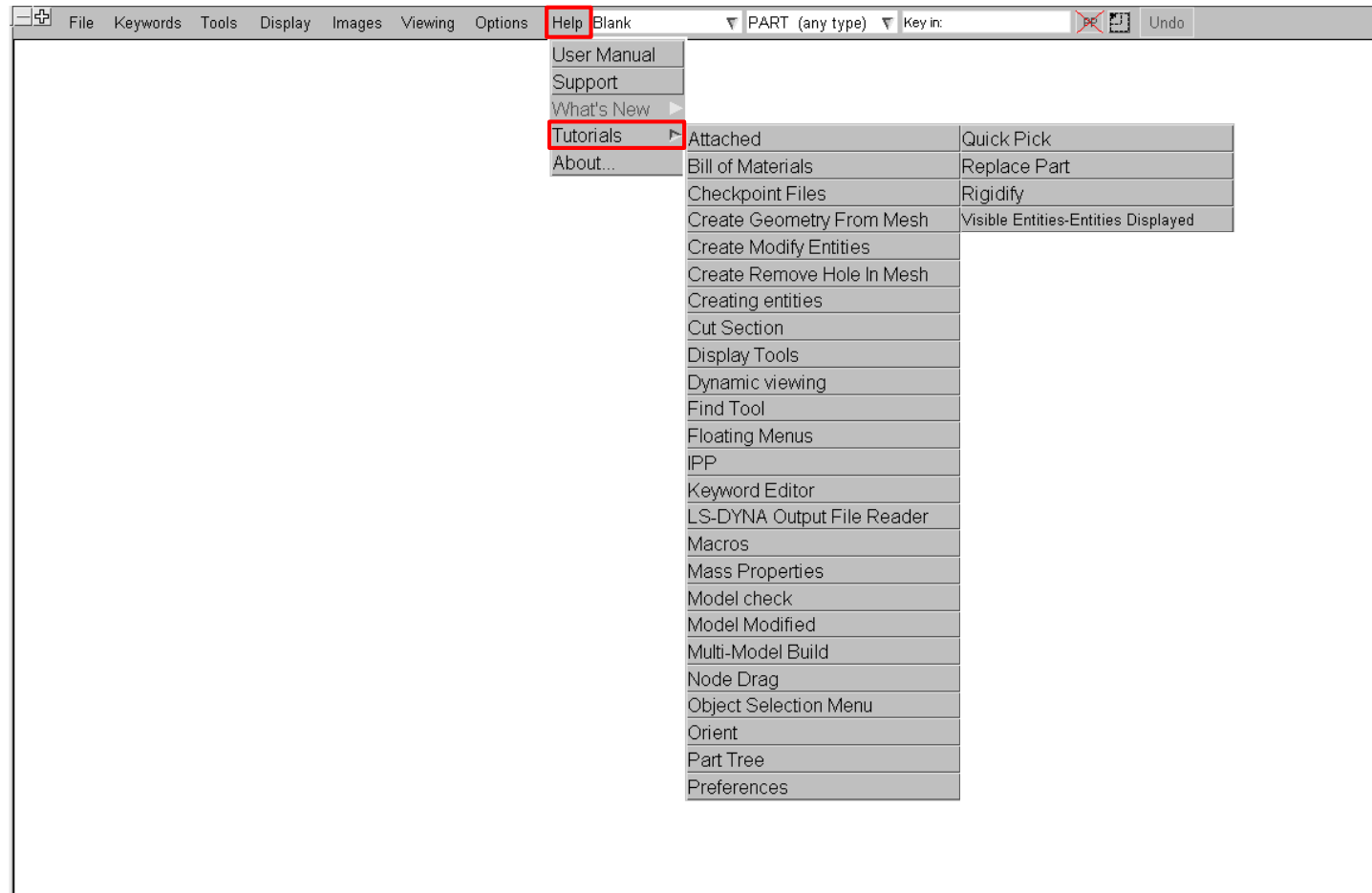
In addition to the main Quick Find button in PRIMER the Preferences Editor now also contains a search facility to help find preferences.



This works using the same 'fuzzy' matching method as the main Quick Find menu. The search terms contain the name of the program, the name of the nodes on the tree, the preference name and the description of it.

Tutorials

- PDF tutorials for PRIMER tools now available through the help panel:



Webinars

The screenshot shows a web browser window displaying the GoToStage channel page for 'Oasys LS-DYNA Environment'. The browser address bar shows the URL: <https://www.gotostage.com/channel/8b1eb202d8f0494c88a72e8fd93e8ab571login=corporate>. The page features the GoToStage logo and navigation links: LEARN MORE, MY CHANNEL, ANALYTICS, and SIGN OUT. The channel name is 'Oasys LS-DYNA Environment' with the tagline 'The Software House of ARUP'. Below the channel name, there are social media sharing icons for Facebook, LinkedIn, Twitter, and Email. A grid of 11 webinar thumbnails is displayed under the 'General' tab. Each thumbnail includes a play button, a star icon, and a date. The thumbnails are: 1. 'Oasys PRIMER: Spotwelding and Co...' (Sep 6, 2017), 2. 'Oasys PRIMER: Seatbelt Creation an...' (Aug 1, 2017), 3. 'Oasys PRIMER: Occupant Positioning' (Aug 1, 2017), 4. 'Oasys PRIMER: Model checking and...' (Aug 1, 2017), 5. 'Oasys PRIMER: v14.0 Update' (Aug 1, 2017), 6. 'Oasys Post Processing: v14.0 Update' (Aug 1, 2017), 7. 'Oasys PRIMER: Advanced Belt Fitting' (Aug 1, 2017), 8. 'Oasys D3PLOT: An Introduction' (Aug 1, 2017), 9. 'Oasys T/HIS: An Introduction' (Oct 20, 2017), 10. 'Oasys PRIMER: Model Build & Data...' (Nov 29, 2017), and 11. 'FAST-TCF Introduction' (Dec 8, 2017).

General

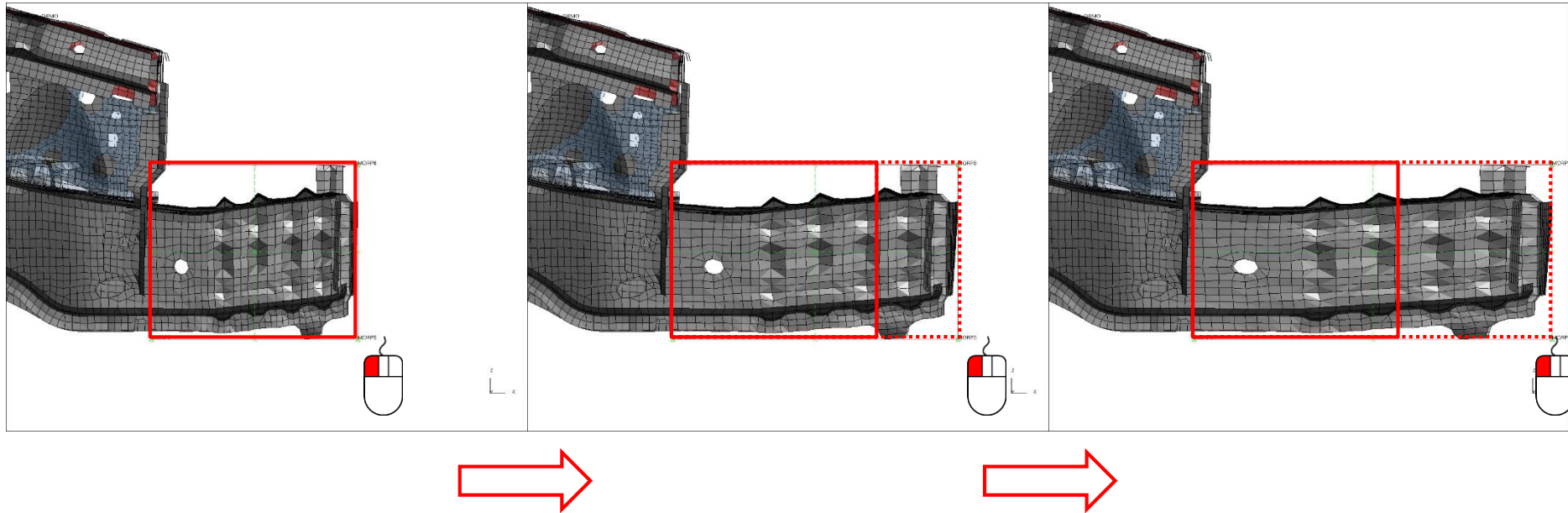
- Oasys PRIMER: Spotwelding and Co... (Sep 6, 2017)
- Oasys PRIMER: Seatbelt Creation an... (Aug 1, 2017)
- Oasys PRIMER: Occupant Positioning (Aug 1, 2017)
- Oasys PRIMER: Model checking and... (Aug 1, 2017)
- Oasys PRIMER: v14.0 Update (Aug 1, 2017)
- Oasys Post Processing: v14.0 Update (Aug 1, 2017)
- Oasys PRIMER: Advanced Belt Fitting (Aug 1, 2017)
- Oasys D3PLOT: An Introduction (Aug 1, 2017)
- Oasys T/HIS: An Introduction (Oct 20, 2017)
- Oasys PRIMER: Model Build & Data... (Nov 29, 2017)
- FAST-TCF Introduction (Dec 8, 2017)

Creating/Modifying your Model

Morphing

Morphing

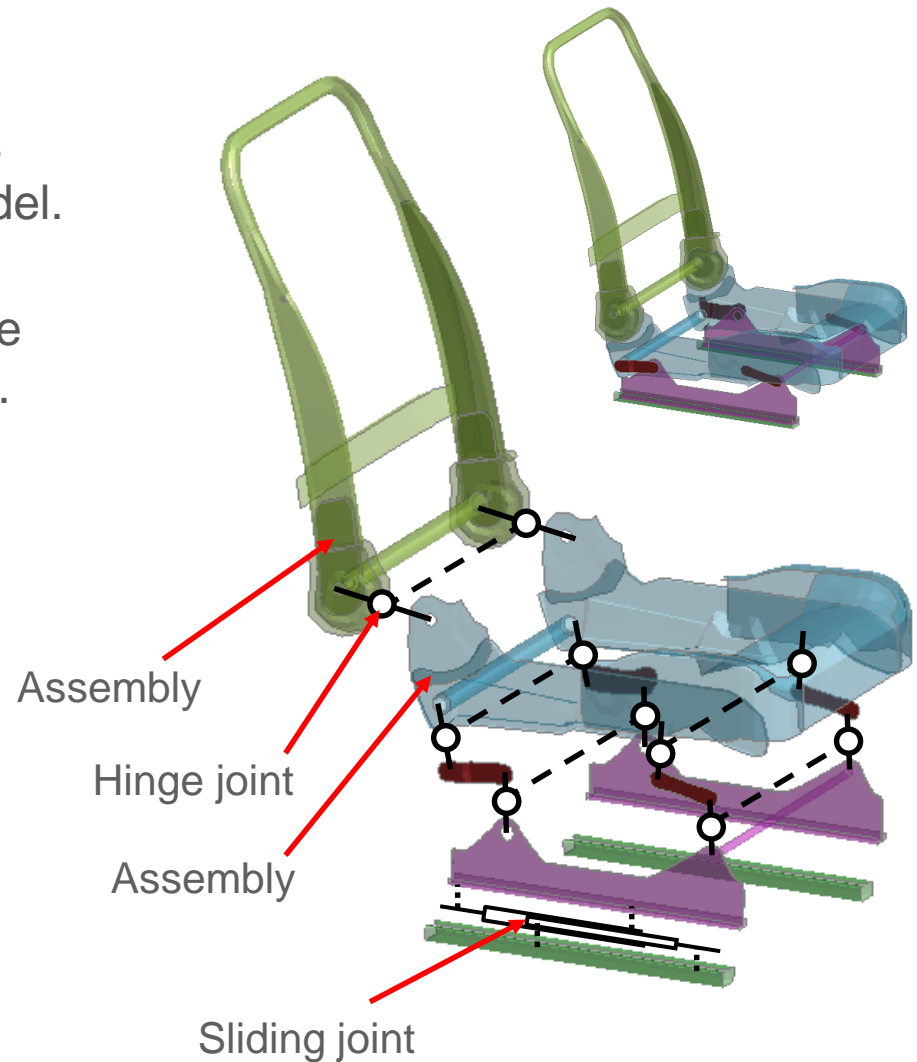
- In previous releases of PRIMER, you could use orient + interpolate to “morph” mesh.
- In v15 a new interactive morph tool has been introduced.
- The morph tool allows you to create bounding boxes around mesh. You can then interactively change the size and shape of the box which in turn changes the size and shape of the mesh.



Mechanisms

Mechanisms

- The mechanism tool in PRIMER allows the user to define linkages between assemblies within a model.
- Once the linkages are defined, PRIMER can be used to move the assemblies relative to each other.
- This tool is useful for positioning things such as seats:

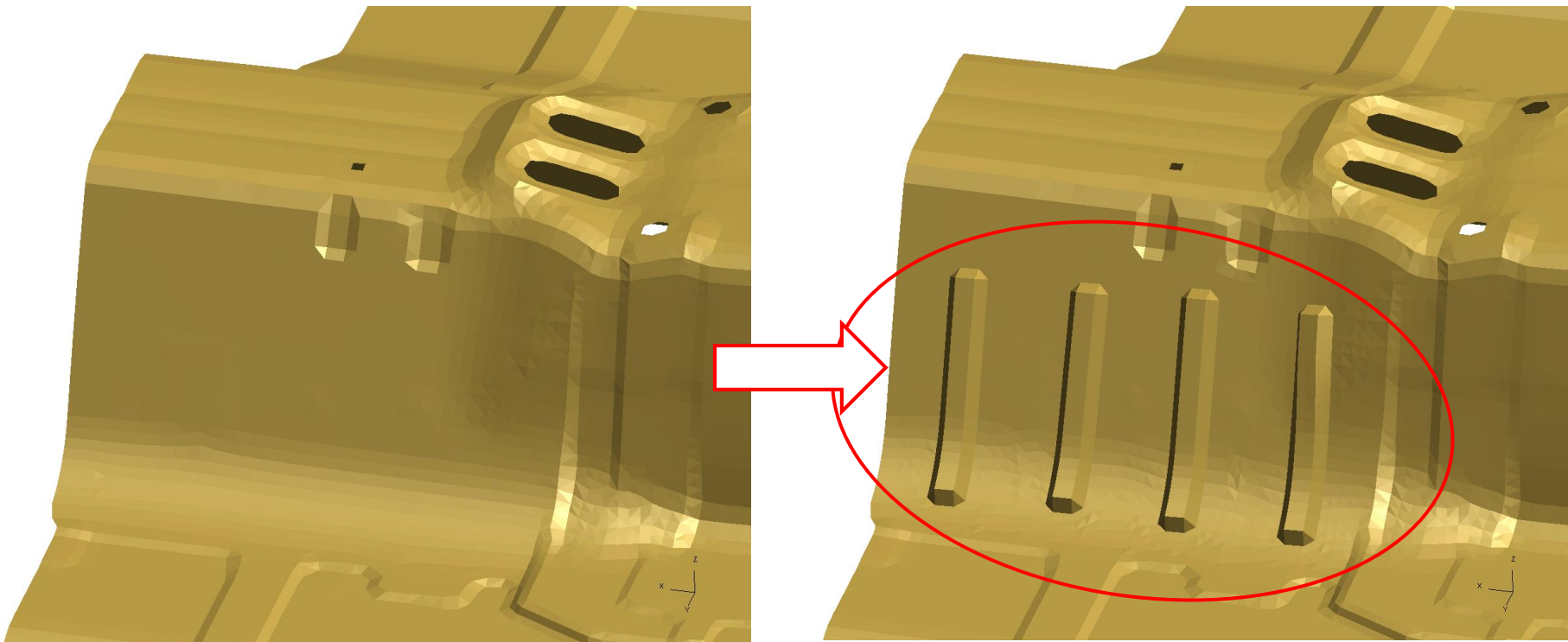


- New additions to the mechanism tool for V15:
 - Ability to read more ANSA comments to convert ANSA kinetic entities into PRIMER mechanisms.
 - Addition of a new connection type – “coupler”. The new coupler type imposes a linear equation which allows you to link together mechanism connections.
 - This means when two connections are coupled the motion of one connection can be imposed on another such that rotation can be related to translation, and vice versa.
 - Rotation can also be coupled to rotation, and translation coupled with translation.

