SPEED 4.4.1 Release Notes (23 - December - 2024)

2D FE Lagrange

- Full revision and re-implementation of the 2D FE solver
- Simulations can now be parallelized
- Improved friction handling
- Improved hourglass control: internal hourglass pre-factor is now based on the local FE time step.
- Contact matrix with part-wise contact definition

Note: Upon loading an existing model setup (*.spe) into SPEED v4.4.1 the following changes will automatically be made:
- previously stationary gauges will be transformed into movable,
- the new erosion parameter “Min. Scaled Jacobian” is added and set to zero by default,
- previous contact settings are removed (contact must be re-defined by the user (contact matrix))

Note: State files (*.sta) from the previous versions are not compatible with this version

3D FE Lagrange

- Improved hourglass control: internal hourglass pre-factor is now based on the local FE time step

Bugfixes

- Erroneous display of wedge elements as pyramid elements in 3D FE pre-processing corrected
- Incomplete postprocessing “Surface with Edges” visualization for triangular faces in 3D FE corrected
- Inaccurate assignment of gauge points corrected for tetrahedral, pyramidal and wedge-shaped FEs
- 3D FE state file reading backwards compatibility fixed
- Added missing new region ID on “Paste Region” in pre-processing
- Display issues with the region definition “Geometries” tab in pre-processing solved
- Fixed erroneous display of the contour variable and the edge colour for parts which were hidden during a change in 3D FE post-processing
- Fixed crash occurring upon continuation of an interrupted 3D FE batch run
- Fixed erroneous ignition events after element erosion in FE simulations applying the “Burn on Time” option

SPEED 4.3.2 Release Notes (14 - September - 2023)

Bugfixes

- SPEED crashed if a 2D FE simulation is removed/deleted from the object list under the condition it is the only 2D FE simulation in the object list.
- Sometimes occurring erroneous results caused by the definition of node list-based nodal boundary conditions together with node- and/or region- based ones fixed for 3D FE.

SPEED 4.3.1 Release Notes (01 - August - 2023)

3D FE Lagrange

- Simple Target feature, by which the behaviour of the target is completely defined by the forces it exhibits on the surface of a penetrator. This significantly reduces the calculation time for cases, where only the structural response of the penetrator is of interest.
- Improved visualization on zoom

2D FE Lagrange

- Remap of 2D FE models
- Automatic check for negative x-coordinates of nodes in axisymmetric simulations
- Automatic correction of slightly negative x-coordinates of nodes in axisymmetric simulations (e.g. rounding errors from CAD import)
- Automatic validity check for manually defined elements

All Solvers

- Increased robustness of the calculation of internal Hugoniot temperature tables used in Shock, Mie-Grüneisen and Universal Liquid EOS.

Preprocessing

- Materials modified during model setup can be saved back to the material library
- Improved node selection in 3D FE Lagrange
- Reduced GPU memory consumption during 3D FE model setup
- Geometry import from FreeCAD restricted to applicable geometries

Bug Fixes

- Unintended additional Time History and Part Summary entries for “By Time” incrementation removed
- Possible crash occurring upon reaching a high but arbitrary number of screen refreshes fixed
- Crash occurring if the number of regions is greater than the number of elements contained
- Segment lists were not updated after deletion of the related parts
- Continued display of selected nodes upon change to a different tab prevented

- After reloading of a .spe file and subsequent remeshing of a geometry or part the old elements were not deleted in 2D and 3D FE
- Thread safety issues in 3D FE removed
- Clean-up after part deletion / remeshing improved
- Problems with the element information (post-processing) for elements with negative x-coordinate in 2D FE plain strain simulations solved
- Possible crash that may occur during a restart of 2D FE simulations from state file fixed
- Problems with inconsistent element masses when nodes near the y-axis are moved in axisymmetric 2D FE simulations solved
- Possibly incomplete automatic part summary output for 3D FE removed
- State files could continuously be overwritten if their file name included a dot.
- Detection of (merged) internal part interface nodes as surface nodes prevented
- Detection of (merged) internal part interface segments as surface segments prevented
- 3D FE tripot visualization improved
- Gauge acceleration data in 3D FE was not recorded

SPEED 4.2.2 Release Notes (27 - September - 2022)

Non-public customized version.

