Description of New Features and Bug Fixes at Version 5.01a

			Description
1	New	Remove 2-Part Rack	A new convenience menu option has been added under 'Edit' to remove the 'two part rack' from the current model's template.
2	New	Remove Drive Shaft	A new convenience menu option has been added under 'Edit' to remove the 'drive shafts' from the current model's template.
3	New	Remove Compliant Hubs	A new convenience menu option has been added under 'Edit' to remove the 'compliant hubs' from the current model's template.
4	New	Remove Roll Bar	A new convenience menu option has been added under 'Edit' to remove the 'Roll Bar' from the current model's template.
5	Bug Fix	Delete Spacer	Previously when a spacer was deleted via the 'Graphic Editor' the spacer properties were not completely removed from the model's template. This has been corrected at this release.
6	New	Error Listing	The previous error listing (now referred to as 'Brief') has been added to by a 'Full' option. The switch between 'none' 'brief' and 'full' is made through the 'Solve' menu. The Full option provides details on the increment for the error and possible source.
7	New	User Vector Tracking	A new tracking option has been added along side the original orthogonal X,Y,Z axis options. The new 'user vector' option is a vector defined by its three components to have a non-orthogonal 'dragging' direction. This user vector can be edited, picked and locked to the picked vector. It can be optionally included into the tracking cycle loop.
8	Change	Formatted SDF	Previously user formatted SDF's defined the corner via a '-1' and '+1' etc. setting as a difference from the current corner. This was considered confusing and has know been changed to a direct definition of the required corner.
9	New	Graphic Edit	Extra functions have been added to the Graphic Editor such that Graphical elements that are associated with specific parts of the model that have associated 'properties' are editable through the graphical editor. An example of this is the Tube graphic used as part of the Roll Bar, access is provided to the roll bar stiffnesses.
10	New	Compliance Bar Chart	The compliance bar chart has support added for a 'double click' selection event to change the displayed load case to that selected.
11	New	Ball Joint Target	The 'hover over and list' functionality has been added to the ball joint target display. The x and y values of the nearest point is shown at the bottom of the display.
12	New	Ball Joint Target	A points 'list' option has been added to the Ball Joint Target display. Selected from the local 'File' menu this lists the current points x and y values in the standard spline list display.
13	Change	Ctrl+S	Previously the Ctrl+S shortcut key was linked to the 'All Settings' editor. Since the standard use of Ctrl+S is for the 'Save' function.

			Thus at this release Ctrl+S has been switched to the 'File / Save' menu and the shortcut key for opening the 'All Settings' editor is now Ctrl+E
14	Bug Fix	Template Editor	A number of issues with the template editor reading and writing user and custom templates have been resolved at this release. They involved missing read/write actions when replacing an existing template in a stored custom and user templates file.
15	Change	Menu Locations	A number of menus have been moved from the previous release location to more logical positions. Examples include; 'Save Def Window Settings' from 'Setup' to 'Window'. 'Edit Menu Tree' from 'Setup' to 'Edit'.
16	New	Definition Values	The definition values previously had a predetermined method as to which point is changed to meet the specified definition value (i.e. Static Camber Angle). This functionality has been extended so that users can now control which point(s) or part(s) are moved to meet the specified definition value. These definitions are controlled via the 'View / SetUp Definition Values'.
17	Change	Bush Edit Display	The editing tool for bush properties has been enhanced to display the 'special' rotational and translation rates that are applied to 'rigid' points that are used for specific connections in the template.
18	Bug Fix	Batch Mode	Previously the bath mode could cause a crash when running a batch file. The 'hit return to end' prompt was incorrectly handled. This has now been fixed.
19	Change	Deformed Geometry	The animation of the deformed geometry display has changed such that the calculated forces are scaled up and down with geometry deformation to produce a more logical display.
20	New	Hover over Point	The hover over point function has been extended such that for points defined in a local co-ordinate set the local values are shown in [ ]'s after the global position.
21	New	Extended Travel	A trap has been added to the extended travel options such that if one is selected but no positions are currently defined for it, the edit box is automatically opened for user editing.
22	New	Bush 'bolt' Axis	A graphical option has been added to the compliant bush display. It has no effect on the numerics but allows the graphical 'bolt' axis to be switched from the Zp axis to the Xp axis.
23	Bug Fix	Scope Deviation	A problem with the optimisers scope deviation values when working in roll or steer articulations has been fixed. Additionally a 'n/a' label rather than a '0.0' is drawn if there are no scope points defined. This avoids confusion over whether a line has been defined or not.
24	Change	Data File Force Sets	Force Sets can now be optionally included within a data file. This together with some of the existing data file options means that a single data file can be self-contained for improved complaint analysis repeatability.
25	Change	Braked Hub	The switching from an un-braked hub to braked hub if now