Swage/Bead Creation

Swage/Bead creation

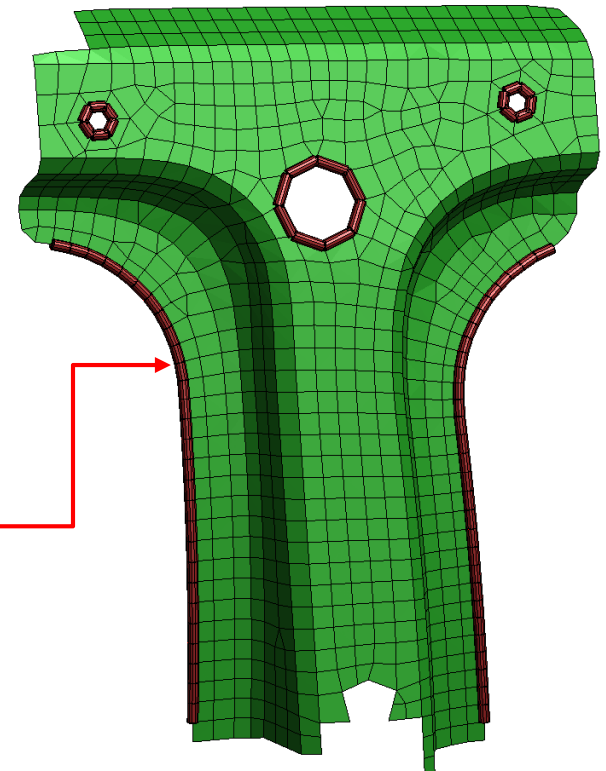
- A new tool has been added to easily create swages/beads in shell meshes.



Other Meshing Tools Updates

- Improved internal meshing engine which is used by a variety of tools within PRIMER:
 - Hole creation/removal.
 - Remesh area.
 - HAZ creation for spotwelds.
- New tool to create beams on selected nodes:
 - This allows you to create beams along a series of selected nodes easily:

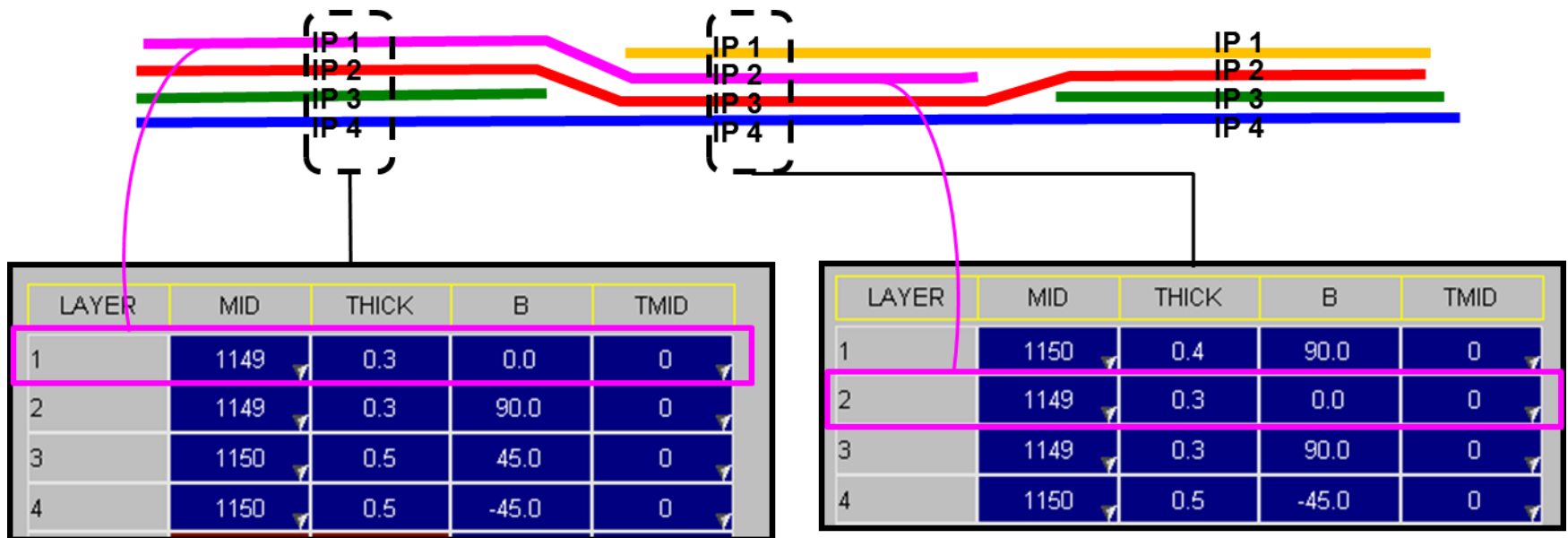
Easy to create beams along a series of nodes, for example on free edges



Composites

Composites

- PRIMER contains tools for creating, managing and modifying composite data in your LS-DYNA model:



- These tools have been improved, most notably in the ability to set orientation angles of the composite fibres.

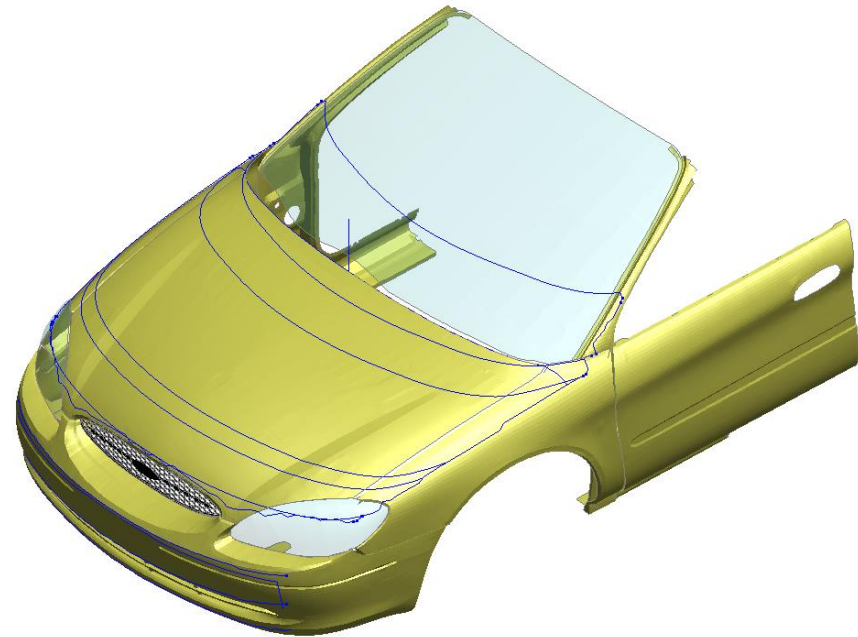
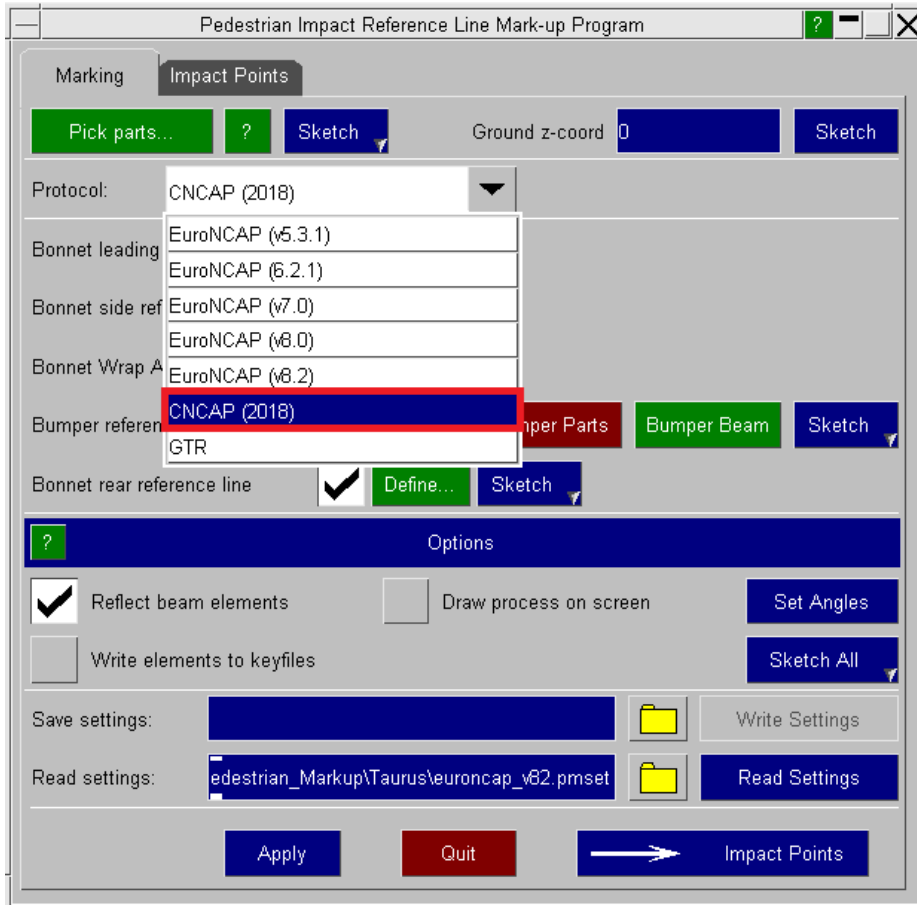
Scripting

- Scripting continues to be an important and popular functionality within the Oasys software.
- The Oasys team are continuously adding more functionality to the JavaScript API's to allow users to create their own tools.
- For v15 the following has been added to the PRIMER API:
 - Added ability copy model flagged entities.
 - Added 24bit colour support for widget images.
 - New function to start interactive penetration fixing panel.
 - Added ability to control font size on widgets.
 - Added ability to specify de-clash options for RenumberFlagged() function.
 - Added ability to edit comments in the master file.
 - Added function to read CSV files easily.
- Also, the ability has been added to automatically run a script prior to keyout. This allows you to introduce questions/checks/reminders when writing out a model.

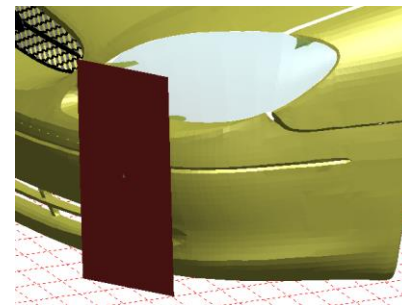
Pedestrian

Pedestrian Markup

The CNCAP 2018 protocol can now be used to mark vehicles:



This uses the plate method to find the corner bumper.

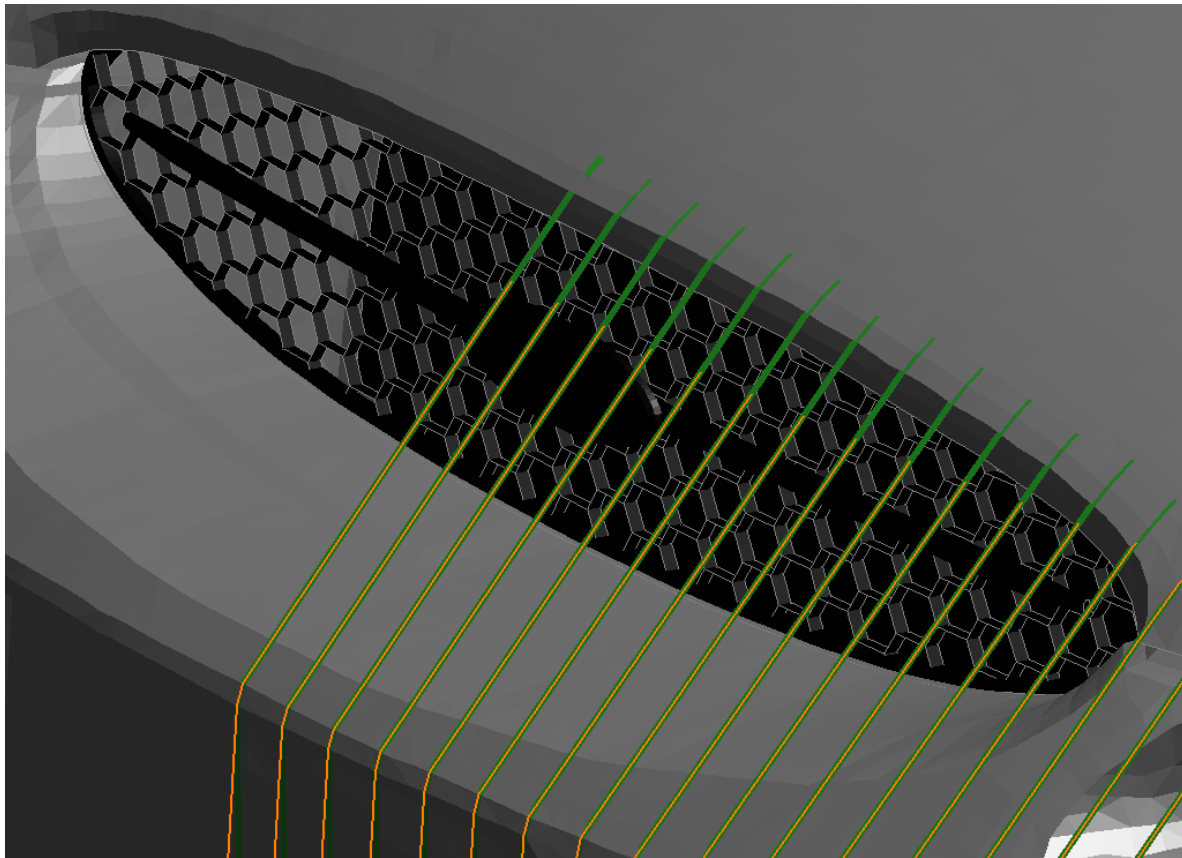


The GTR protocol now uses this method too.