SPEED 4.2.1 Release Notes (26 - July - 2022)

3D FE Lagrange

- Pyramidal and prismatic (wedge-shaped) transition solid elements
- Gravity
- Artificial viscosity calculations adapted for more consistent results for flat elements
- Scale Factor, Activation Time and Deactivation Time added to Prescribed Motions

2D FE Lagrange

- Scale Factor, Activation Time and Deactivation Time added to Prescribed Motions

Preprocessing

- Initial angular velocities can be assigned to all suitable solver models (3D FE, 2D FE (Plane Strain), 3D Multi-Material Euler, 2D Multi-Material Euler (Plane Strain))
- Revised and extended k-file import for 2D and 3D FE Lagrange
- Export of 3D FE models in k-file format
- SPEED now supports export to and import from FI-BLAST (© NUMERICS)
- Decoupled, FreeCAD interfacing (now based on the FreeCAD Python API)
- Latest version of FreeCAD (v0.19.4)
- Initial Velocities, Stress Boundaries and Prescribed Motions can also be applied to regions in 3D FE Lagrange

Postprocessing

- Profile plots for 3D FE Lagrange
- Reflections for the visualization of 3D FE Lagrange results

- Improved algorithm for jet export in 2D and 3D Multi Material Euler.

Bug Fixes

- A limitation of the main thread to Core 0 in 3D FE simulations has been removed.
- Nodal mass adjustment for erosion for 3D FE Lagrange was corrected.
- The definition of a clip plot in 3D FE without application of the clipping plane could cause SPEED to crash.
- FE 2D solver ignored the Time Step Safety Factor user input and generally applied the default value of 0.5.
- An erroneous state iteration for start / restart after reaching the stop time in 2D FE simulations was corrected.
- Pick Element and Pick Node related postprocessing issues solved.
- Missing value and unit conversions upon unit system change during model setup fixed.
- An incorrect 4th node ID was displayed in the Segment Lists tab for 3D FE.
- Inconsistent behaviour of displayed scale for 3D FE Contour and Threshold plots in edge cases removed.
- The Parts and Gauges buttons on the Post tab did not directly open the respective files.

SPEED 4.1.3 Release Notes (20 - May - 2021)

GUI

- GUI adapted for displaying Chinese characters.

SPEED 4.1.2 Release Notes (14 - May - 2021)

Bug Fix

- Compatibility problems with Windows 7 OS solved.

SPEED 4.1.1 Release Notes (28 - April - 2021)

3D FE Lagrange Solver

- Flanagan-Belytschko solid hexahedra elements, standard tetrahedra possible as filler/transition elements.
- Handles all existing material models and explosive burn options
- Boundary conditions: surface tractions and prescribed nodal motions
- Initial conditions: nodal velocities, element pressure and temperature
- Accurate iterative kinematic contact, including self-contact
- Element erosion, mainly based on element distortion criteria
- Parallelization based on multi-threading and domain decomposition.
- Pre-processing with simple body mesh generation
- K-file import, if complex meshes are needed
- Comprehensive post-processing

Ideal Gas Solver

- Some bug fixes were necessary for multiple meshes containing rigid parts.

GUI

- Added (semi-)transparency for contour scales.
- Results (state, time history, material summary) can be stored “by cycle”.

Material Library

- Some non-ideal commercial explosives have been added: ANFO 0.8 HVRB, ANFO 0.88 HVRB, Ammonal 90/10, Kinepak 2 HVRB, Semtex 1A, Semtex 90 PH, Semtex H.

Data Interface

- The “jet summary” for 3D Euler simulations has been extended.

SPEED 3.2.11 Release Notes (03 - December - 2020)

2D FE Solver

- The Flanagan-Belytschko hourglass control is now available for plane strain in 2D. It is highly recommended for problems involving large rotations.
- The “ogive” within the simple geometries can now be hollow.
- The maximum overpressure and impulse are stored and can be displayed in contour plots.
- Erosion of degenerate elements is always activated. The check box on the options tab has been removed.

Initial Conditions

- Initial angular velocities can be set per part, provided the model is not axisymmetric.