			forced by the solver whenever it detects the absence of drive shafts in the model, the un-braked option is only valid if the necessary additional drive shaft geometry is specified. The user is informed of this automatic switch setting.
26	New	Graph X-axis	The Graphs x-axis can now be optionally set based on a defined increment value as well as the original fixed option of 10 even increments. This mimics the existing functionality of the y-axis.
27	New	Add Point to Ground	The original option of adding a point to ground relative to point was just based on Cartesian co-ordinates. This has been extended to allow both Spherical and Cylindrical definition methods. Once added the points' position is displayed in global Cartesian.
28	New	Add Point to Part	The original option of adding a point to a part relative to a point was just based on Cartesian co-ordinates. This has been extended to allow both Spherical and Cylindrical definition methods. Once added the points' position is displayed in global Cartesian.
29	Change	Report Editor	The report editor has been improved to reduce the initial opening time for this editor.
30	New	User SDF Editor	A selection box has been added to the User defined SDF editor such that switching between panes is more convenient.
31	New	Pick Visibility	A new Pick Visibility option has been added that turns all graphical elements off (and on) to make picking of just hard points potentially a lot easier.
32	New	Toolbar Icons	Previously the toolbar icons have been predetermined and fixed. From this release users can now define the individual icons and toolbars to suit their own preferences. This includes initial visibility and position.
33	Bug Fix	Toe Angles	The Toe angle labels, (plane and SAE) have been identified as the wrong way round. This is now corrected. Users should notice only very small changes to their numbers.
34	New	Control Editing	The control editor now supports use of the PageUp and PageDown keys to move through the defined list. This is inline with the rest of the application, where a similar functionality is supported in items such as graphical editing. The dialogue title also reflects any defined label.
35	Bug Fix	Graphic Elements	A number of the graphical element properties labelled their dimension as 'diameter' when in reality they are drawn as 'radius'. The labels have been corrected to show radius.
36	Change	Add Spring, Dampers	The process for adding springs and dampers has been modified such that if you add a spring, damper or bump stop its specific visibility switch is turned 'on'.
37	Change	Template Editor	Previously when editing templates using the spread sheet method, the user was required to specify the number of bushes in the template. This is no longer required since the number of bushes is directly defined by the entering of a bush No.

38	New	Drive shaft	A new visibility switch has been added to control the drawing of the drive shaft elements.
39	New	Solution Type	A new post solution type has been added that solves for a points position in a local co-ordinate system. Thus a point can have no incremental positional connection with a part, but could still be used to apply a force to its relevant part.
40	New	Ackermann results	Four new Ackermann type results have been added, Delta, Average, Error and Ackermann(2). These revised results are driven by specific customer requests.
41	Bug Fix	User SDF's	Previously a user defined SDF that was just made up of constants and parameters would not be solved. This has now been fixed.
42	New	Custom Controls	New menu option added that allows a defined custom control window to be deleted directly from a menu. Previously you had to open the control go in to edit mode and then delete it.
43	Change	User SDF Labels	The user SDF force labels have been changed from Lcx to Bcx to indicate that they are 'bush' local axes rather than 'point' local axes.
44	Change	Pnt-Pnt_Pnt Angle	The pnt-pnt-pnt angle graphic has been modified such that it can be forced to consistently produce either the internal small angle or the external large angle. This also works with an angle that passes through the 180 degree. This behaviour is enabled through its properties and set in the modified graphics property editor.
45	Change	Graphics Menus	All relevant graphic element menus have been split between two sub menus 'Graphics' and 'Measure' to aid menu navigation.
46	Change	Set Ride Height	The 'standard' set ride height routine has been modified such that it moves, the body or ground as defined by the current setting for ground motion. Previously it would always move the body points. Modifications have been made such that point tolerance boxes are modified in a logical manner that depends on whether the points is to ground or not.
47	Change	Control One step delay	The one step delay applied to control elements was previously compulsory to ensure stability of solution under all cases. At this release an option has been put in that enables a user to disable the one step delay and make it directly coupled in the solution. This may as before cause problems when the controller causes the solver to be unstable.
48	New	Tolerance Mid points	Point tolerance analysis has been optionally modified that the user can choose to skip the mid-points of the tolerance boxes. Thus rather than 27 positions being calculated only the eight corners and the original position are plotted.
49	New	User SDF's	Options have been added to the user SDF editor such that users can save their SDF's to an external file or load SDF's from an external file. Thus SDF's can be shared between users without recourse to wholesale copying of INI files.