Pedestrian Markup

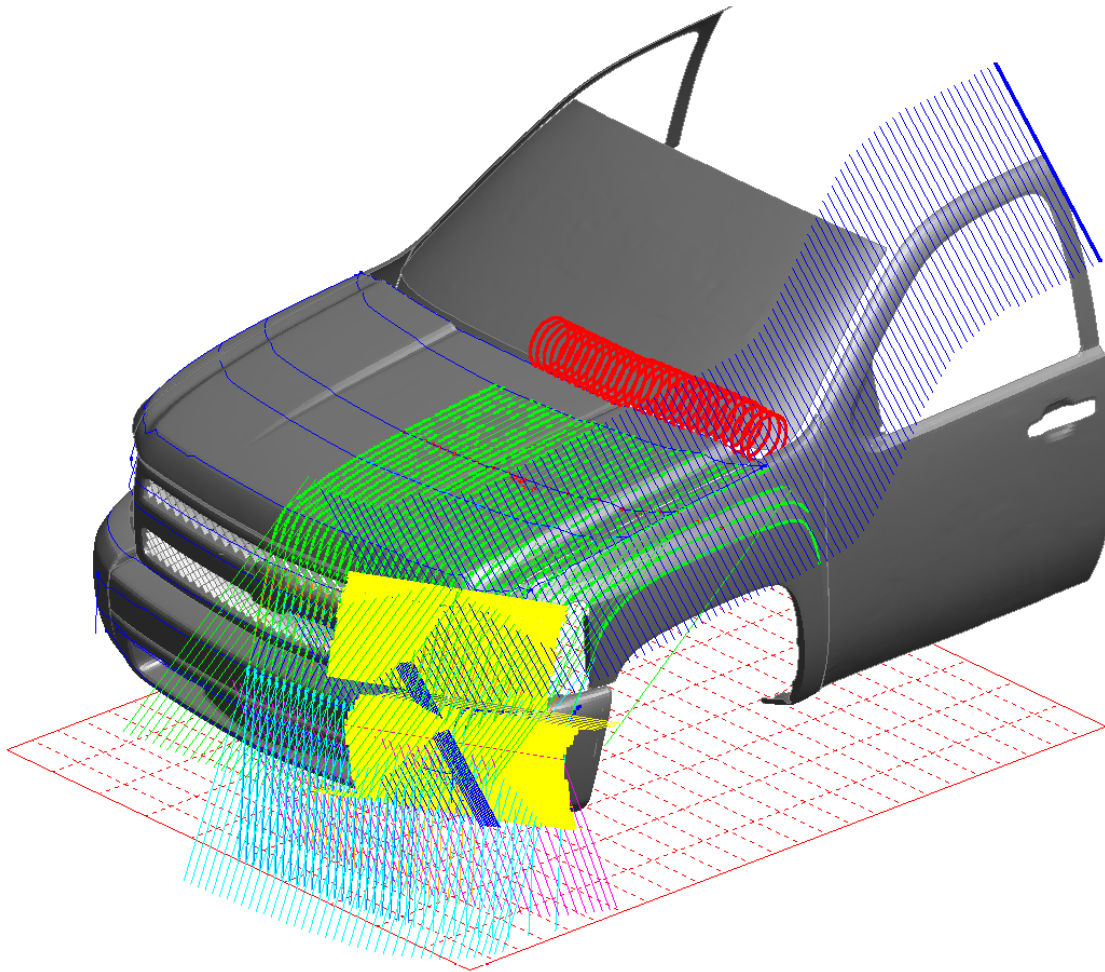
The outer surface around the front of the vehicle is now approximated using tape to span any gaps, for example in the grill area.

This is used in the WAD line calculations to stop points on the line falling into gaps.



Pedestrian Markup

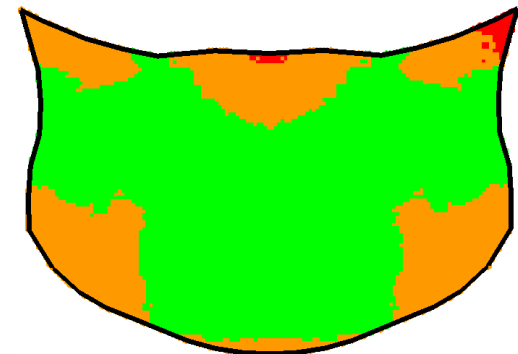
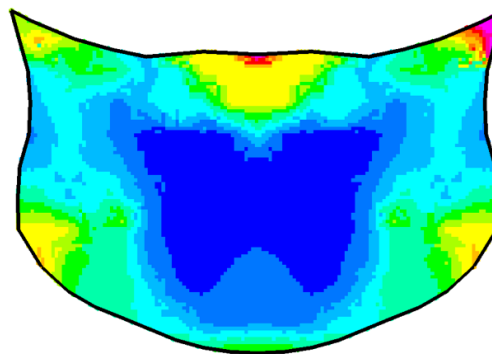
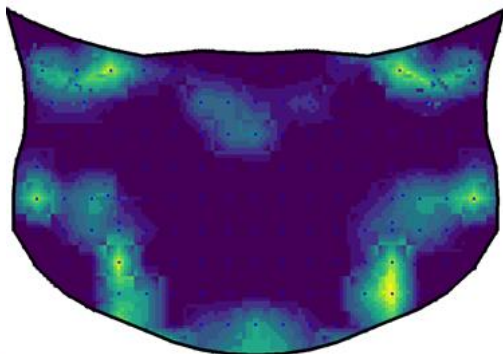
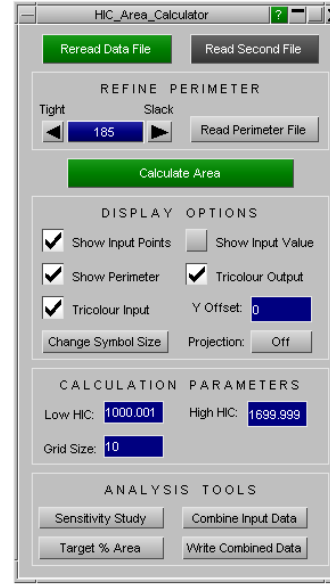
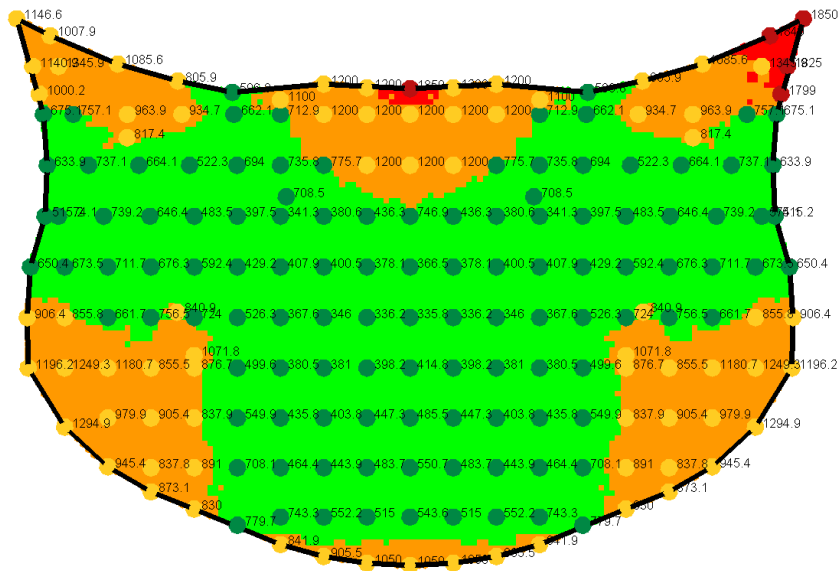
The sticks and tape used to markup the vehicle are now output to a separate model. They can then be used as references for making design changes.



HIC Area Tool – Added in V14

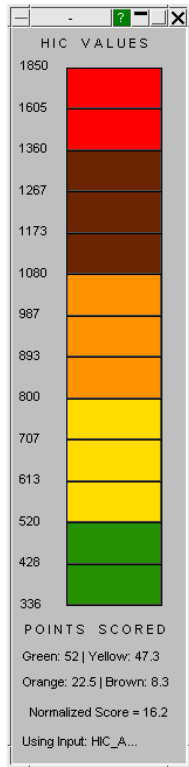
- New interactive tool for calculating and interpreting pedestrian head impact HIC area.

Tools		Mesh tools	
Assign m...	Composite	Macro	Rigidity
Attached	Connection	Mass Prop	Safety
Blanking	Out sect	Mea	Airbags
BOM	Explode	Mea	Crash test setup
Check	Find	Nodi	Dummies
Clipboard	Groups	Orie	Ejection mitigation
Coat	Include	Oth	SBA Automation
Compare	Load Path	Rem	FMH
Volumes 1 & 1			
IP Pendulum			
AIRBAG	DATAS	INT	Luggage retention
ALE	Pedestrian markup	Pedestrian	
BOUND	Multiple model build	Seatbelts	
CASE	HIC area calculator	Seatsquash	
COMMENT	EOS	NOC	Sled test
CONSTR	FREQ	PARAM	TERMIN
CONTACT	HOURGL	PART	
CONTROL	INCLUDE	PARTICLE	
DAMPING	INITIAL	PERTURB	

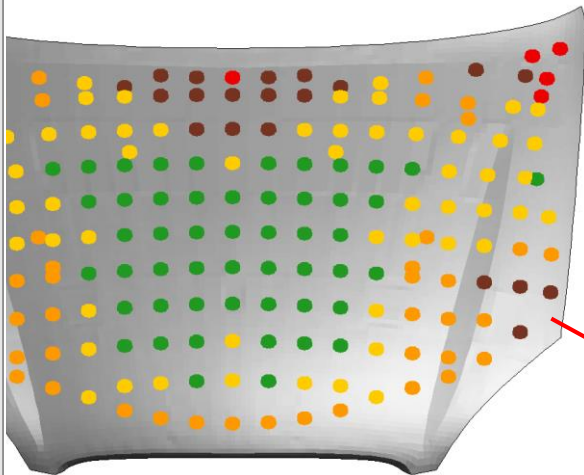


HIC Area Tool – V15 Enhancements

- New features and calculation methods added to HIC Area Tool:



New EuroNCAP v8 grid method score calculation.



POINTS SCORED
Green: 52 | Yellow: 47.3
Orange: 22.5 | Brown: 8.3
Normalized Score = 16.2

Option to edit an individual point by clicking it on screen and typing a new HIC value.

HIC_Area_Calculator

Read Data File | Read Second File

REFINE PERIMETER
Tight Slack
220 | Read Perimeter File

DISPLAY OPTIONS
 Show Input Points Text: Not Shown
 Show Perimeter Banded Output
 Banded Input Y Offset: 0
 Change Symbol Size Projection: Off

CALCULATION PARAMETERS
 Regulation: EuroNCAP | Save Settings
 Yellow HIC: 520 | Orange HIC: 800
 Brown HIC: 1080 | Red HIC: 1360
 Calculate Points

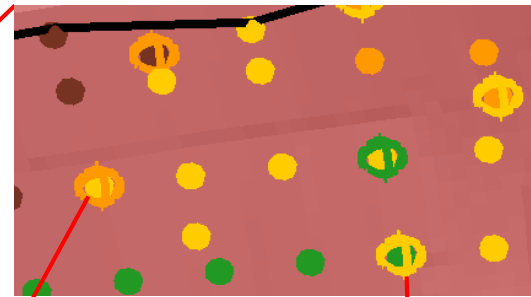
ANALYSIS TOOLS
 Edit Individual Point | Band Sensitivity
 Combine Input Data | Area Sensitivity
 Write Combined Data | Target % Area

Not Shown
Not Shown
Show Value
Show Name

Now possible to assign and show a point name as an alternative to a value.



New tool to highlight which points are close to changing banding, based on an input HIC delta value.



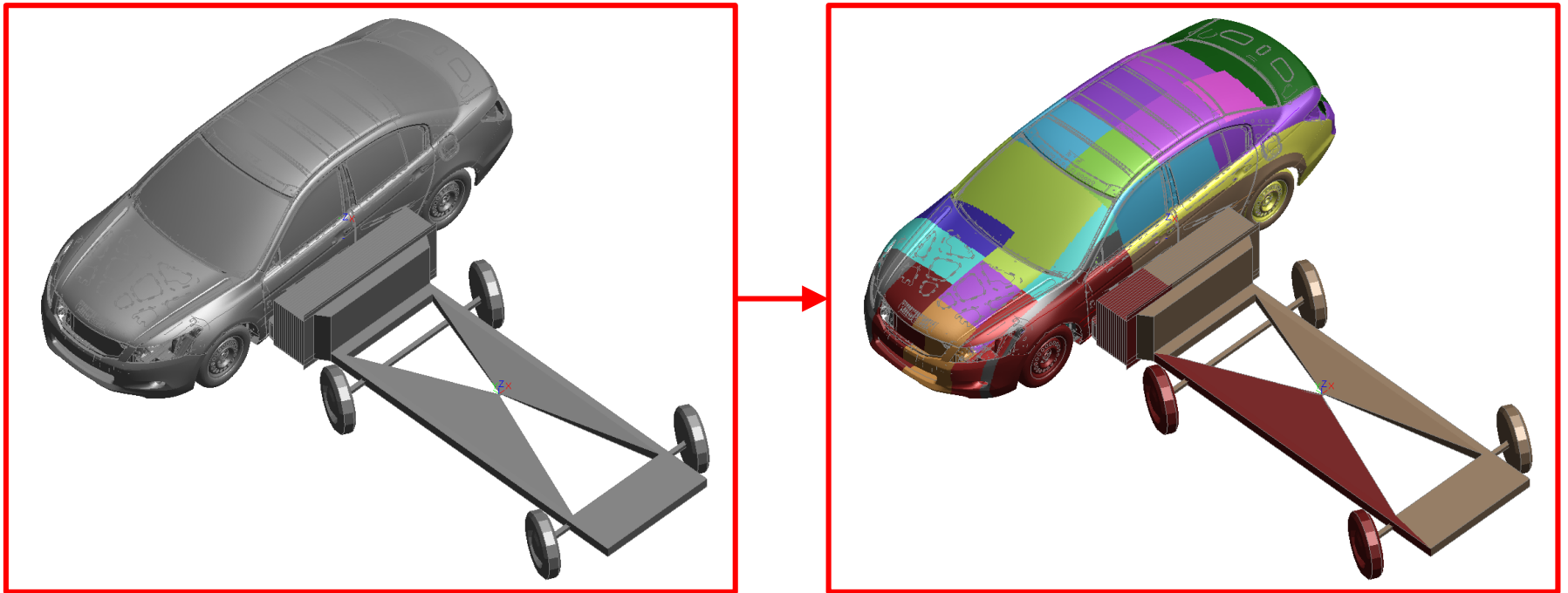
Yellow close to turning orange.

Green close to turning yellow.

Decomposition

Model Decomposition

- New script allows you to easily see how a model has been split across multiple CPUs for LS-DYNA analysis.
- Reads a *decomp_parts.ses file (produced by *CONTROL_MPP_DECOMPOSITION_OUTDECOMP) and changes the colours of the shells, solids and beams in a model.