Bug Fixes

- Many functions of the windows API allow for limited file path lengths only. Longer path names could crash SPEED. A check is done now, and warning pops up.
- Contour scales could be covered and therefore be unreadable.
- In rare cases SPEED crashes were observed possibly caused by the progress bar. Appearance of progress bars can be turned off via the menu “Settings/Customize…”.
- Opening speed per double-click has been re-activated.
- Visualization of rigid boundaries of the 3D MM solver has been corrected.
- The job queue crashed in version 3.2.10

SPEED 3.2.10 Release Notes (04 - November - 2020)

2D FE Solver

- Erosion is possible based on volumetric strain without considering damage.

Bug Fixes

- Burn on Time did not correctly work in versions 3.2.6 and 3.2.7.
- Remap into ideal gas solver could produce incorrect results.
- Actions displaying a progress dialog failed occasionally on certain computers.
- 2D FE state files could not always be opened correctly.

SPEED 3.2.7 Release Notes (13 - January - 2020)

Bug Fixes

- Initialization of Euler models with gravity option could produce empty cells.
- 2-d part transformation page showed inapplicable 3-d transformations .
- 2-d parabola mesh did not create constant edge lengths.
- Deleting FE-parts could lead to a crash when a 2-d mesh was selected.

SPEED 3.2.6 Release Notes (12 - November - 2019)

Bug Fixes

- Maximum cycle number was limited to 10^6.
- Creating segment lists was not possible in 2-D FE.
- Only version 3.2.4 was affected by these bugs.

SPEED 3.2.4 Release Notes (23 - September - 2019)

2-D FE Modelling

- Multiple elements can be selected for deletion and part assignment.
- For multiple node selections new commands have been added: “Move To”, “Move By”, “Undo Move”

Material Modelling

- Temperature calculations for expanded states have been revised for the following equations of state: piecewise us-up, cubic us-up, polynomial, and universal liquid.

Bug Fixes

- Remap of plastic strain and damage state variables fixed. Affected versions: all later than 2.2.4.
- Nodal constraints in an FE-model were not saved and retrieved correctly.
- Crashes when reading incorrect time history file are now avoided.

SPEED 3.2.3 Release Notes (28 - June - 2019)

Bug Fixes

- The implementation of the bulking equation in the ceramics model has been corrected.
- Before a FE-run starts, irregular surface edges are detected and reported.

SPEED 3.2.2 Release Notes (09 - April - 2019)

Bug Fix

- Crash if graphics pane is smaller than the contour scale has been fixed.

SPEED 3.2.1 Release Notes (20 - December - 2018)

Material Models

- The RHT concrete model has been implemented. It improves over the HJC model by including strain hardening and third invariant dependence of the yield surface. In the SPEED implementation a couple of inconsistencies of the original RHT have been removed.
- The Xue-Wierzbicki damage model has been added. It models failure as a functional of the triaxiality and the third invariant of the stress deviator.
- The Doan-Nickel model for air offers a physical domain up to P ≈ 1000 bar and T ≈ 20,000 K.
- Modelling of solids is facilitated by offering a "modular material". Equations of state can arbitrarily be combined with strength and damage models.

Equation of State (mandatory)	**Porosity (optional)**	**Strength (optional)**	**Damage (optional)**	**Spall Damage (optional)**
Mie-Grüneisen, Cubic U_s-u_p	P-alpha	Drucker-Prager	Johnson-Cook	P-alpha Spall
Shock, Piecewise Linear U_s-u_p		Elastic-Plastic	Xue-Wierzbicki	
Polynomial P(μ)		Johnson-Cook		
Tillotson		Steinberg		
Universal Liquid		Zerilli-Armstrong		

GUI

- Improvements have been made to adapt SPEED to high resolution screens.
- Drag and drop is enabled to allow for manual reordering of gauges and particles.
- FE-Meshing discriminates between "Mesh Whole Part" and "Mesh Geometry"
- FE-Modelling: Copy and Paste of functions is possible via the data type "Time History"
- The edit menu has been extended with the "Paste Text…" function. Tabular data from any other code or SPEED itself maybe imported from the clipboard using this functionality.
- "Volumetric Strain" is now a in the list of possible gauge outputs.
- 2D-Contour: Smoothing is now optional.

