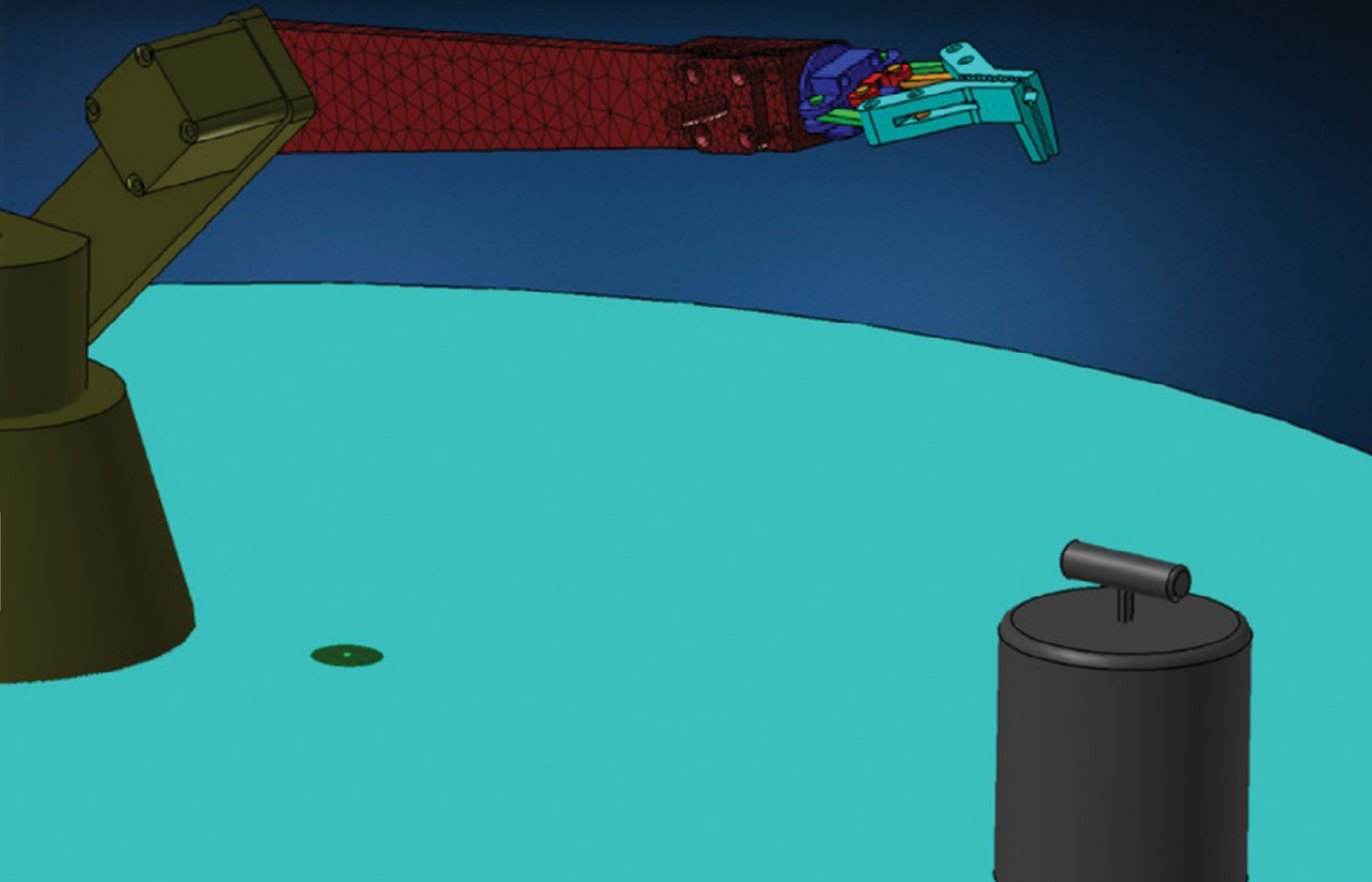


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# Adams Modeler –

A novel, intuitive,  
and streamlined  
user experience

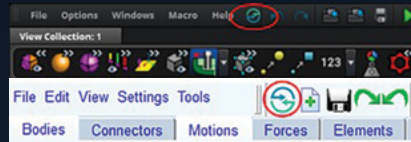
By Chris Baker, Head of System Dynamics CoE, MSC Software



In the early 1970's Prof. Milton Chace at the University of Michigan and his graduate student, Nicolae Orlandea, wrote the first version of a 3-D multibody dynamics solution software. They used state-of-the-art techniques such as stiff integration schemes and sparse matrix methods to make it commercially viable. They called this software Adams (Automatic Dynamic Analysis of Mechanical Systems) and commercialised it by incorporating Mechanical Dynamics International (MDI), which MSC later acquired. Adams went on to be a resounding success and continues to be the gold standard for multibody dynamics simulations. It is utilised by engineers across industries to solve their most complicated mechanism development problems. Adams has continued to evolve over the years with vertical offerings such as Adams Car and horizontal solutions such as Adams Real Time.

Adams Modeler represents the next evolution in Adams model generation. The improvements go beyond just an improved user interface and focus on fundamental workflow improvements and model-building efficiencies. By streamlining model workflows, common tasks require fewer clicks and picks, and models are far easier to manage and explore.