50	New	Results Spline Fits and Spline Data	The settings for the Spline fits can be saved/read to and from an external file. This provides an INI file independent method of transferring settings for this section between users. A similar set of options has been added to the SDF spline data.
51	New	Local axis colour	An optional colour property has been added to local co-ordinate axes. This colour can also be applied to points that are defined in this 'coloured' co-ordinate system.
52	New	Graphics Files	Previously all graphical exports (i.e. into RTF's etc) used JPEG format. Because of problems some users have under Windows XP sp2 an alternative Bitmap option has been added. The switch between bitmap and JPEG is under the 'Setup / Default Graphics File Type' menu.
53	New	Batch Commands	A new batch command AE = 'Add End' has been included to the list of supported commands such that you can create a full vehicle model from the batch mode. Previously only individual ends could be built through the 'new' menus.
54	New	Import / Export split Screens	The split screen displays for Import and export actions can be re-sized using the Ctrl+Up and Ctrl+Down key combinations.
55	Change	Icon Size	As part of the change to user defined icons and toolbars the icon size has been reduced to provide greater space for user selected icons.
56	New	C of G editor	A Delete button has been added to the C of G editor to facilitate the removal of C of G points.
57	New	Solver Type	A new post solver type has been added that allows points to be positioned as functions of an associated graphical element. Each graphical element has one or more potential 'hot spots' that can be used to specify a points position. These post solved points can thus be used to position further graphical elements and this leads to increased graphical functionality.
58	New	Graphical Vectors	The graphical plane and vector elements now have an optional dimension property such that corners and ends can be placed at specific user defined positions.
59	New	Graphics Types	Two new graphics types have been added, both vectors one a simple vector through two points, (with the option to set the vector length), and one vector that is perpendicular to a line through a point.
60	Change	Point Editor	The Point editor has been modified such that string editing for a points definition (rather than by direct value) can be edited through the standard editor. The [ ] brackets are used on strings to distinguish between strings and values.
61	New	Optimizer	A trap has been added to the optimizer to check that user settings for the minimum values are less than the maximum. Some users where specifying -ve numbers and getting min and max values round the wrong way.