Bug Fixes

- FE-Modelling: User input of negative node and element numbers now prevented.
- FE-Modelling: "Paste Part" part number incrementation corrected.
- 3D-Model visualization: incorrect raytracing for tetrahedron and extruded polygon fixed.

- Possible problems with bulking in JH2-model resolved.

SPEED 3.1.2 Release Notes (11 - January - 2018)

Finite Element Solver

- Friction option added to contact.

Multi-material Euler Solver

- A general speed-up between 10% and 60 % could be achieved. On average the gain is around 25%.
- 3D initialization accelerated (mesh filling uses multi-threading).
- “Repair cell” option has been enhanced to avoid wrapup caused by overemptied cells.
- “A “flow out” boundary condition is available for 2D and 3D Euler solvers. It is expected that it gives for many problems more realistic flows than the “transmissive” boundary.

Material Library

- The Tillotson EOS has been implemented. Several examples in the library use it together with the Johnson-Cook strength model.

GUI

- Polygon point picking can be used for 2D FE geometries and regions.
- 2D FE parts can be copied and pasted (geometry and mesh definitions)
- In the “Tools” menu an option to create time histories from power spectral densities has been added. This can be used to specify random loads.
- Movies can be recorded with camera motion following a specified gauge.

Bug Fixes

- Large Euler models (say close to 100 Mio. Cells) suffered occasionally from unintentional write access to cell memory.
- Function definitions for boundary conditions used occasionally wrong units.
- Initial positions and node masses are saved in the 2D FE state file. This allows plotting velocities and strains correctly.
- Density gradient due to gravity option was not initialized in version 3.1.1

SPEED 3.1.1 Release Notes (11 - November - 2017)

Finite Element Solver

A 2D finite element solver has been added.

- Quadrilateral and triangular solid elements

- Plane strain and axial symmetry
- Quad mesher for arbitrary geometries
- Interface to integrated FreeCAD
- Import of LS-DYNA k-files and AD structured grids
- Access to all existing material models
- Contact and erosion options

CAD Module

FreeCAD has been integrated into SPEED.

- Import of CAD data
- Macros for 3D to 2D axial symmetry conversion
- Setup of 2D geometry for Euler parts and FE meshes

Euler Solver

- For the CJ shock burn higher robustness and essentially improved isotropy have been achieved by abandoning the existing geometry based implementation in favour of a level set algorithm.
- Energy partition in mixed cells has been improved and leads to more realistic temperature output.

Material Library

- Pmin values have been revised for all materials.

GUI

- On the post tab the logfile can be opened.
- The “heat” colormap has been added to the contourplot options.

Documentation

- A “Tutorial Manual” has been added.

Bug Fixes

- Initial time step was sometimes incorrect for the Euler solvers when rigid parts were present.
- Material boundaries in contour plots were frequently not visible.
- Parameters of Steinberg EOS were incorrect in Restarts from a state file.

SPEED 2.3.3 Release Notes (12 - December - 2016)

Geometry Import

- Parts (geometries) in STEP format can be imported from CAD applications into 3D models.
- Multiple selection of geometries / parts / assemblies for import from k-files and STEP-files is now possible.

State Export in ASCII Format

- 2D and 3D multi-material simulation states can be exported in a structured ASCII format. The exported file contains all state variables for all cells.

Material Models

- A “Universal” Hugoniot for Liquids (Universal liquid EoS) has been added.
- A new “P-alpha Spall Model” has been added. This (optional) model is available for the Johnson-Cook, Zerilli-Armstrong and Steinberg models.

Material Database

- Added Universal Liquid Materials: Benzene, Carbon Tetrachloride, Ethanol, Gasoline, Glycerol, Heavy Mineral Oil, Water

Postprocessing, Time Histories, Gauge Data

- New state variables Max. Overpressure and Max. Overimpulse for e.g. safety area determination have been added to 2D and 3D multi-material simulations.
- An option to multiply the ordinate values of time-history data has been added.
- An option to generate a new curve by concatenating data sets has been implemented.
- An option to plot the maxima or minima of different time-histories (e.g. peak pressures in different gauges) has been added.
- An option to display diagrams / curves with two different y-axes for displaying different scale / different units curves in a single diagram has been implemented.
- A feature to export all time-history data for one or more gauges into a text file has been added.