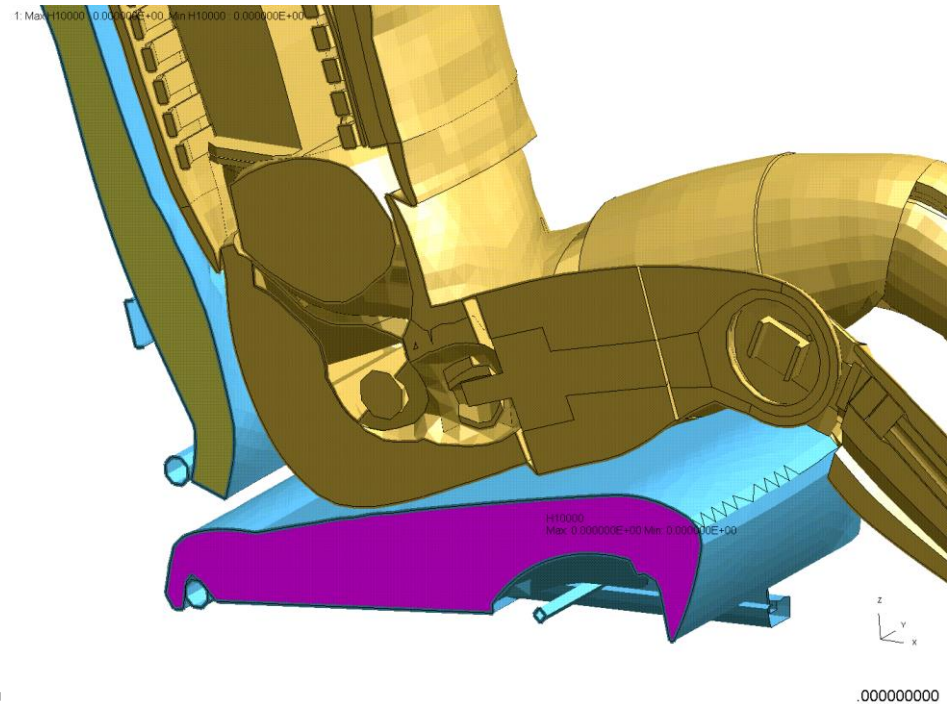
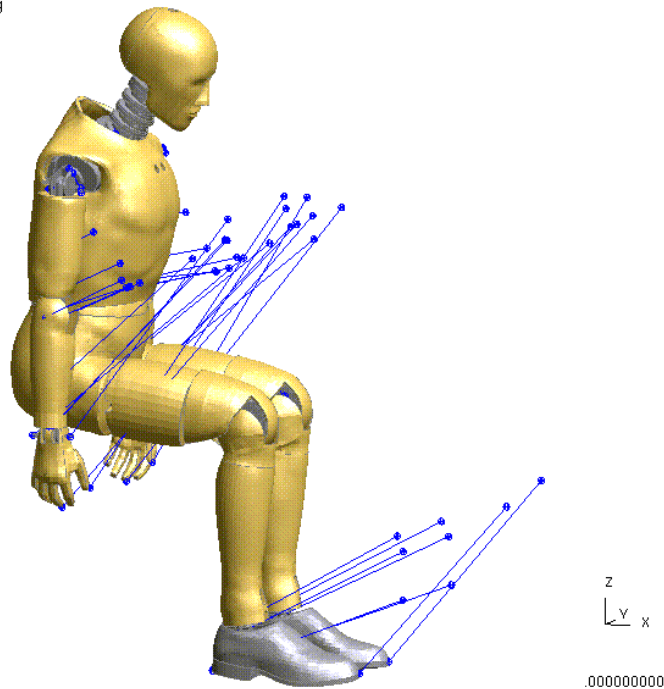


Occupants

Combined Dummy Positioning + Seatsquash

- PRIMER contains functionality to set-up simulation based occupant positioning and seatsquash separately.

D3PLOT: LS-DYNA dummy positioning

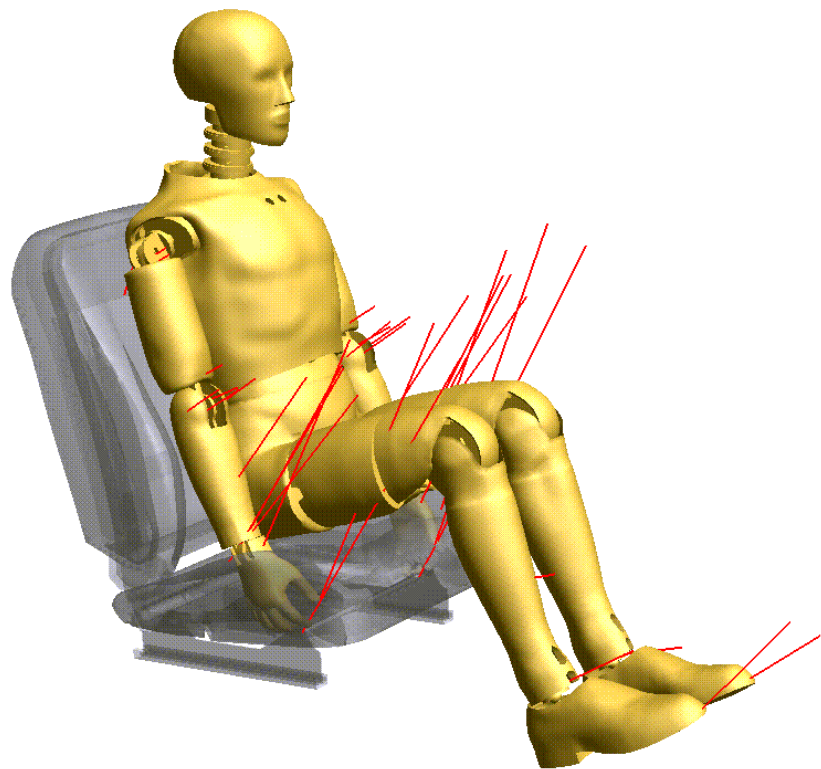


- New functionality had been added to combine these into one analysis.

Combined Dummy Positioning + Seatsquash

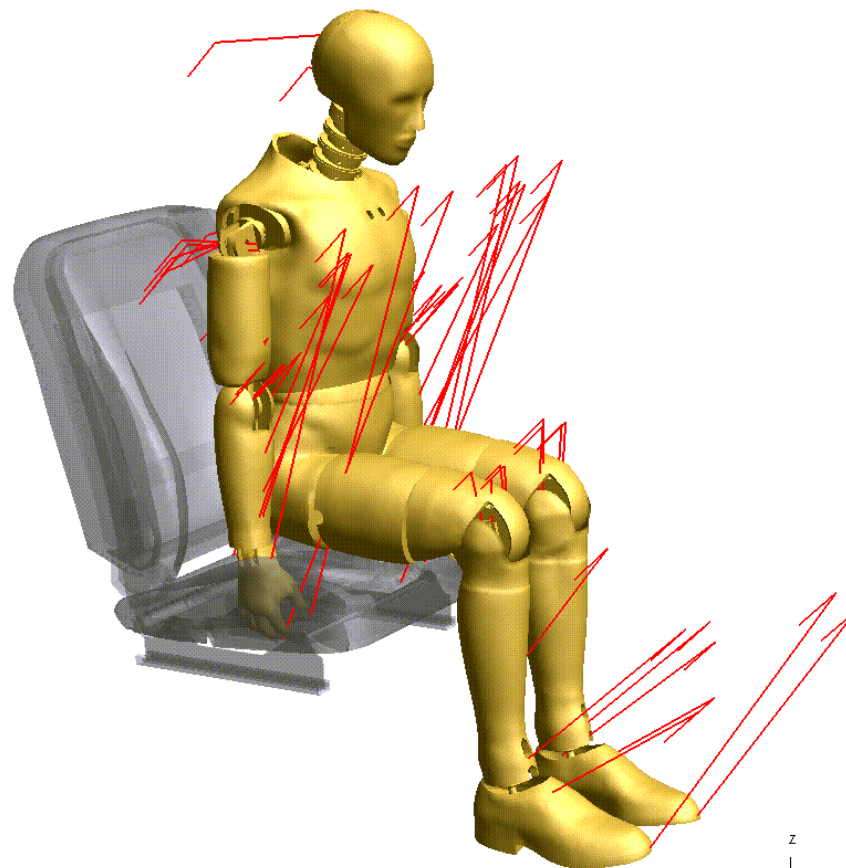
D3PLOT: M1: occ rr + M2

D3PLOT: M3: occ rr + M2



One Stage

.000000000



Two Stage

.000000000

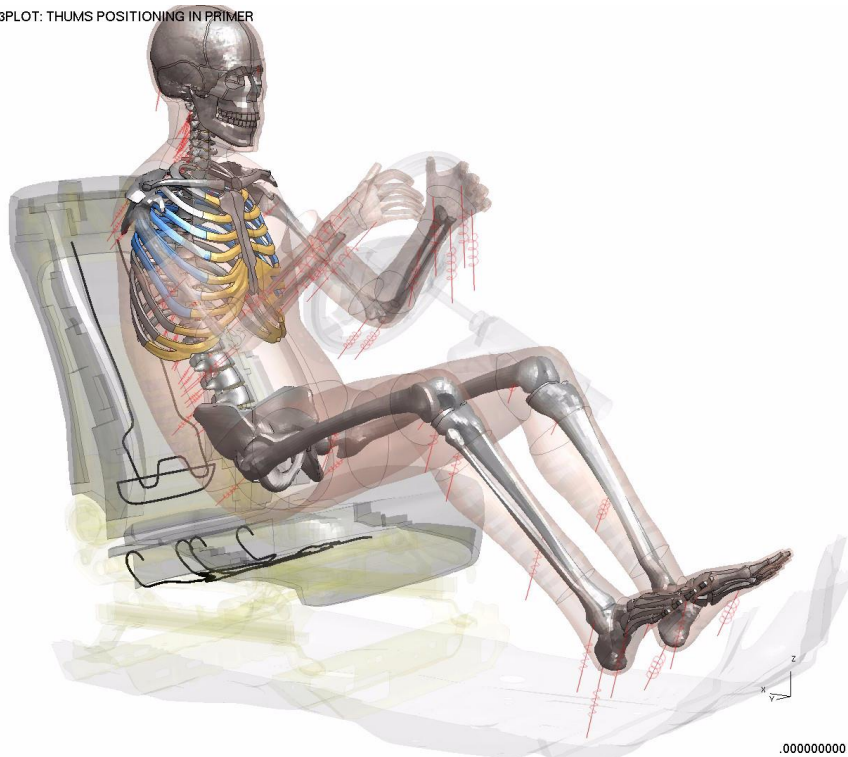
Combined Dummy Positioning + Seatsquash

- Additional features:
 - Ability to create multiple analyses in one operation.
 - “Displacement” based cables rather than “force” based gives the user more control in specifying termination times of analyses.
 - “Sequential” method which give more control in the user specifying start, intermediate and end positions.
 - Available through command line interface, which allows these tools to be driven as part of an automatic/batch process.

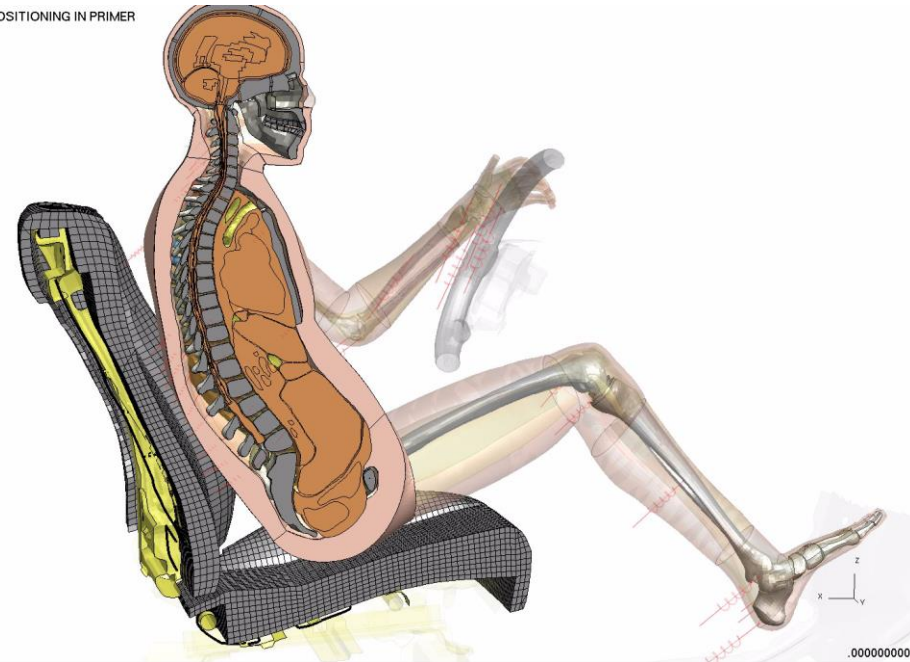
Combined Dummy Positioning + Seatsquash

- Method used for positioning THUMS human model into a seat and final position.

D3PLOT: THUMS POSITIONING IN PRIMER



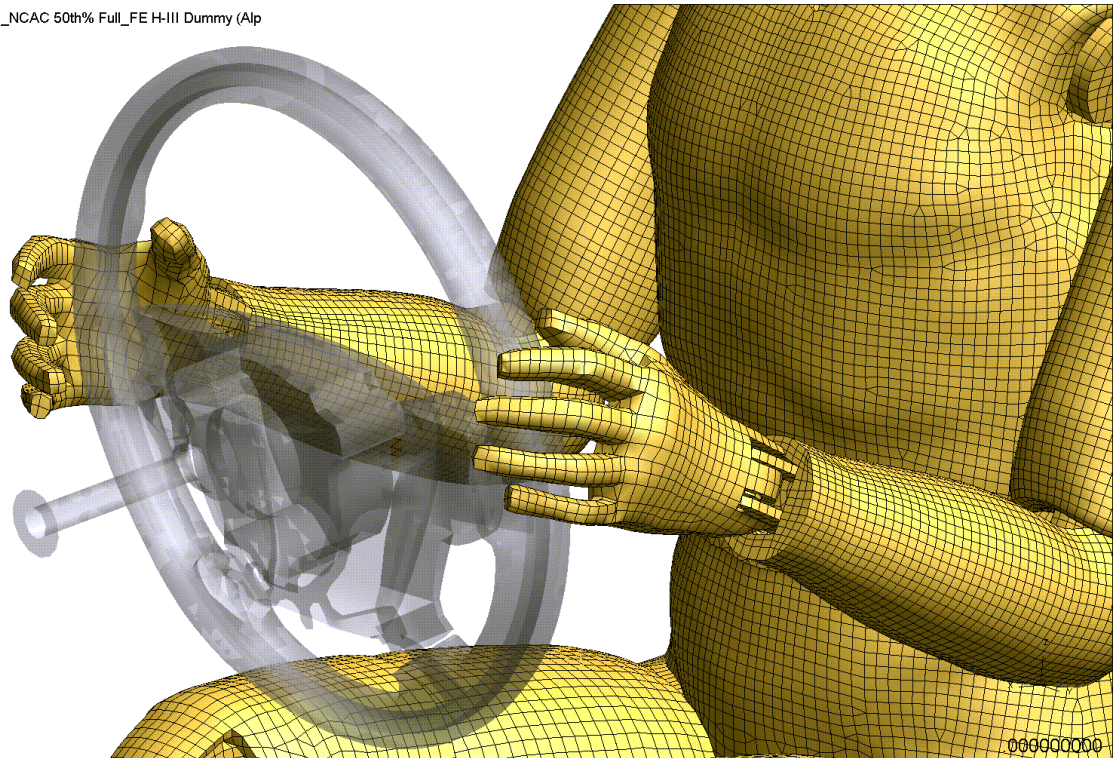
D3PLOT: THUMS POSITIONING IN PRIMER



Finger Positioning

- A new script is also included to easily create finger assemblies in a dummy model.
- This allows you to position fingers within PRIMER – which can feed into simulation based positioning.

D3PLOT: LSTC_NCAC 50th% Full_FE H-III Dummy (Alp)



Model Investigation

Friction

Investigating Friction

- Contact friction coefficient values are important in any LS-DYNA model.
- There are now a variety of ways of setting friction coefficient values used in contacts:
 - The *CONTACT card itself.
 - The *CONTROL_CONTACT card.
 - *PART_CONTACT cards.
 - *DEFINE_FRICTION cards.
- If you have a combination of the above methods, it can be difficult to understand which friction coefficient values are used in your model.
- New tools in PRIMER allow you to investigate these values.

Contact Friction Write

Volumes I & II		Volume III	
AIRBAG	DATAABS	INTEGRN	RAIL
ALE	DEFINE	INTRFCE	RIGIDWALL
BOUND	DEF_2_RG	LOAD	SECTION
CASE	ELEMENT	MAT	SENSOR
COMMENT	EOS	NODE	SET
CONSTR	FREQ	PARAM	TERMIN
CONTACT	HOURGL	PART	
CONTROL	INCLUDE	PARTICLE	
DAMPING	INITIAL	PERTURB	

Create	Delete	List	Pen check
Copy	Keyword	Check	Only
Modify	Sketch	Renumber	Help
Part	Write	Friction	

CONTACT K ?

