RealFlow

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RealFlow Features

Liquids

RealFlow offers two fundamental types of liquids. Particle-based liquids are mainly used for small- or medium-scaled projects.

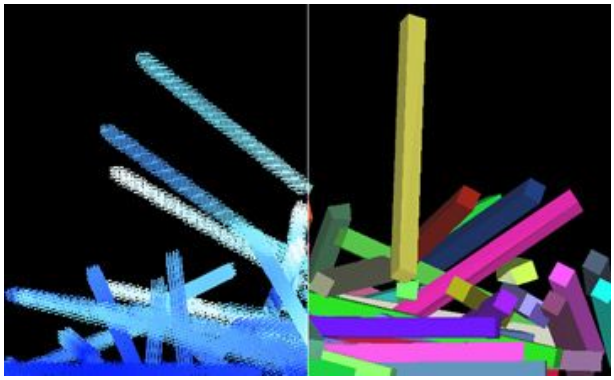
Hybrid-based liquids are well-suited for the simulation of large-scale scenes, and they provide the possibility of adding secondary elements (splashes, foam, mist, bubbles) for realistic results. Both fluid types are multi-threaded and support simulations on the GPU.

Elastics

This material type is used to simulate the behaviour of soft-bodies, jelly-like substances, and even cloth. Elastics are part of RealFlow's innovative, GPU-accelerated Dyverso multi-physics technology.

Granulars

RealFlow's granular solver allows you to simulate piles of sand, wet snow, trickling salt, icy flakes, and many other materials. Granulars are part of RealFlow's innovative, GPU-accelerated Dyverso multi-physics technology.

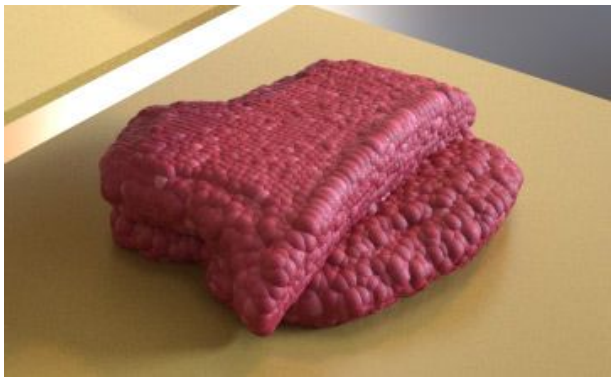


Rigids

This material type is used to simulate the behaviour of rigid, non-deformable bodies. Rigids are part of RealFlow's innovative, GPU-accelerated Dyverso multi-physics technology.

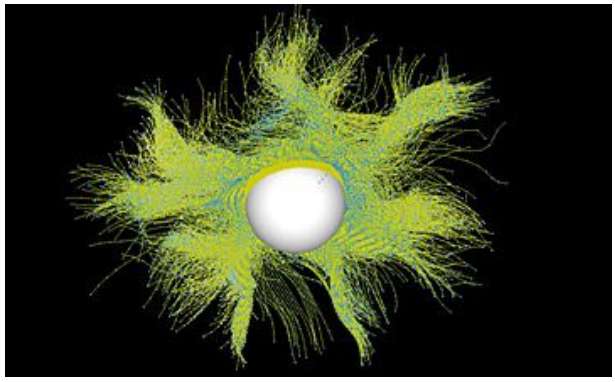
Viscous Materials

A dedicated material type for viscous liquids allows users to simulate substances like cream, chocolate, oil, honey, caramel, and many other. Viscous liquids are part of RealFlow's innovative, GPU-accelerated Dyverso multi-physics technology.



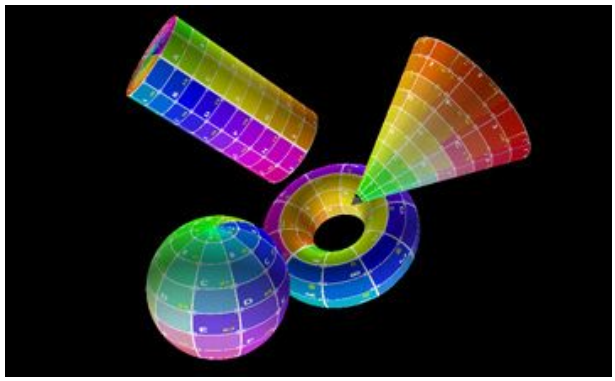
Viscoelastic Materials

Viscoelastic materials are, for example, the choice for foamy or silicone-based materials, but also muscles, some jelly-like substances, or certain paints behave that way. Viscoelastic liquids are part of RealFlow's innovative, GPU-accelerated Dyverso multi-physics technology.