Graphics

- Volume rendering has been added for IGS models.
- Zoom by Shift + Left Mouse Button implemented for 3D models.
- A function to fit the current view of 3D models into the Graphics Pane has been added.
- 3D parts can now be masked / unmasked during the model setup.

Model Setup

- The location of gauge is now checked upon initialization of the simulation. The user is warned if gauges are located inside rigid parts or outside of the mesh.

Cell Selection / Output

- Specific cells in the simulation can now be selected for evaluation in the Text Pane output. Selection can be made with respect to i-j-k index, smallest time step, min. value in contour and max. value in contour.

Bug Fixes

- Changes of the material definitions were not considered when an existing state was re-started.
- A possible display error when plotting curves with logarithmic scale has been removed.
- An error in the bulking calculation of JH2 materials has been corrected.
- A possible crash when deleting a parts from the setup has been removed.

SPEED 2.3.2 Release Notes (23 - March - 2016)

Bug Fix

- Import geometry from k-file has been corrected. Affected version: 2.3.1

SPEED 2.3.1 Release Notes (25 - January - 2016)

Multithreading

Multithreading uses a user specified number of (virtual) processor cores which work in parallel on rectangular subregions of the Euler mesh. The speedup depends on computer resources and problem details. Multithreading also interferes with licensing: each thread requires one license.

Job Queue

A job queue can be defined to run successively several problems.

SPEED-Pre-Post

SPEED users can install a pre-post-version for free. SPEED-Pre-Post can be used for pre- and postprocessing purposes without consuming a licence.

Compressed State Files

An option was added, which permits to save state files (*.sta) in a compressed format. This may save disk space.

Logfile

For each run a logfile is written to disk. It contains time and time step data on a per cycle basis.

Remap

- Materials to be mapped can be selected by the user
- A rectangular region in the source file can be specified for remap
- Limitations: Cannot read older version state files. Work around: Open state file with latest SPEED version, save the state, and do the remap.

Material Models

- The P-alpha model has been revised.
- The Steinberg model considers strain rate now.

Material Database

- Added Johnson-Cook Materials: Aermet 100, 1080 Steel
- Added JH2 Materials: Granite

Postprocessing, Time Histories, Gauges

- Additional history variables of a cell can be plotted

Bug Fixes

- Errors in 2d geometry “Parabola” had to be fixed by a new definition of “Parabola”. Backward compatibility could not be maintained.

SPEED 2.2.4 Release Notes (11 - May - 2015)

Bug Fixes

- Using together “Gravity” and “Rigid” options in 3d resulted in incorrect mesh filling.
- Parts imported via k-Files could be incorrectly filled along axis-parallel and diagonal planes.
- “continuous rezone” in x-direction crashed the program in 2d plane strain and 3d problems.

SPEED 2.2.3 Release Notes (27 - November - 2014)

Bug Fix

- The receiver mesh of a remap could contain empty cells. Affected version: 2.2.2

SPEED 2.2.2 Release Notes (14 - October - 2014)

Geometry Modeling

- Copy and paste for parts has been implemented.
- 3d parts can be transformed as a whole.

Remap

A cell in the receiver mesh becomes “rigid” if the cell itself had been rigid before, or when it overlaps with a rigid cell in the source mesh.

Graphics

- 2d models can be displayed rotated by a multiple of 90°.
- 3d models can be displayed in a “Wireframe” or “CSG” mode.
- 2d and 3d models show optionally a material key (legend).
- Materials can be selected or deselected for a 2d contour plot.

Bug Fixes

- A source of instability arising from mixed cells when using one of the ignition models has been removed.
- A bug that could cause a crash when removing items from the object list has been fixed.

- Using “Gravity” in 3d is now possible.

SPEED 2.2.1 Release Notes (14 - August - 2014)

Ideal Gas Solver

The “3d ideal gas solver” is a third processor type now available in addition to 2d and 3d multi-material Euler solvers.
State files from the 2d and 3d multi-material solvers can be mapped into IGS meshes.