Create	Delete	List	Pen check
Copy	Keyword	Check	Only
Modify	Sketch	Renumber	Help
Part	Write	Friction	

Apply Fric->Write 4 CONT(s) selected

Write Visualise

File: Desktop\Demo\CONTACT_FRICtest.xlsx

Save As: .xlsx

Write Background

Write Labels ?

of Labels: 6

Export images to file

Width (in px): 257

Height (in px): 166

CONTACT ? <<

All None ↑↓ Opt

Filter Vis Key_In Sk

(ML) CONTACT(s) (all mo

M1/CONT1003 (H3-50 INT

M1/CONT8000 (DAB SELF

M1/CONT11000 (TR LAP B

M1/CONT11001 (TR SH BE

M1/CONT20800 (transduc

M1/CONT20801 (COL SEL

M1/CONT20900 (connectio

M1/CONT20901 (connectio

M1/CONT21000 (connectio

M1/CONT21001 (connectio

M1/CONT22000 (DAB TO







M1/CONT22001 (DAB TO

M1/CONT22002 (Vehicle

M1/CONT22003 (SEATBEL

M1/CONT22004 (test_dum

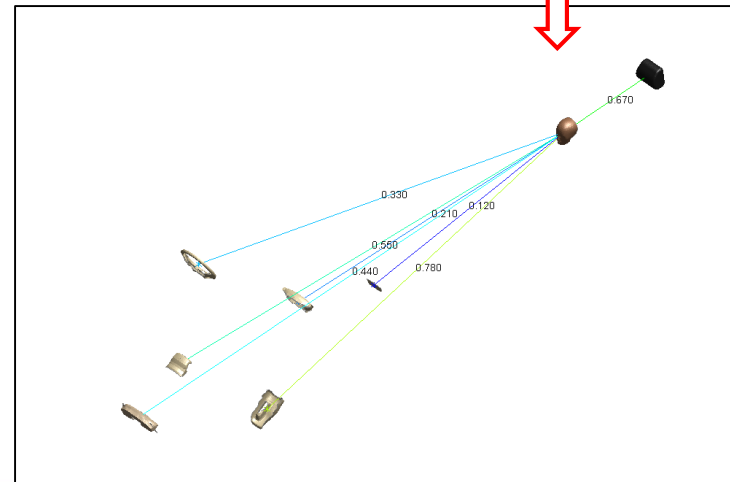
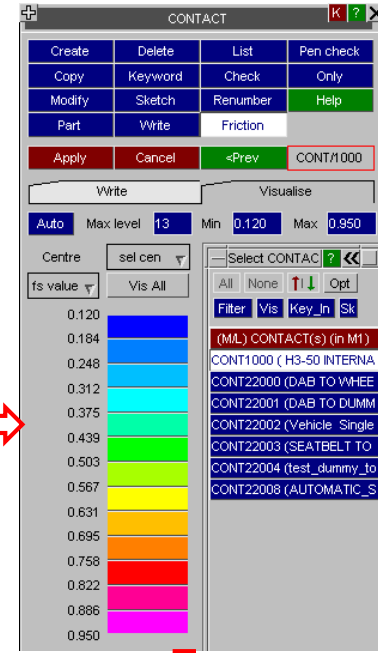
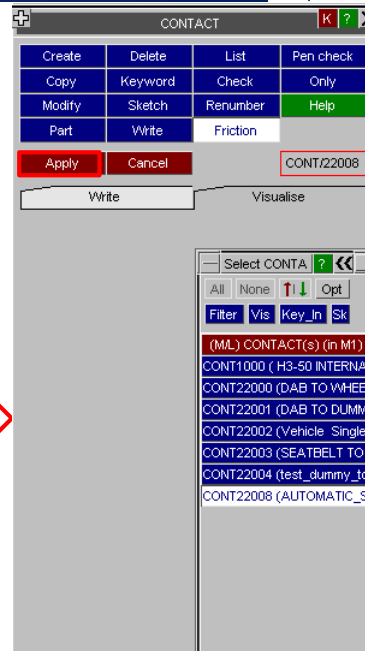
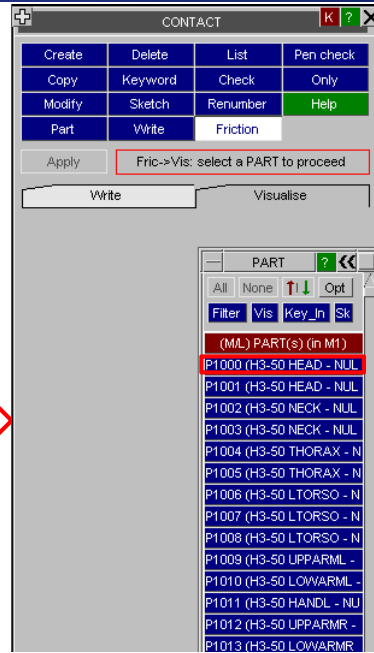
M1/CONT22005 (AUTOMA

Contact ID	Friction Type	#Parts in Slave Side	Slave Part ID(s)	Slave Part(s) Image	#Parts in Master Side	Master Part ID(s)	Master Part(s) Image	F5	FD	DC	VC
2	22002 *DEFINE_FRICTION card		2 21204 21103					0.15	0.16	0	0
3	22002 *DEFINE_FRICTION card		2 20204 20581					0.17	0.18	0	0
4	22002 *DEFINE_FRICTION default		784 1000 1001 1002 1003 1004 1005					0.34	0.24	0	0
9	22005 *PART_FRICTION	1	21204					0.2	0.2	0	0
10	22005 *CONTROL_CONTACT				1	21150		0.124	0.345	0	0
11	22005 *PART_FRICTION				1	21199		0.4	0.5	0	0

Contact Friction Plotting

Volumes I & II		Volume III	
AIRBAG	DATA	INTEGRN	RAIL
ALE	DEFINE	INTRFCE	RIGIDWALL
BOUND	DEF_2_RG	LOAD	SECTION
CASE	ELEMENT	MAT	SENSOR
COMMENT	EOS	NODE	SET
CONSTR	FREQ	PARAM	TERMIN
CONTACT	HOURGL	PART	
CONTROL	INCLUDE	PARTICLE	
DAMPING	INITIAL	PERTURB	

Create	Delete	List	Pen check
Copy	Keyword	Check	Only
Modify	Sketch	Renumber	Help
Part	Write	Friction	



- Select a part - then a list of all contacts which refers to the selected part will be shown.
- Select a contact from the list followed by 'Apply'.
- All the parts in the selected contact will be shown in the exploded view.

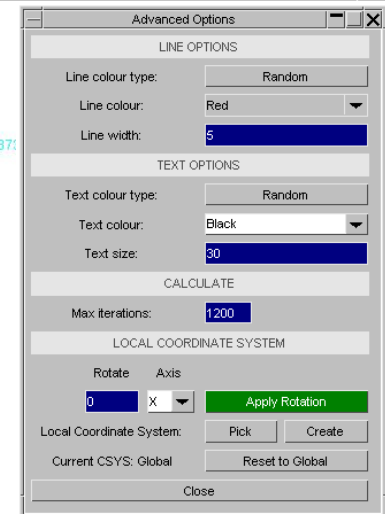
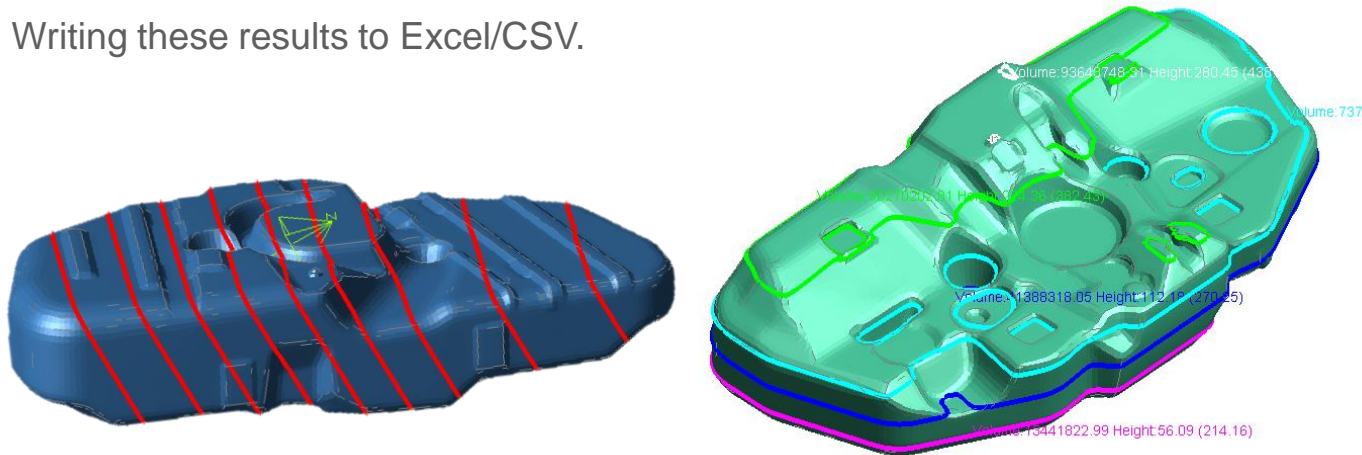
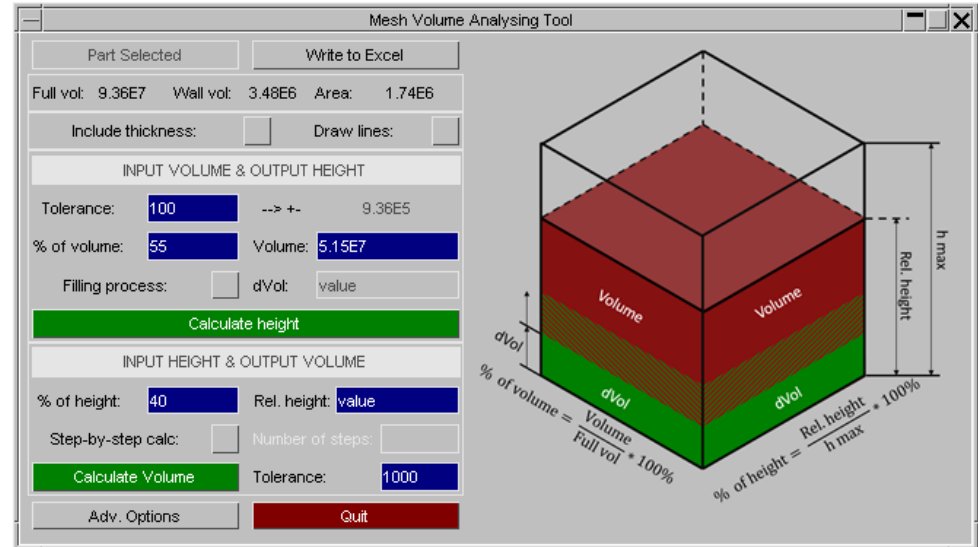
Volume Calculator

Mesh Volume Analysis Tool

This is a tool for analysing the volume of closed meshes.

Key features include:

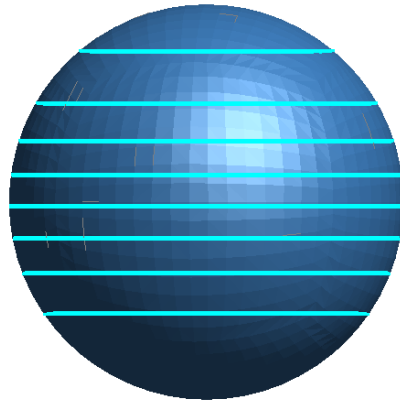
- Liquid line visualisation.
- Global or Local Coordinate Systems
- Calculations on fuel tank:
 - Full tank volume
 - Step-by-step volume calculation
 - Wetted surface
- Writing these results to Excel/CSV.



Mesh Volume Analysis Tool

Step-by-step volume calculation:

- Input volume - output height



Volume:3999.89 Height:17.6 (7.6)
 Volume:3500.09 Height:14.97 (4.97)
 Volume:3000.13 Height:13.06 (3.06)
 Volume:2500.08 Height:11.38 (1.38)
 Volume:2000.08 Height:9.77 (-0.23)
 Volume:1499.84 Height:8.15 (-1.85)
 Volume:1000.06 Height:6.42 (-3.58)
 Volume:499.98 Height:4.37 (-5.63)

Excel results.

Relative height	Liquid volume	Wet surface
17.6	4000	1123
15.0	3500	958
13.1	3000	822
11.4	2500	720
9.8	2000	610
8.2	1500	501
6.4	1000	391
4.4	500	254

GUI panel.

INPUT VOLUME & OUTPUT HEIGHT

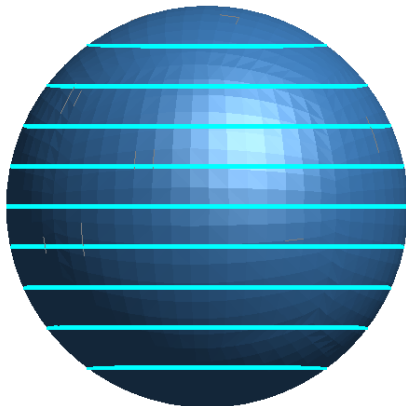
Tolerance: --> +- 0.17

% of volume: Volume:

Filling process: dVol:

Calculate Height

- Input height - output volume



Volume:4171 Height:20 (10)
 Volume:4049.3 Height:18 (8)
 Volume:3726.54 Height:16 (6)
 Volume:3259.15 Height:14 (4)
 Volume:2688.71 Height:12 (2)
 Volume:2073.48 Height:10 (0)
 Volume:1456.13 Height:8 (-2)
 Volume:886.06 Height:6 (-4)
 Volume:423.52 Height:4 (-6)
 Volume:112.58 Height:2 (-8)

Excel results.

Relative height	Liquid volume	Wet surface
20	4171	1254
18	4049	1154
16	3727	1015
14	3259	884
12	2689	760
10	2073	633
8	1456	490
6	886	358
4	424	238
2	113	91

GUI panel.

INPUT HEIGHT & OUTPUT VOLUME

% of height: Rel. height:

Step-by-step calc: Number of steps:

Calculate Volume Tolerance:



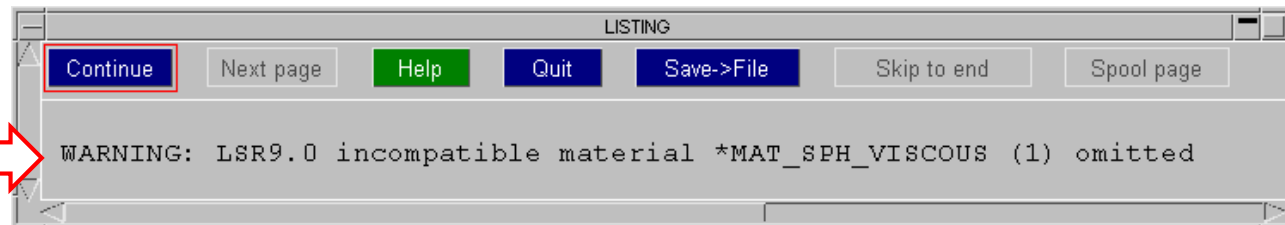
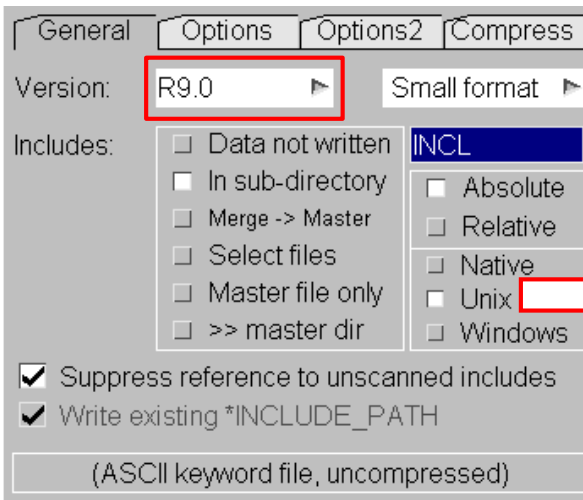
Wet surface area up to the line.