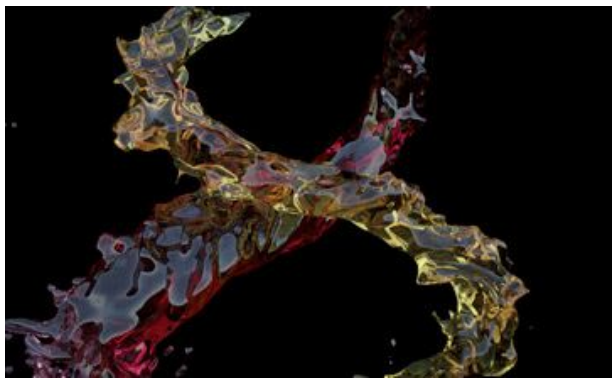
Fibres

Hair- and filament-like structures are the main field of application for this solver.



Built-in Basic Primitives

Basic primitives like planes, cubes, spheres, cylinders, or cones are relevant for many simulations, e.g. as water tanks or simple obstacles. RealFlow's built-in objects carry UV coordinates and can be turned into rigid, elastic, or soft bodies.

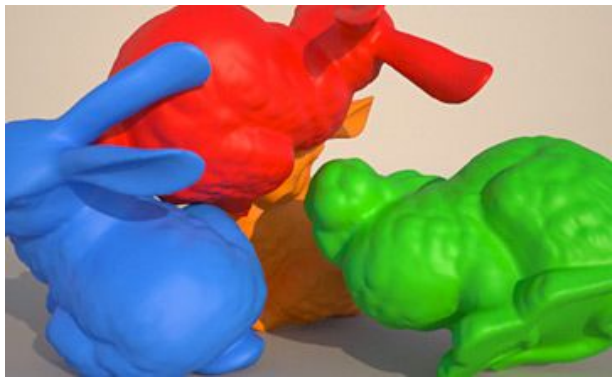


Particle Emitters

Emitters determine a liquid's point of creation. With particle-based liquids you are able to choose from a wide variety of 2D and 3D shapes, for example circles, squares, triangles, spheres, or cylinders. It is also possible to use bitmaps and objects as sources of particle emission.

Rigid Bodies

RealFlow comes with a fully-featured, multi-threaded body dynamics engine named "Caronte". Caronte's rigid body dynamics provides different collision primitives (cube, sphere, convex full, and mesh) for fast and accurate collisions. A state-of-the-art stacking algorithm cares for a natural behaviour. The bodies are also able to interact with RealFlow's various types of liquids and materials, as well as RealWave surfaces.

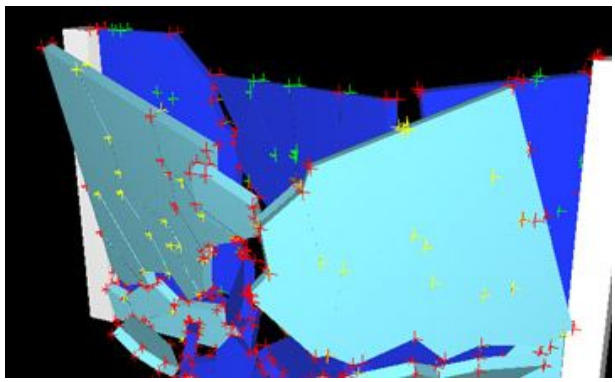


Soft Bodies

RealFlow comes with a fully-featured, multi-threaded body dynamics engine (“Caronte”). Caronte’s soft body dynamics engine supports plastic and elastic free form deformation, and it is very efficient with high-resolution meshes. The bodies are also able to interact with RealFlow’s various types of liquids and materials, as well as RealWave surfaces.