JH-2 Ceramics Model

The Johnson-Holmquist material model for brittle materials (glass and ceramics) has been implemented. The material database includes B_4C, Al_2O_3, SiC, AlN, and float glass.

- ***Geometry Modeling***
- Geometry defintions can be copied to any part in any open SPEED application.
-
- ***Geometry Import***

Geometry from k-Files can be imported into 3d multi-material models. The k-File must include solid elements.
K-Files are the format of LS-Dyna input. They can be created e.g. by LS-Pre-Post (a freely available modelling tool).
Export of an unstructured 3d Lagrange mesh from AUTODYN to a k-file is possible with a “ad_usersub.exe” which is included in the SPEED setup package.

Bug Fixes

- In 3d visualization boundaries normal to the y-axis were incorrectly displayed.
- In 3d visualization rigid bodies were incorrectly displayed after geometry changes.
- The remap from 2d axi-symmetric to 3d is now independent from the ordering of the materials.
- Restart handles used and unused materials correctly.

SPEED 2.1.3 Release Notes (10 - April - 2014)

Bug Fix

- When gravity was activated, SPEED crashed during initialization. Affected versions: 2.1.1 and 2.1.2.
- Remap could lead to empty cells followed by a crash. Affected versions: 2.1.1 and 2.1.2.

SPEED 2.1.2 Release Notes (24 - February - 2014)

Bug Fix

- Graphic pane was not updated if the application was displayed on monitors set left or above of the primary monitor.

NUMERICS

SPEED 2.1.1 Release Notes (13 - January - 2014)

64bit Version

- Version 2.1.1 comes with a 64bit executable. Unlimited memory allocation allows for larger problem sizes.

GUI

- Filling particles in parts considers mesh extension.

Mixed Cells

- Option “average pressure” has been improved to avoid instabilities

Remap

- Speed of remaps has been enhanced
- New remap option: 2D plane strain → 2D plane strain
- A constant velocity can be added to the imported mesh

Bug Fixes

- Meshing: jumps in mesh size have been eliminated
- Inaccuracy in rezone with fixed fraction could lead to material diffusion
- Combustion option: Sequence of material is now arbitrary
- 3D post-processing: selecting cells in planes works correctly
- Restart with detonation and combustion options works now.
- Display of 2d geometry figure “Arc” has been corrected.
- Crashes during movie creation have been fixed.
- Temperature output of gauges is working.
- 3d contours “div(v)” and “vorticity” corrected.
- Crashes after failed memory allocation fixed.
- State dumps are done at correct times when using negative start time.

SPEED 2.0.18 Release Notes (02 - September - 2013)

GUI

- Options dialog for movie creation added.

Initialization

- The 3D initialization routines were enhanced to increase speed of element filling.

Bug Fixes

- EoS in Steinberg model could deliver too high sound speed.
- Material Property page for Lee-Traver model was partly not accessible.
- “Hexahedron” edge points had a numbering error.

SPEED 2.0.17 Release Notes (06 - May - 2013)

Material Models

- Ignition and Growth (Lee-Tarver) has been implemented. In the material library the example materials can be found under “Ignition”.
- The TD-JWL assumes $\lambda = 1$, when “Anaerobic Combustion” is off.

GUI

- Material data read from a state file are available for editing at restart.
- Multiple detonation points can be generated using the “Duplicate” button on the “Detonation” page.
- “Hexahedron” was added as new 3D-Geometry.

Material Database

- Several examples for “Ignition and Growth” initiation model have been added.

SPEED 2.0.16 Release Notes (25 - January - 2013)

GUI

- The Movie-function has been altered. After making the movie, it restores the current state instead of the last dump state.

Material Database

- Mortar and Adobe have been added to the HJC concrete model.
- Comp A and PBXN-109 have been added to the Ignition model (HVRB).
- Diesel fuel has been added to the "Shock EOS" model.

SPEED 2.0.15 Release Notes (07 - January - 2013)

Initiation Model in the 2d Multi-Material Solver

- The HVRB (History Variable Reactive Burn) model has been implemented. It can be applied to model high explosive initiation and detonation propagation phenomena like projectile impact and corner turning. Two sections in the Theory manual have been added as well as example files. The material library contains two examples (Comp B and PBXN-110) under the new type "Ignition".