Model Check and Output

- Model checking continues to be an integral part of PRIMER.
- ~500 new checks added into v15 compared to v14.
- Now ~7200 individual checks in PRIMER.

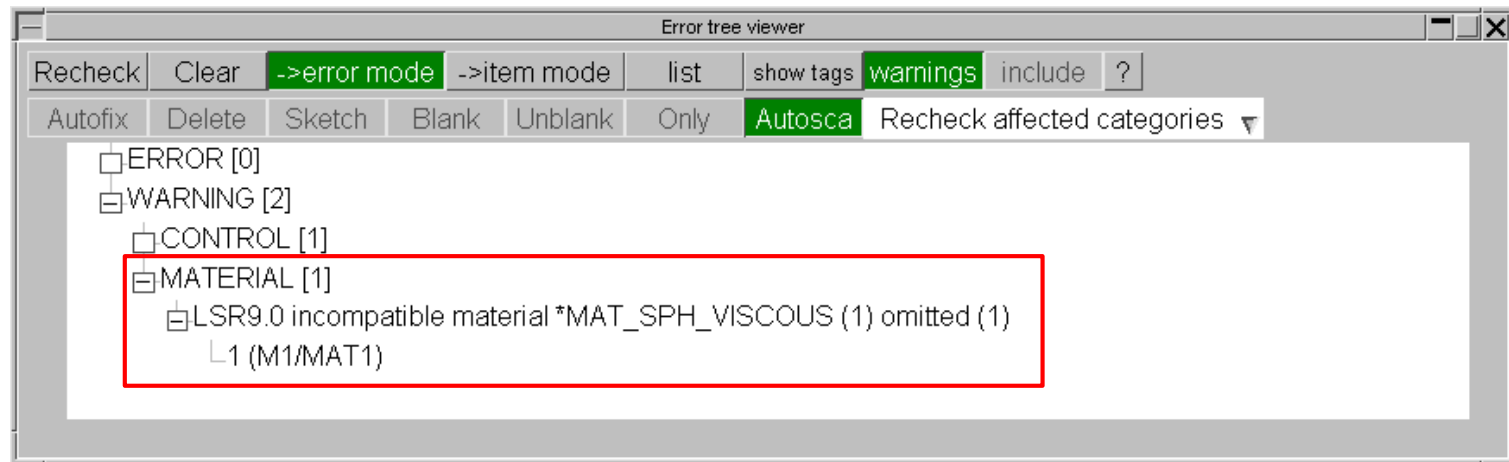
Model Check Reports Omitted Keyout Items

- When keyword output targets a version of LS-DYNA that pre-dates new keywords, or new data fields on existing keywords, PRIMER has historically reported this only during keyout itself, for example
- Example - *MAT_SPH_VISCOUS. This was added into LS-DYNA R10. If you have this keyword in your model and you write out with the output version set to R9 (or below) in PRIMER you will get the following message:



Model Check Reports Omitted Keyout Items

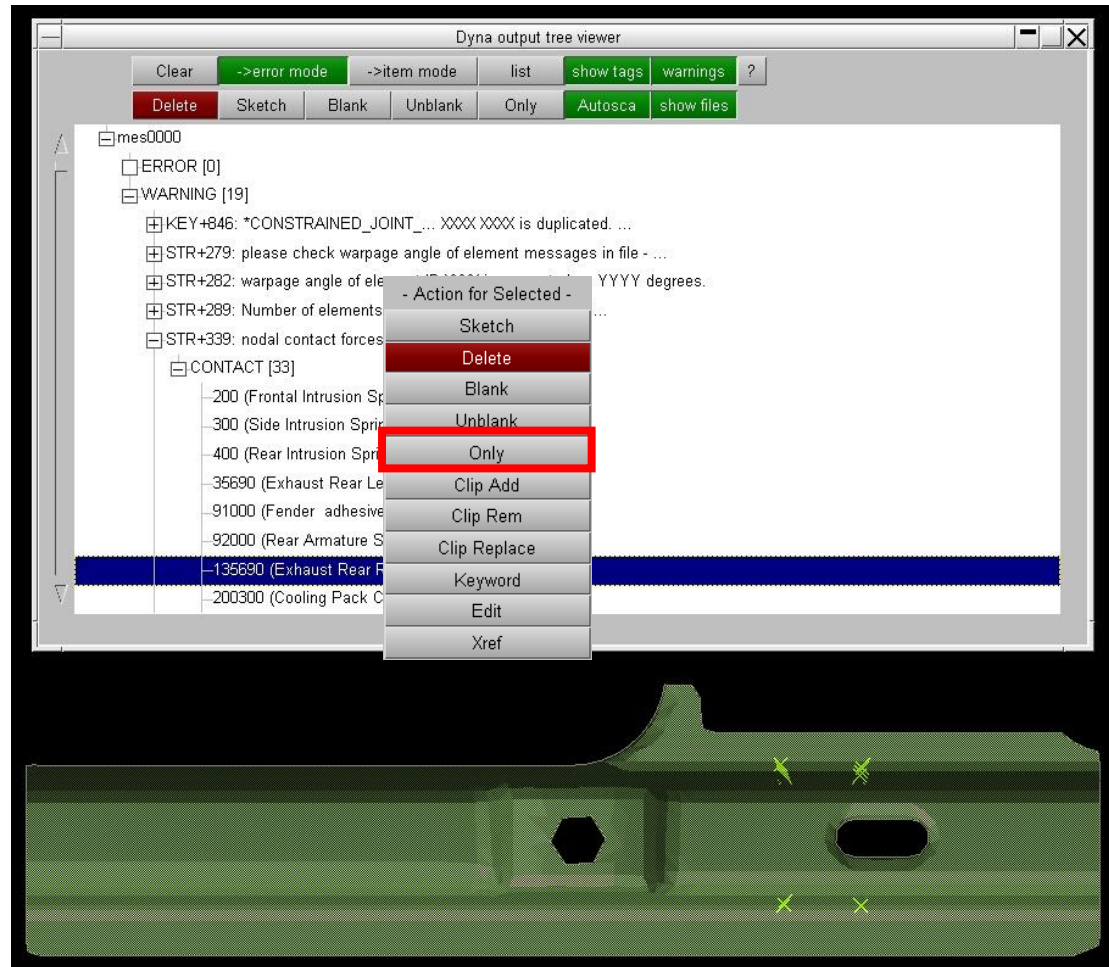
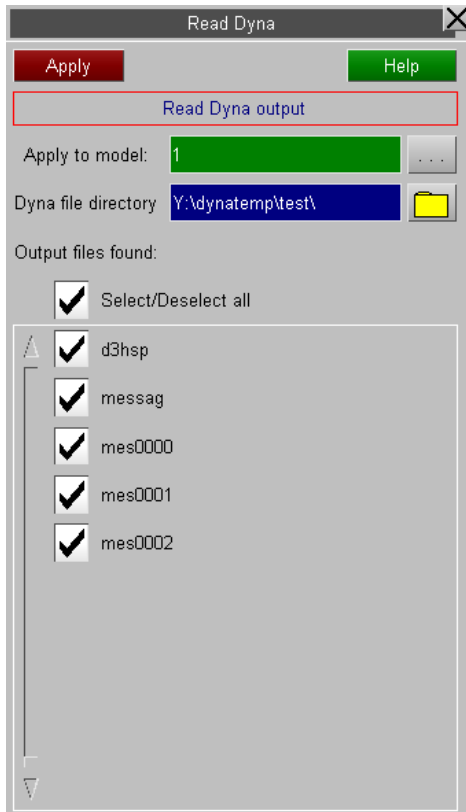
- This was annoying because you only discovered unsupported keywords when you came to write the model out to disk.
- This information is now captured during **Model Check** and is reported along with “ordinary” errors/warnings.



- These messages can be promoted to errors rather than warnings in the check options panel.

LS-DYNA Output File Reader

LS-DYNA Output File Reader – V14



LS-DYNA Output File Reader – V15

- In addition to errors and warnings, PRIMER can now read “termination” style messages:

```

*** Error 40456 (SOL+456) (processor # 0)
NaN detected.

*** Warning 11080 (KEY+1080)
*RIGIDWALL_GEOMETRIC_FLAT ID 1999 has length less than or equal t
LENL = 0.0000E+00; LENM = 0.0000E+00;

*** Warning 70025 (OTH+25) (processor # 0)
Memory is set 378702 words short
increase the memory size to 52000000

*** Warning 70025 (OTH+25) (processor # 0)
Memory is set 7192330 words short
increase the memory size to 59192330

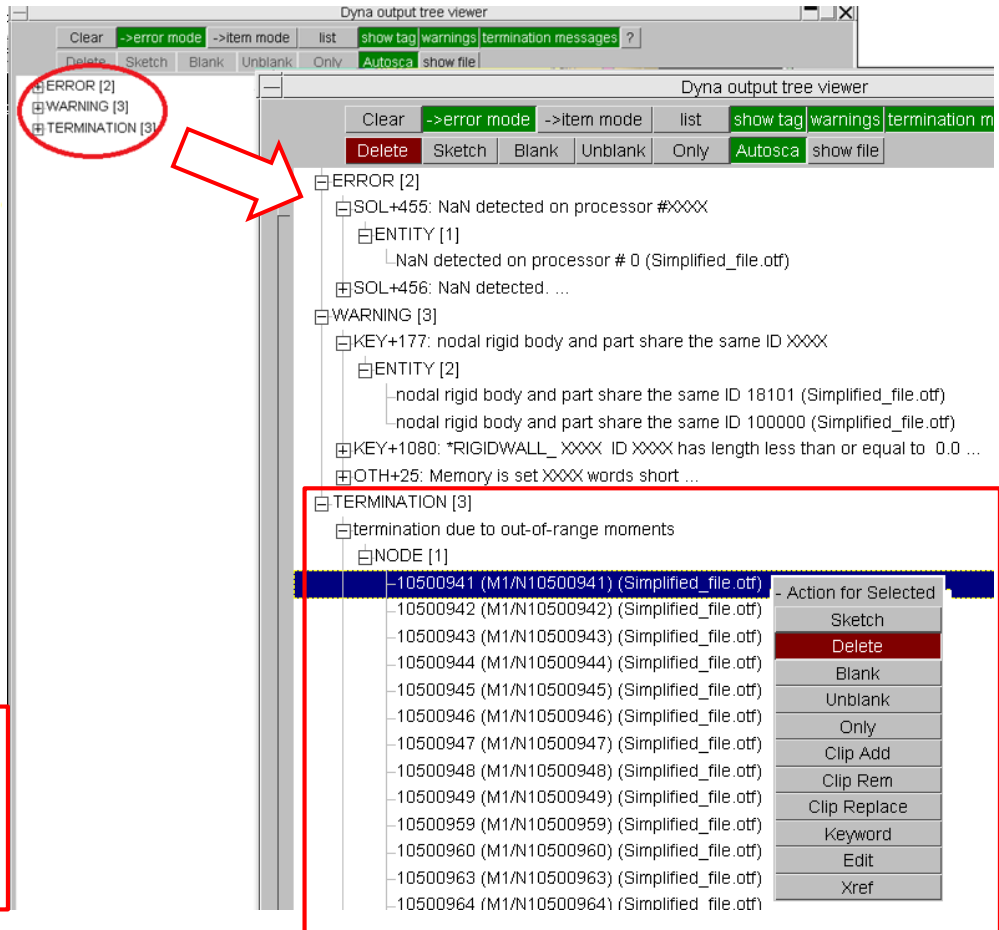
*** Warning 70025 (OTH+25) (processor # 0)
Memory is set 821210 words short
increase the memory size to 63192330

*** Warning 10177 (KEY+177)
nodal rigid body and part share the same ID 18101

*** Warning 10177 (KEY+177)
nodal rigid body and part share the same ID 100000

*** termination due to out-of-range moments
number of nodes has out-of-range moments          402
Node list:
10500941 10500942 10500943 10500944 10500945 10500946 10500947
10500949 10500959 10500960 10500963 10500964 10500965 10500966
10500968 10500969 10500970 10500971 10500981 10500983 10500985
10500988 10500990 10500991 10500993 10500996 10500999 10501001
10501002 10501004 10501005 10501006 10501007 10501008 10501009

```



Dashboard

Dashboard for Model Checking and Health

Introduced in V14:

PRIMER model checks

The screenshot shows the 'DASHBOARD CHECK PANEL' window. At the top, there are buttons for 'RUN_ALL', 'WRITE', and 'DISMISS'. Below these, the model information is displayed: Model: C:\Japan\PRIMER_13\DEMOS\1_TOP_TIPS\top_vehicle.key, Date: Sat Oct 01 09:49:27 2016, Admin Pref File: n/a, Install Pref File: C:\oasys\14\oa_pref, Home Pref File: C:\Users\miles.thornton\oa_pref, and Error Config File: C:\Users\miles.thornton\error.config(home)\home.

The main area is a grid of check panels. A red arrow points to the top row of panels. The first panel, 'Element Quality Check', is red and shows 1 error and 0 warnings. The second panel, 'Model Check', is red and shows 23 errors and 15 warnings. The third panel, 'Output File Check', is green and shows 0 errors and 0 warnings. A red arrow points to the 'Output File Check' panel with the text 'Errors/warnings from LS-DYNA'. Below this row is a red-bordered box containing four panels: 'Model Metrics' (grey, <unchecked>), 'Error script' (red, First error message, Second error message), 'OK script' (green, Check ran OK!), and 'Warning script' (orange, Single warning message). A red arrow points to the 'Model Metrics' panel with the text 'User defined checks/metrics'. Each panel has 'Check', 'Settings', and 'Details' buttons.

Annotations:

- Element quality (points to Element Quality Check panel)
- User defined checks/metrics (points to Model Metrics panel)
- Errors/warnings from LS-DYNA (points to Output File Check panel)

Model Read/Write

- In V15 model read and write is faster:
 - Parallelisation and efficiency improvements mean that V15 reads a typical model in about 60% of the time of V14.
 - Model write is also faster taking about 70% of the time, but if a model has many include files then the speed up will be greater.
 - Input and output to a slow network disk are also improved due to better buffering and parallelisation.

- New optional “Binary” keyword output format added
 - Files start off in ASCII, so the tops of file (e.g. comments) remain readable.
 - After (new) *START_BINARY keyword they swap to binary.
 - Binary file size is typically 30% of original ASCII keyword file and writes to disk in about 25% of the time of the equivalent ASCII file. File read is also faster than ASCII as no conversion is needed.
 - Binary format preserves original formatting, and can be turned back into a normal ASCII formatted keyword file using a standalone programme as well as PRIMER.
 - Binary format is used for “Undo”, speeding up the disk i/o of this substantially.