62	Change	Colour Choice	The colour choice box displayed, when using defined ‘standard’ colours are selected for graphical entities, has been improved to have a more consistent visual appearance and behaviour.
63	New	Convert Damper	A new option has been added to convert a damper to parts. This function adds two new parts, two new points and 4 bushes. The points are defined in local co-ordinate systems that are also added. This method introduces a new special point tag that for compliance identifies a point as a sliding bush, such that default stiffness properties include suitably orientated rotation stiffnesses.
64	New	Static Position	With extended travel options it is not always clear whether a defined position is to be considered as the ‘static’ point. This is particularly the case when using defined by absolute rather than by delta. At this release the user can force an extended position to be considered as the ‘static’ point by adding the string ‘[static]’ in the positions label. Note that this ‘tagging’ of a static position is just related to which position is shown on the graphics display when the 'display ‘static'' position is selected. The original defined point positions will always be the values displayed and edited in any modification of the model, this includes actions such as ‘set ride height’.
65	New	Batch Commands	Support for the change mode commands has been added to the batch mode. The ‘CM’ string under edit (ED) provides access to the ‘Change Point Positions’ (PP), ‘Retain Parts’ (PA) and ‘Set Part Lengths’ (PL) options.
66	New	Steering Points	A new edit ‘convenience’ function has been added that from a single menu selection adds 5 points per corner that are attached to the steering upright and defined in a local co-ordinate system that moves with the steered upright. These points are then used by an automatically added force set to analyse Steering Effort.
67	New	Virtual SKCMS	The load conditions and force settings used at each stage of the Virtual SKCMS process is now listed in an editable spread sheet display. This provides both an opportunity to modify if required but also to understand what settings are applied to each test case.
68	New	Tracking Spherical	Two new tracking methods have been added to the application. The original default tracking method is referred to as ‘linear’ as the point is ‘dragged’ along a linear axis (or axes). The two new methods use a ‘spherical’ track and a ‘circular’ track approach. In the case of the spherical track the modified point is put back on to the surface of the sphere, (by projecting back towards the sphere centre). In the case of the circular track the modified point is first projected back in to the plane of the circle and then back on the circumference of the circle.
69	Bug Fix	STD SDF Scale Settings	Previously editing the standard SDF scale settings whilst having an x-y graph open caused a problem resetting all the values to 0/1. This has now been fixed.
70	New	Add Sub Frame	A new interactive menu option has been added to modify the current template by the addition of a subframe. In this interactive method (rather than the new template builder mode), the

			subframe is added by first picking existing 'ground' points for the subframe to be attached to ground by, and then select which suspension points are to be switched to be mounted on the subframe.
71	New	Point No.	New graphical display option added to show the point template number on the graphical display. This is in addition to the existing short and long labels.
72	New	Point Listing	An alternative point list method has been included. This is selected through the Data / Point Coordinates / Use Open List menu option. As an 'open' list it can be left displayed whilst performing other operations and it will update as necessary.
73	New	Report File Header	The formatted SDF results have been enhanced to include the use of a 'Report' file in the header of the SDF file. Thus any functionality supported by the Result File can be used as part of the header for formatted SDF's.
74	Bug Fix	Bump Rebound Travel	The algorithm used to run through bump and rebound travel has been improved specifically to correctly handle –ve bump values when using define by absolute position.
75	New	Batch Commands	An option has been added to the batch mode, that allows typed commands to be saved as they are entered. This 'saving' can be switched on and off via hot keys during a session and then when finished displayed in a scrollable list for editing and saving to a batch 'file'. Thus standard batch jobs can be generated by a simple 'record' process.
76	Bug Fix	Hover over graphs	The hover of graph points has been improved to correctly handle graphs for the tolerance analysis condition. Previously failed to list any graph values.
77	Bug Fix	Tolerance mid points	The tolerance mid side points have been added to the graphical 'hover over' as well as the drag and joggle options. Their selection is controlled by the new 'solve mid points' option.
78	New	Tolerance Graphs	The functionality of the x-y graphs when in point tolerance mode has been extended such that if you hover over a particular tolerance position the x-y graphs display changes to just show the curve associated with the 'picked' tolerance position.
79	New	SDF Results	A new SDF result has been added, labelled as 'opposite wheel vertical force'. This enables user defined SDF's that require values from both tyres on an axle to be implemented.
80	New	SDF Results	A new SDF result has been added, 'labelled as 'opposite wheel camber angle'. This enables user defined SDF's that require values from both tyres on an axle to be implemented. Similar to the existing 'opposite wheel toe angle' result.
81	Change	Strut Points	A change has been made to the data file reader routine for McPherson struts. The reader checks that the three strut points are correctly defined along a single axis. If not the strut slider point is re-aligned. This process was previously only applied when one of the three points involved was modified.

82	New	Interactive Template Builder	A new module has been to the 3D aspect of Shark. This interactive template builder module allows for complete 'drag and drop' of parts, points and graphics on screen. The previous method of editing templates through the series of spread sheets whilst still valid will be replaced for most functions by the more intuitive graphical approach.