Description of New Features and Bug Fixes at Version 4.03f

			Description
1	Bug Fix	Non-steerable	The routine used to identify the virtual steer axis could return incorrectly identified points for some full axle model cases. This has now been fixed.
2	New	Rack angle	New SDF result added for the angle between the steering tie-rod and rack. Requires a suitable rack model to have been included in the template.
3	Bug Fix	Camber Angle	The Camber angle calculation was always intended to include the change in X on the divisor. This may give a small change in camber angles where large steer angles are involved.
4	New	Graph Integral	In addition to being able to display the graph as the derivative of the selected SDF you can also optionally choose to display it as the integral of the selected SDF.
5	New	Kingpin length	New SDF added for the kingpin length. Taken as the length between the two hard points that define the kingpin axis. The derivative of this length has also been added to the default d/dz options.
6	New	Drive shaft angles	Drive shaft angles have been added to the default SDF list. Requires drive shaft to included in the template. Both inner and outer angles are required.
7	Change	Template points, parts, bushes and connection	The number of points allowed in a template has been increased from 70 to 98. This is to allow some of the more complex full axle models to be successfully implemented. Similar increases have been applied to the maximum number of parts(30), No. of bushes (50) and number of connections (50).
8	New	SDF Integrals	A new SDF sub menu has been added that allows direct selection of SDF integrals. All integrals are zeroed for their first point, i.e. the constant of integration is adjusted such that the first points value is 0.0
9	New	Drive shaft plunge	The change in drive shaft length, (and its associated derivative and integral curves) have been added to the default SDF list.
10	Change	Start-up Recovery	The start-up procedure has changed such that on recovery instead of pulling the newest buffered file in (since this was most likely to have caused the crash), the next newest buffered file is loaded.
11	Bug Fix	Drive Shaft	Trap added for the ‘add drive shaft to template’ option to check if using a full vehicle and both front and rear suspensions use the same template that the addition is correctly handled in adding to both.
12	Bug Fix	Window position	Some users have reported problems with positioning of the main window when not maximised on start-up. Additional traps have been added to deal with this problem.
13	New	Bush x-z	Bush x-z plane definition has a new option added such that the

		plane definition	axis can be defined by a point.
14	New	Data file extensions	The logic of whether to use *.shk or *.dat on file reading and writing has been formalised and always track last selection. This is then saved to the ini file such that on a consistent use of one or the other will lead to only being offered the preferred file extension.
15	Bug Fix	Path spaces	Some actions within LSA use a full path name to a file or application file. The switch to using the 'My documents' folder location identified a problem with spaces in path names. This has now been resolved.
16	Bug Fix	Mass Units	The inertia units display for the mass properties incorrectly showed kg/mm2, now corrected to show kg.mm2.
17	New	Print Options	Print and clipboard options added to the Modal and forced damped speed sweep plots.
18	Change	Graphics drawing	An option has been added to graphics drawing that makes use of segments. This produces much faster dynamic viewing and animation graphics. It is only available in OpenGL graphics frame mode.
19	Change	Solver Update	An alternative faster compliance solver has been implemented to replace the original Gaussian Elimination method. Users can switch back to the original solver via the solver menu.
20	Change	Force Display	The calculated and external force graphical display can now be changed to be drawn in one of three forms, fixed length-fixed head, Scaled length-fixed head or Scaled length-scaled head.
21	New	Speed sweep	The Forced damped speed sweep plot can now toggle between part displacements and bush forces. Forces are selected from a list of bushes, global x, y and z forces are optionally plotted along with the resultant global force.
22	Bug Fix	Steering Box	The steering box calculation routine was not configured to handle asymmetric steering geometry. This has been corrected. In addition the data file now stores both left and right hand steering box data points, no longer assuming symmetry.
23	New	Forced Damped plot	Further options have been added to the forced-damped speed sweep plots. The y-values can be displayed next to the selected frequency line for all displayed force lines. The minimum x-axis value can also be specified to control the range of frequencies plotted.
24	New	Graphical Angles	A new group of nine graphical entities has been added. They allow the angle of a vector to any orthogonal axis to be displayed.
25	New	Graph left and right sides	An option has been added to the x-y graph such that when both sides are displayed, they can be drawn as two individual lines or as the difference between them or the sum of both sides.