Fracture Tools

There are four Voronoi-based fracture tools available inside RealFlow to create random and radial patterns, or zones with higher and lower densities of fragments.

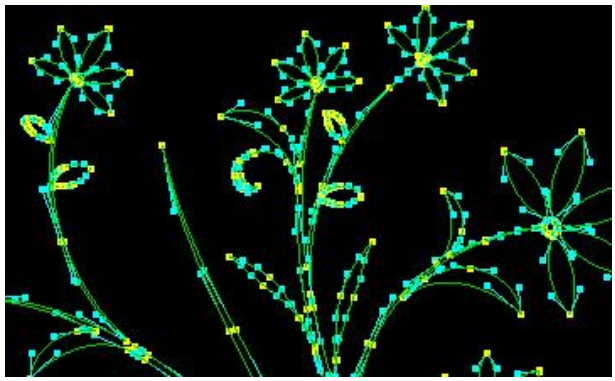


Joints

RealFlow’s joints are created automatically between rigid and/or soft bodies. They help to achieve a realistic breaking behaviour, because the connections react on external forces. With joints it also possible to simulate constraints, the connection between trees and their leaves, as well as permanent deformation.

Fluid Surfaces (“RealWave”)

RealWave meshes can be influenced and deformed through objects, rigid and soft bodies, particles, and a wide variety of – freely combinable – wave generators like fractal or Gerstner. A statistical spectrum deformer is capable of creating highly-realistic ocean surfaces. Other features are the export of the wave information as displacement maps, the support of custom geometry, object and crest splash emitters, as well as the realistic simulation of floating bodies and downstream forces.

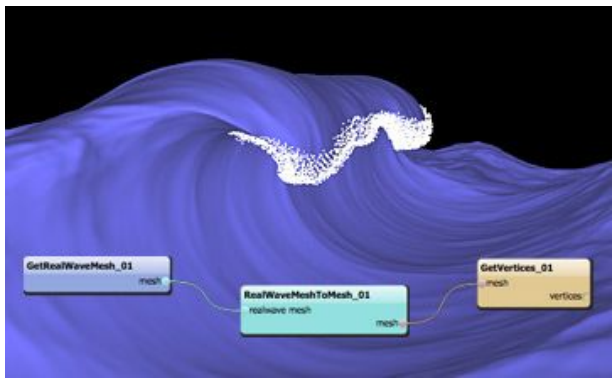


Splines

Splines can be created inside RealFlow or imported via the SVG format. A set of tools helps to edit, manipulate, and customize the splines. Splines are often used as paths for particles and forces in conjunction with appropriate daemons or emitters.

Text Tools

A convenient text editor lets you create text elements as objects, or splines for particle emission and force-modelling.



Visual Programming Tool ("Graphs")

Programming made easier. In RealFlow's "Graphs" system, programs are created by connecting nodes with pre-defined functions instead of writing Python or C++ code. A huge library of nodes helps to accomplish almost any task, e.g. fast and effective manipulation of fields, spatial viscosity, custom forces, image processing, or white caps export from statistical spectrum waves.

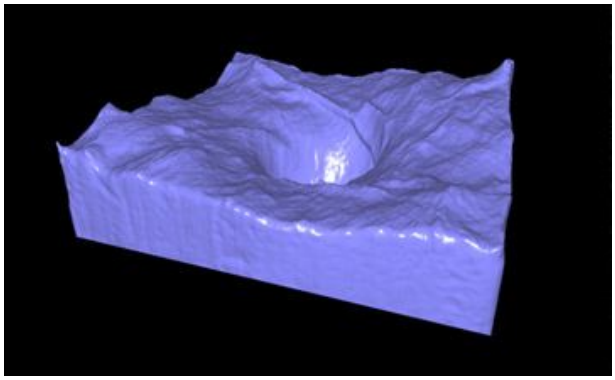
Simulation Flow

RealFlow simulations can be influenced through custom Python scripts, C++ plugins, or Graphs (visual, node-based programming system) at any stage. "Simulation Flow" provides convenient editors and a clearly-arranged tree structure for applying your scripts and tools.