Our first release focuses on fundamental workflows for modelling mechanisms.



Key benefits of the new framework include:

- Improved CAD geometry management and direct modelling capabilities for seamless geometry modification and model association.
- Native flexible body generation that will enable rapid design iterations.
- Associative definitions so that for example if a joint is defined using geometry, any change to the geometry will also be applied to the joint.
- Robust and intuitive meshing

The challenge of many first-release products is having equivalent capabilities for the product they replace. With Adams modeler, you truly get the best of both worlds. At the heart of Adams Modeler is a “bi-directional” interface with Adams View. The interface allows users to work on the same model in the new Adams Modeler interface or the traditional Adams View interface. This means taking advantage of the new capabilities and workflows of the new interface or switching to the old for features not yet native to Adams Modeler. Users can toggle in a matter of

seconds via a “context switch” button. So even in the first release, you still have access to the full Adams capabilities.

## CAD management

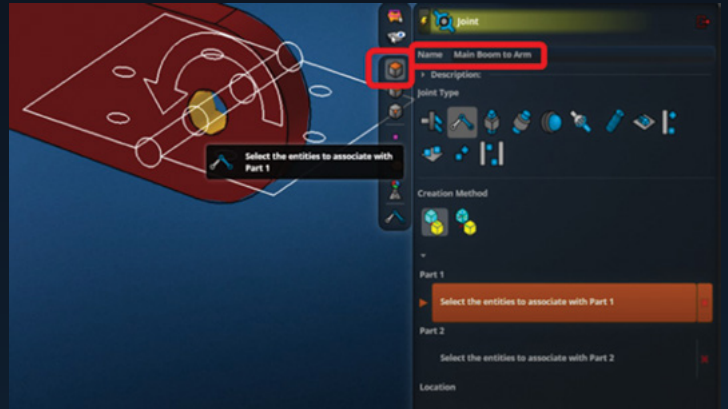
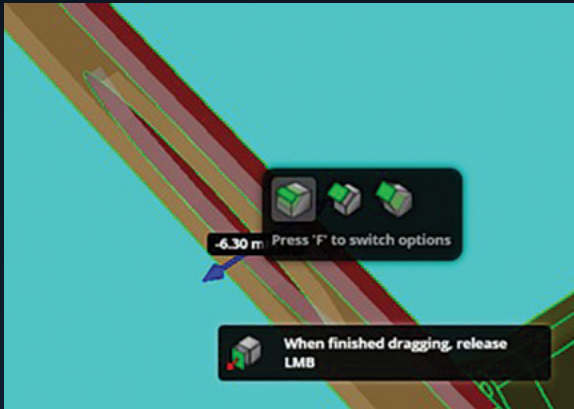
When Adams was first developed, leveraging 3D CAD was not a priority. However, in present-day mechanism simulation activities, supporting large and multi-level assemblies is mandated.

Rearranging, searching, filtering, replacing make working with geometry effortless.

Central to the Adams Modeler interface is a direct modelling paradigm. This enables customers to make quick modifications and for those changes to propagate to dependant mechanism objects.

**Geometry editing:** The interface provides a wide selection of interactive tools for modifying geometry. For example, pushing/pulling faces, changing hole diameters, and re-locating bodies are more convenient and intuitive tasks.

**Generative dependancies:** Especially powerful is the ability to easily associate Adams modelling objects, like constraints and forces, with a broad set of geometric features. A great example is the ease with which one can locate a joint at the middle of a cylindrical hole. Better yet, if a



connective face is pushed or pulled to make the part thicker or thinner, the joint will automatically update its location to match where that of the new hole centre point is.

### Native flex body generation

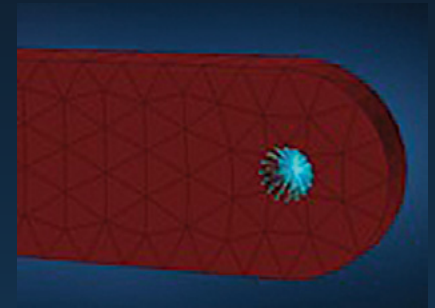
While classic Adams View had the ViewFlex capability for generating MNF-based flexible bodies without leaving the Adams environment, the ability in the Adams Modeler interface offers several improvements.

The meshing and MNF generation processes in the Adams Modeler are streamlined to handle a broader diversity of geometry configurations and visualisation performance. Adams modelling objects like constraints and forces automatically create connections to the geometry and associated mesh. This offers the added benefit of maintaining the geometric relationship with those features. This alleviates the painful work of defining attachment nodes,

especially their set of dependent nodes. Suppose a part's constraints and forces were all defined using geometric association. There is nothing further the user needs to do when creating the MNF-based flexible representation of the part.

The generative geometric relationships described earlier also provide a considerable benefit to natively generated flexible parts. Any changes that would alter the flexible body's modal content will trigger a regeneration of the flexible part rep. For example, adding a hole or thinning a section via direct modelling will update the mesh and then flag the flex body as out of date. One can define the preference for if that situation will trigger the native flex body to be recalculated automatically or to be manually updated.

Adams Modeler represents a significant step forward in making the power of Adams more accessible. The new user experience will make MBD engineers more efficient, and



the significant improvements to workflows will allow designs to be built and simulated in less time. The first release later this year will be part of a multi-year journey as we continue to enhance and expand the Adams user experience.