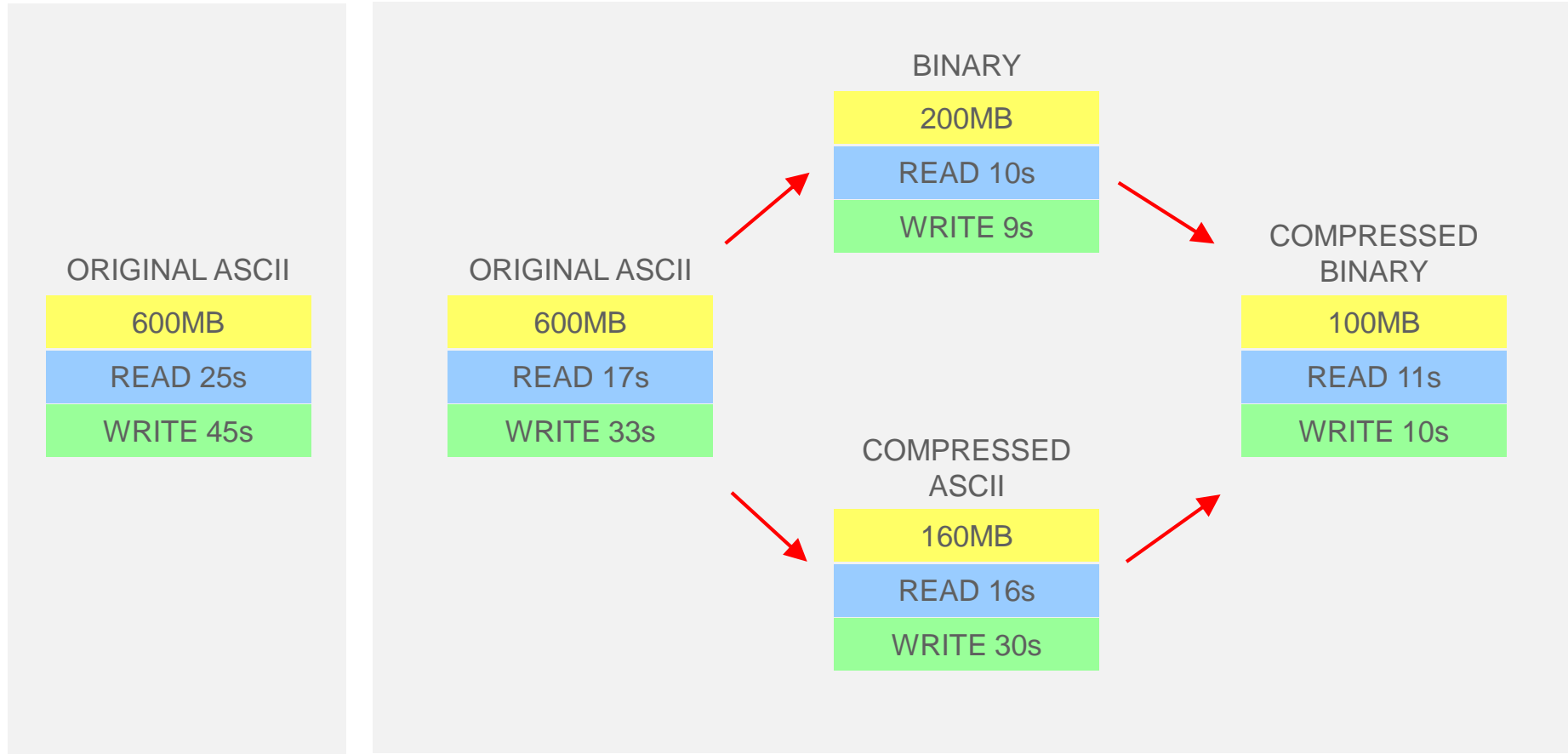
Improved Model Read and Write

- Optional data compression has been added.
 - Files are compressed using standard zipping:
 - Unix/Linux - Gzip - (.gz)
 - Windows - Winzip - (.zip)
 - Models with multiple include files can be compressed into a single .zip archive containing master file and all includes in an embedded INCL directory.
 - The degree of compression is user-configurable, the default level giving file sizes about 25% of the original ASCII files.
 - Binary format can also be compressed, typically resulting in files that are < 20% of the size of the original ASCII files.

Improved Model Read and Write

V14

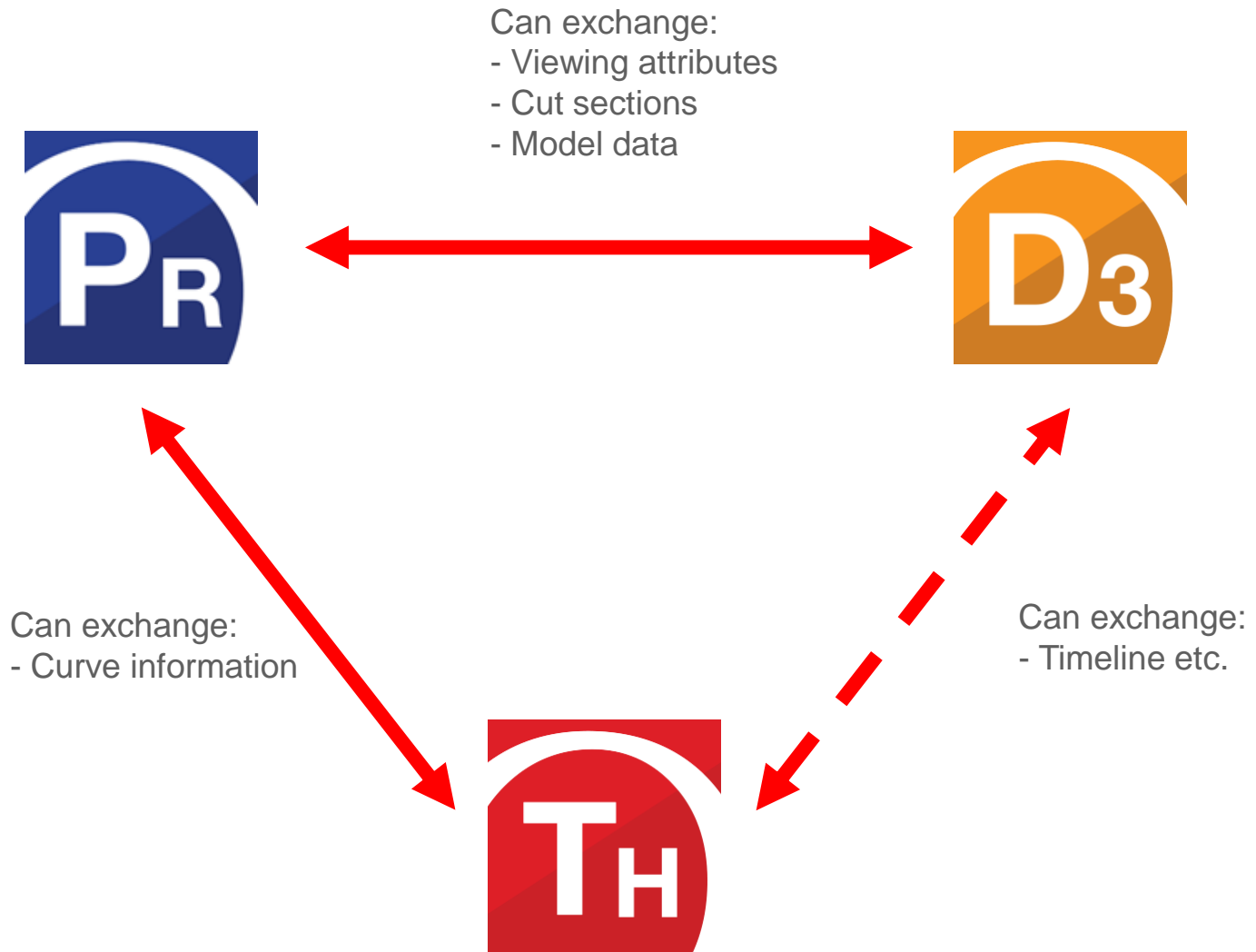
V15



Integration With Post Processing

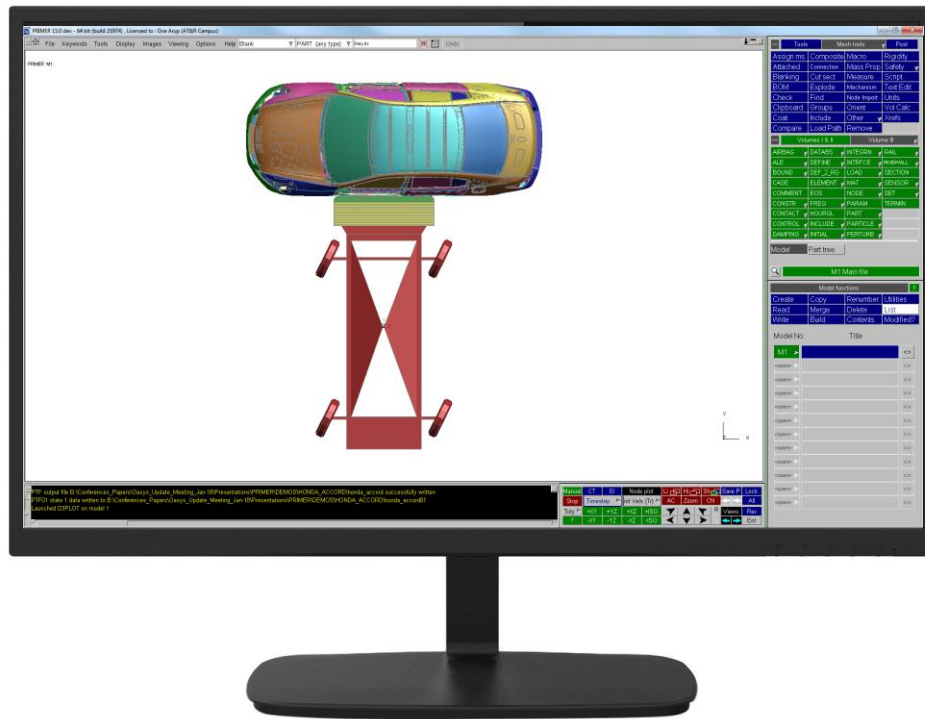
- With the Oasys products you would traditionally look at LS-DYNA input files and output files separately.
- It is often desirable to access both sets of information at the same time, for example:
 - With output results, wanting to look at material properties for a part that has failed.
 - In the input model, wanting to look at spotweld failure of a current analysis when deciding how to change your spotweld configuration.
- The ZTF file (written by PRIMER) allows some model information to be transferred to D3PLOT to aid this.
- In V15 there is also an ability to open one piece of software from another with the contents linked to allow easy access to both sets of information.

Pre-Post Integration



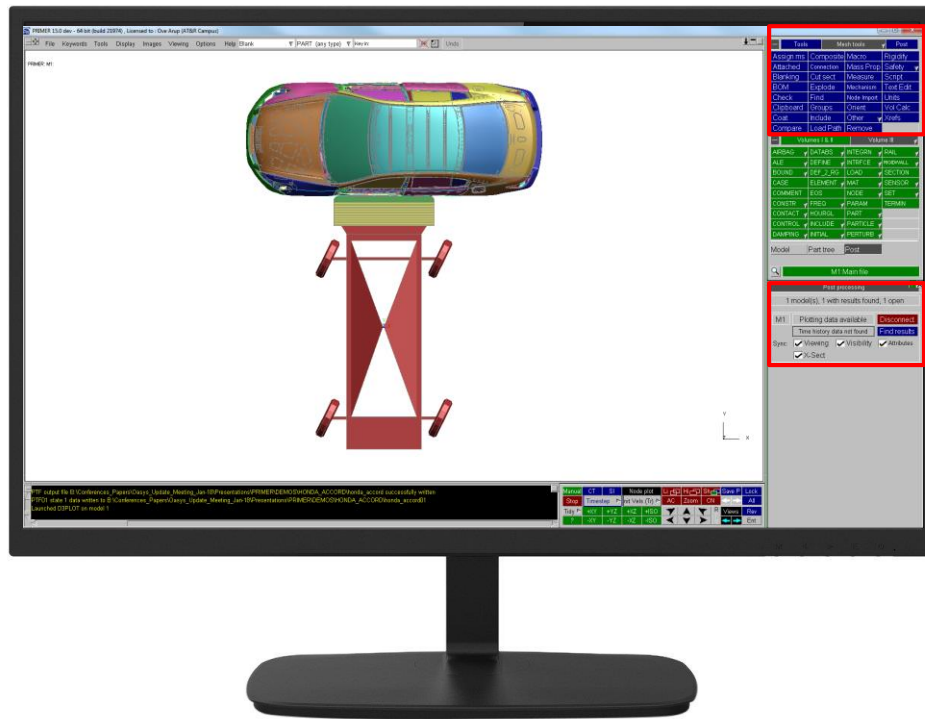
Pre-Post Integration - Example

- You are working in PRIMER – you want to view results information related to your model



Pre-Post Integration - Example

- New “Post” button allows you to launch D3PLOT/T/HIS from PRIMER.
- You can also launch PRIMER from D3PLOT.



Tools	Mesh tools	Post	
Assign ms	Composite	Macro	Rigidify
Attached	Connection	Mass Prop	Safety
Blanking	Cut sect	Measure	Script
BOM	Explode	Mechanism	Text Edit
Check	Find	Node Import	Units
Clipboard	Groups	Orient	Vol Calc
Coat	Include	Other	Xrefs
Compare	Load Path	Remove	

Post processing

1 model(s), 1 with results found, 0 open

M1 | Plotting data available | **Start D3PLOT**

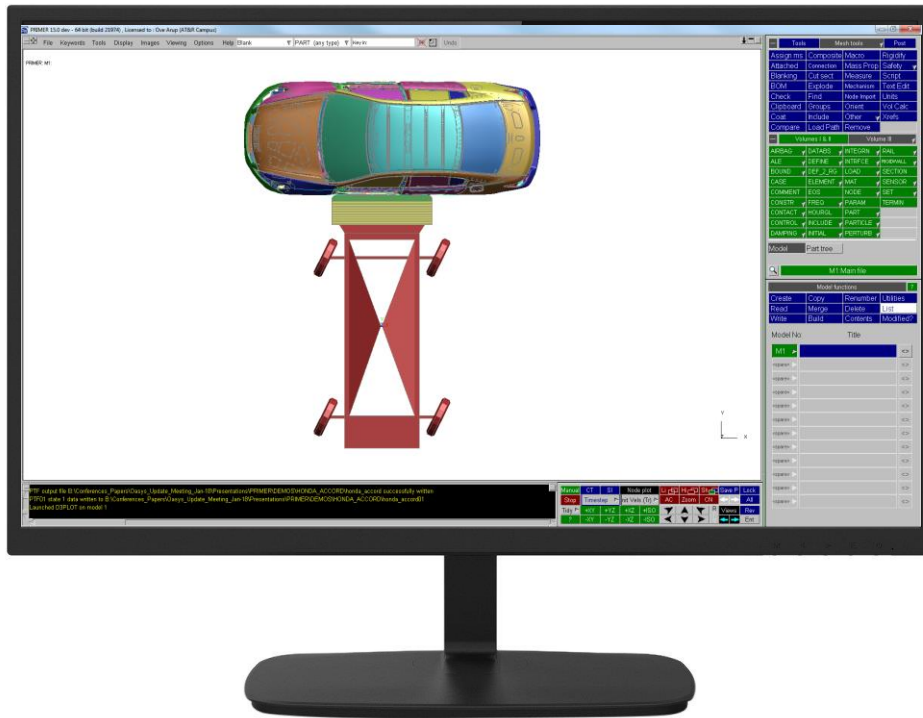
Time history data not found | Find results

Sync: Viewing Visibility Attributes

X-Sect

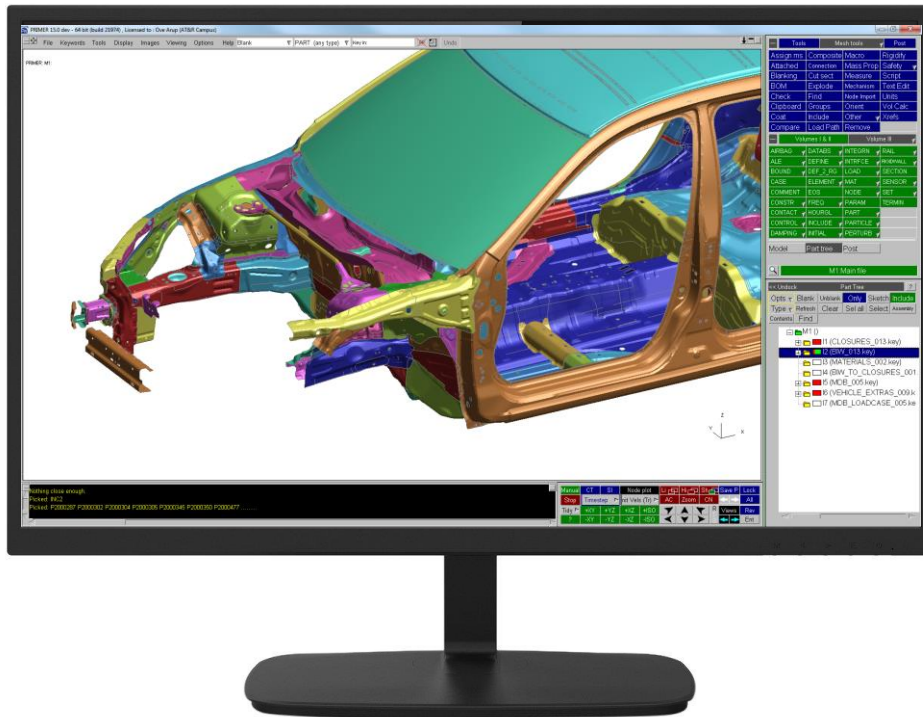
Pre-Post Integration - Example

- D3PLOT opens and automatically reads results – view and blanking status are matched.
- This link works best on multiple monitors.