Additional Features

- The "Tools" menu has been introduced.
- "Tools/Elastic Constants..." calculates elastic constants and wave speeds from any two (or more) inputs specified by the user.
- "Tools/Steel Hardness..." converts tensile strength into Brinnel/Vickers/Rockwell hardness and vice versa.

GUI

- During creation of a movie refreshing the window is suppressed. Single states are not displayed when loaded.

SPEED 2.0.14 Release Notes (07 - December - 2012)

Increased Memory

- SPEED can handle larger models on 64bit Windows OS due to potentially larger memory allocation (now about 2 GB, formerly about 1.2 GB).

GUI

- On the "Control" page runtime and termination information is given in the "Info" pane at the right hand side.
- A progress dialog appears during initialization (mesh filling).
- The default for combining geometries to parts has been changed from "intersect" to "add".

Bug Fixes

- Contour and profile plots in 3d could crash SPEED.

SPEED 2.0.13 Release Notes (19 - November - 2012)

Bug Fixes

- CJ Shock Burn did not work correctly in 3d.

SPEED 2.0.12 Release Notes (02 - November - 2012)

Bug Fixes

- Broken 3d functionality in 2.0.11 (advection)
- 3d example added (2-room-example, reduced resolution, modified geometry compared to manual)

SPEED 2.0.11 Release Notes (18 - October - 2012)

Demo Version

- The 3d option is enabled in the demo version.

GUI

- New geometry in 2d added: Arc.
- Counter for number of cells added.

Bug Fixes

- Mesh creation could fail for intervals with only a few cells.

SPEED 2.0.10 Release Notes (09 - October - 2012)

Unicode Support

- Version 2.0.10 and higher are supporting the Unicode character set.

GUI

- 3d states can be displayed "single plane" mode.

Multi-Material Cells

- The multi-material solver has been enhanced resulting in an improved stability.

Bug Fixes

- Gauge array definition with 3 base vectors works now correctly.
- 2d Ogive geometry is now correctly displayed.
- z-Position in time history plots was corrected.

SPEED 2.0.9 Release Notes (09 - August - 2012)

EOS

- Implementation of the HJC concrete model has been improved.

User Manual

- Two chapters have been added:
    1. Mesh Adaptivity
    2. 3D Internal Detonation Example

GUI

- The creation of the time history and material summary files is delayed until the Start or Restart Button is pushed. The user must confirm deletion of existing files.

SPEED 2.0.8 Release Notes (28 - July - 2012)

EOS

- The EOS of solids has been improved for highly expanded states.
- Modifications of material parameters after "Initialize" become effective.

Adaptivity

Mesh adaptivity is now available.

SPEED 2.0.7 Release Notes (22 - July - 2012)

3D Multi-Material Solver

- The "Remap" has been enhanced for 3D axis-aligned cases.

Bug Fixes

- The 3d Remap neglected history variables.
- Using 2D Ogive geometry caused a crash when reading the model file.

SPEED 2.0.6 Release Notes (20 - July - 2012)

3D Multi-Material Solver

- The "Remap" function is now activated.
- Contour Plot Options and Profile Plot Options are extended.
- A cell can be selected on a plane for inspection of its state in the text output window.

General Solver Improvements

A new option "Adaptive Mixed Cell Treatment" is now available. It is considered to be the most stable of the alternatives offered, and is therefore the new default option.

Material Models

The "Steinberg" model was revised. The spallation model has been corrected and tested for mesh independency.

Bug Fixes

- Boundary conditions were not displayed after loading a state file.
- Co-ordinates of mouse pointer displayed in the status pane had incorrect units.

- The dM/dv plots of the jet summary have now correct units "mass/velocity".
- The text output window scales now with window size.

SPEED 2.0.5 Release Notes (22 - June - 2012)

3D Multi-Material Solver

- The 3D multi-material solver option has been activated.

SPEED 2.0.4 Release Notes (15 - June - 2012)

Bug Fixes

- Program crashed when used with "gravity".
- Refresh of contour plots did not work.
- Warnings are now raised when materials for aerobic combustion are missing.

Material Data Base

- FOXIT has been added.

Visualization

- Names for contour plot variables changed (beta, lamda)
- Material color/name legend now displayed