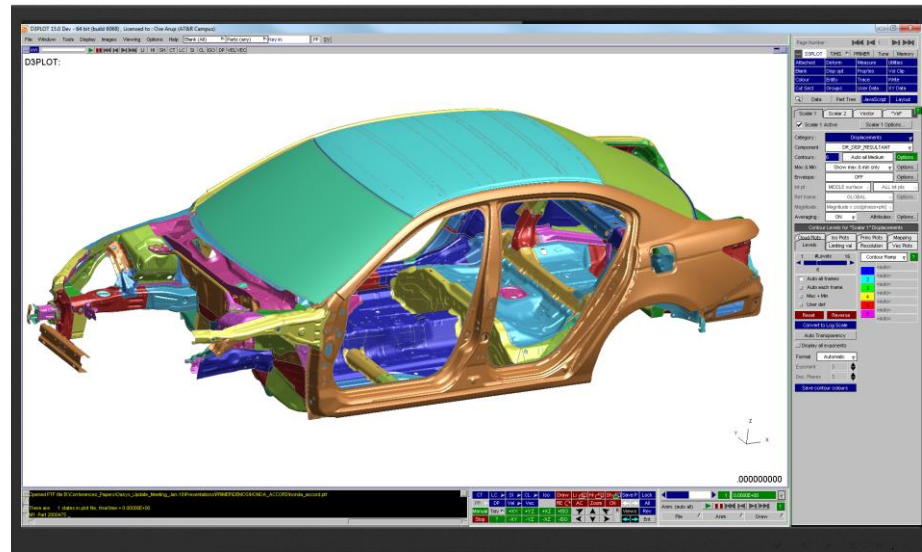
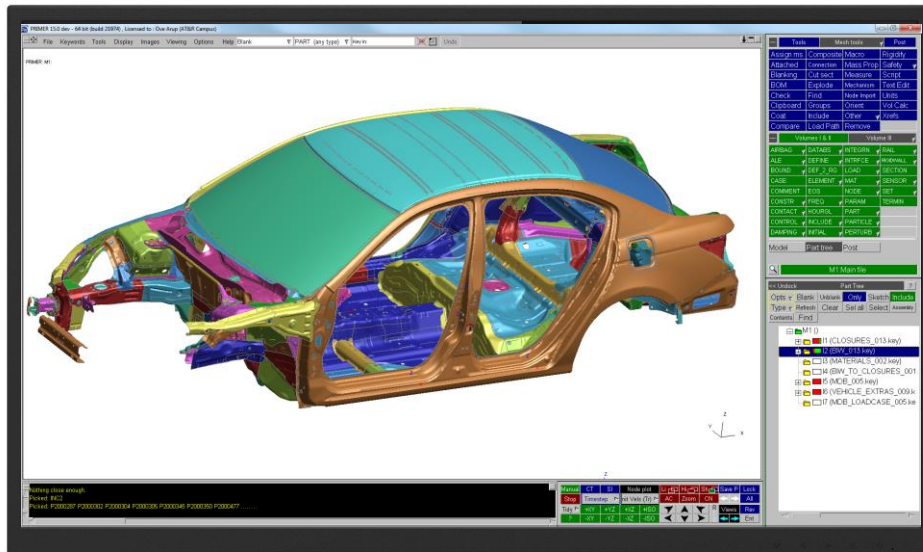
Pre-Post Integration - Example

- Blanking is automatically synced across the link – if you blank entities in one program, the blanking is automatically applied in the other.



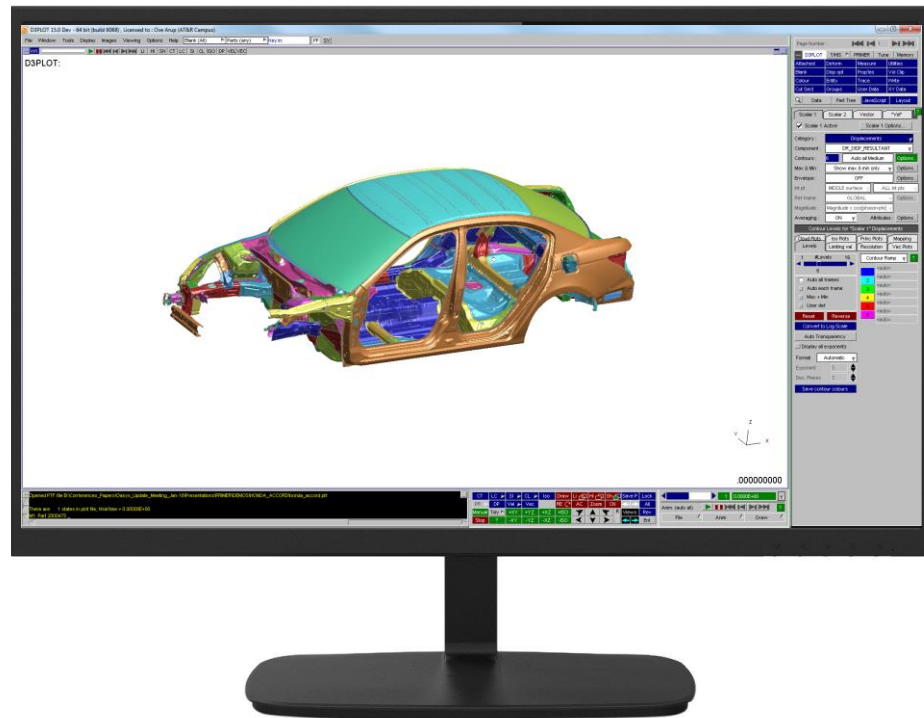
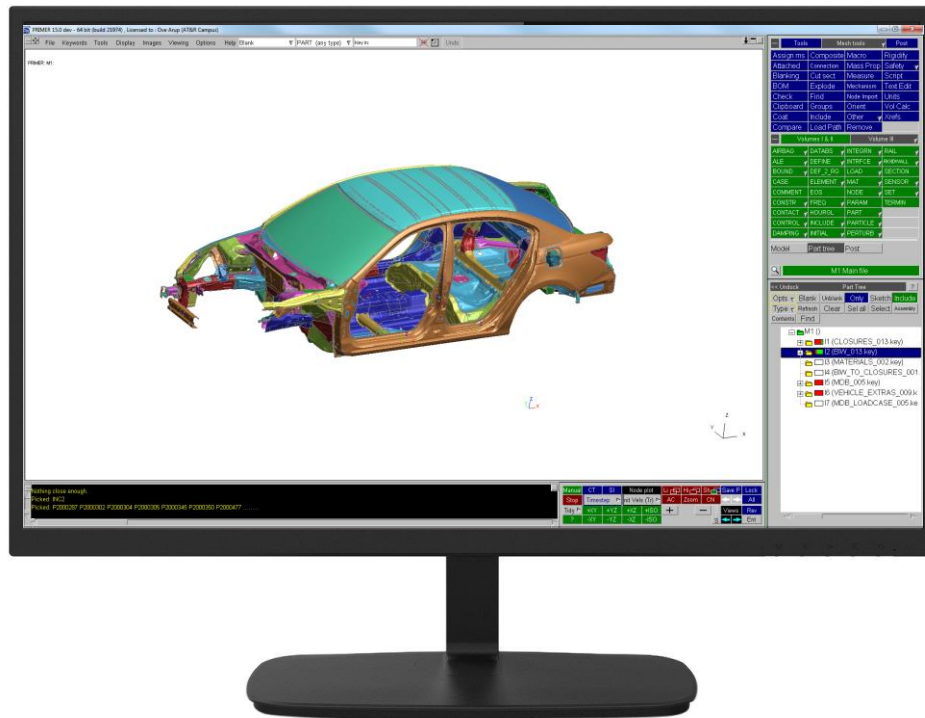
Pre-Post Integration - Example

- Dynamic rotation/translation/zooming is automatically synced across programs.



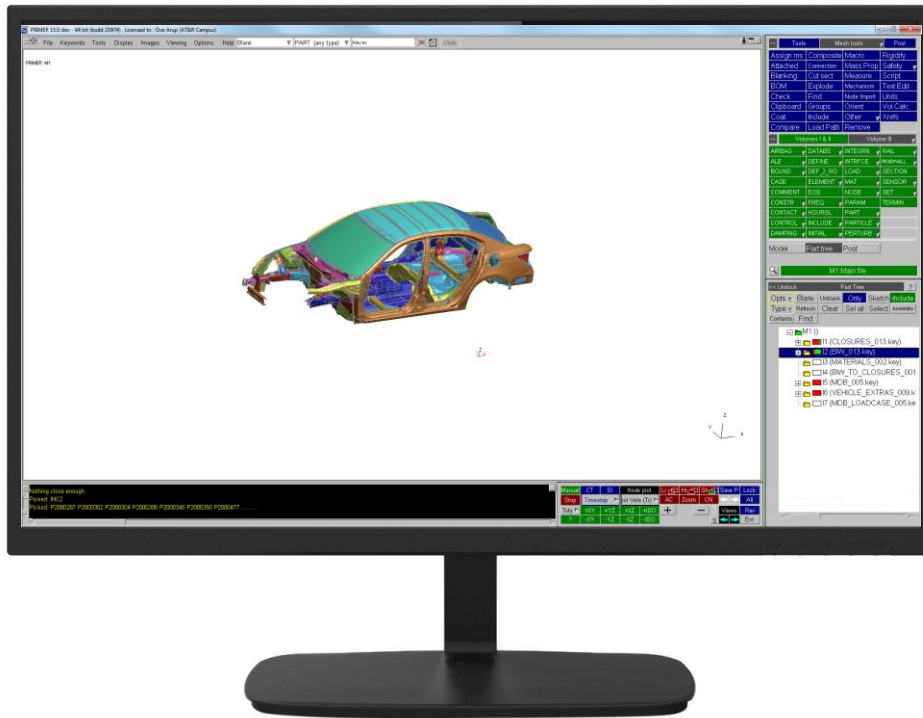
Pre-Post Integration - Example

- Dynamic rotation/translation/zooming is automatically synced across programs.



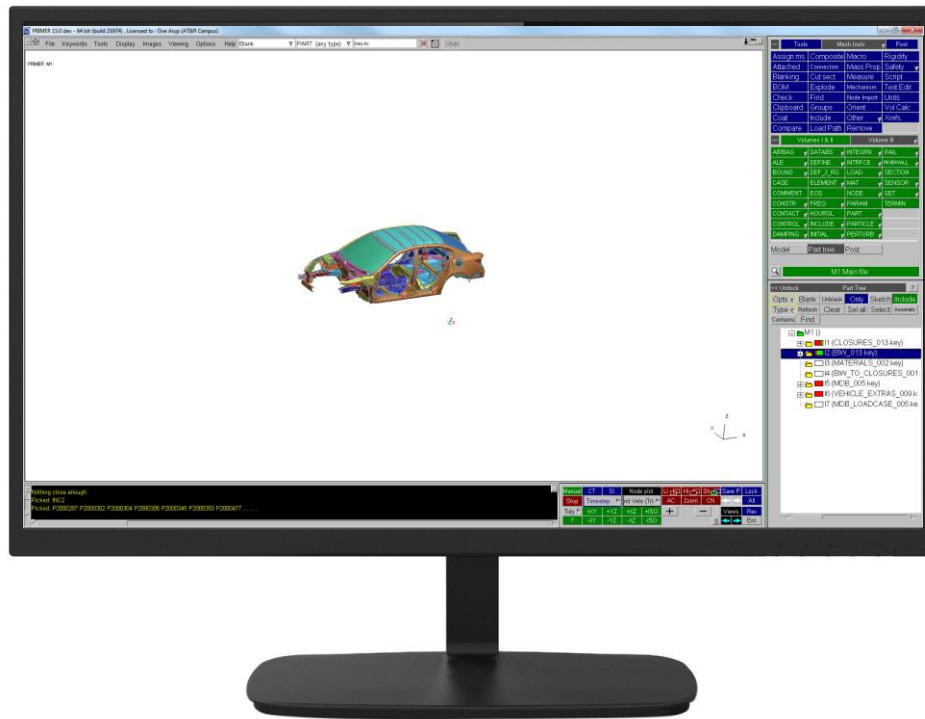
Pre-Post Integration - Example

- Dynamic rotation/translation/zooming is automatically synced across programs.



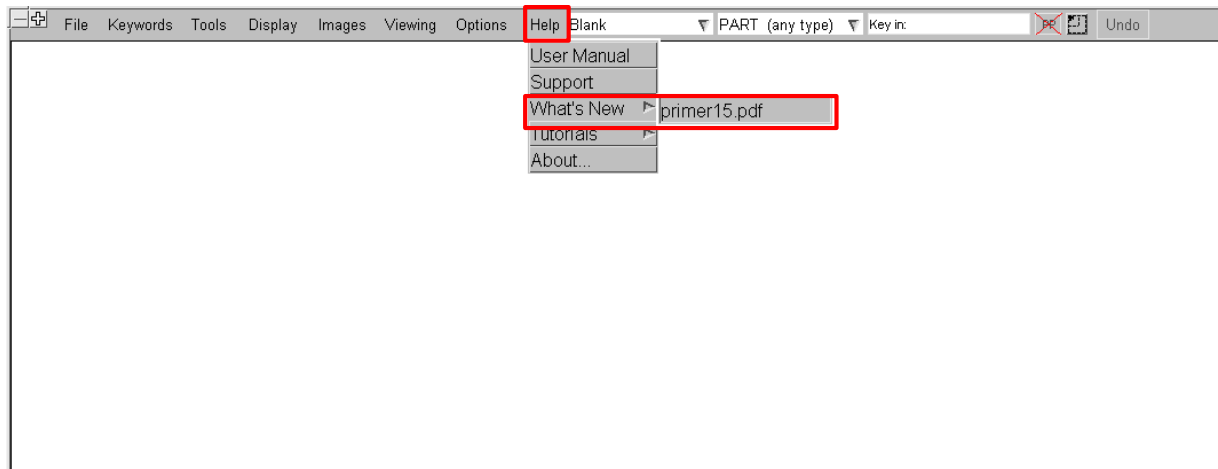
Pre-Post Integration - Example

- Dynamic rotation/translation/zooming is automatically synced across programs.



Summary

- V15 to be released in March 2018.
- Visit www.arup.com/dyna for information and support.
- New webinars and tutorials are available.
- “What’s new” information available from within software:



PRIMER Update

2018