ALEMBIC OpenVDB Field3D

Industry-Standard File Formats

RealFlow is capable of reading and writing Alembic® files with particles and geometry. An integrated stitching tool combines individual Alembic® files from sequences to a single file. Furthermore, RealFlow reads and writes OpenVDB® and Field3D® files with volumetric data.



Meshes

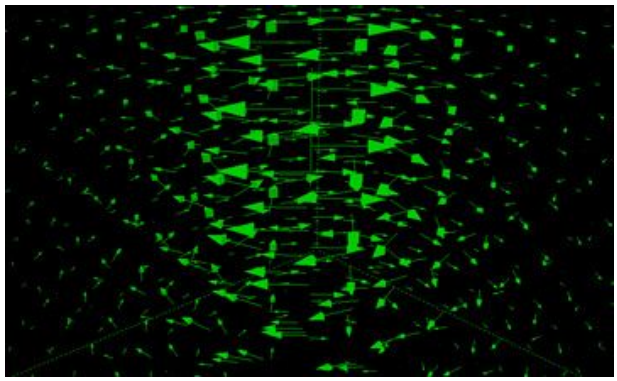
RealFlow's mesh engines are fast, and support particle- and grid-based fluids. The meshes store data like age or velocity, and they can be refined through filters. Clipping and polygon optimization is available, as well as various industry-standard formats for data exchange. Grid fluid meshes can be enhanced through displacement maps.

Cameras

RealFlow has a built-in physical camera model, offering parameters like ISO, F-stop, or shutter. It is also possible to import/export cameras from/to major 3D applications. A link target function makes cameras follow a specific object.

Retiming Tool

The timing of simulations can be changed with a comfortable retiming tool. Retiming is done with simple factors, expressions, or complex, fully customizable curves. A fast preview function helps to evaluate the results without having to trigger the retiming process.

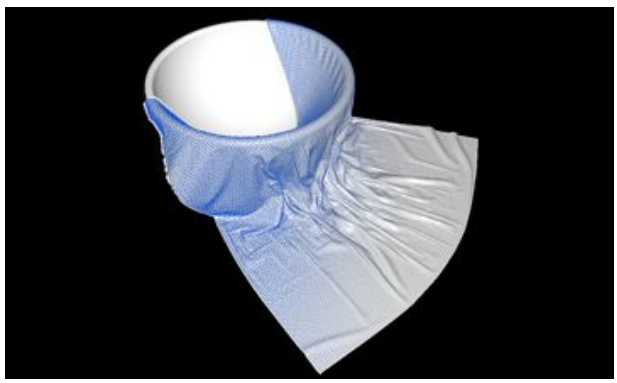


External Forces

Forces are introduced through easy-to-use daemons. Many forces can be scaled, bounded, and limited to control their scope and behaviour. Examples for daemons are gravity, attraction, wind, vortices, drag, or spline-based forces. It also possible to introduce custom forces through Python, C++, and Graphs – RealFlow's node-based.

Shaping Tools

RealFlow has tools for the creation of crown splashes and the filling of holes in particle fluid simulations. The latter one cares for thin, cohesive sheets of fluid and supports the forming of tendril structures.

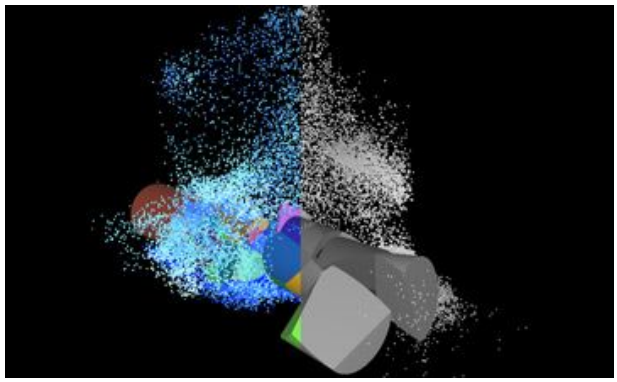


Skinning Tool

This tool transfers position and velocity information from Dyverso "Rigid" and "Elastics" material particles to objects to make them behave like rigid or elastic bodies.

Initial States

Initial states can be created from arbitrary simulation frames and used as a starting point for a new simulation pass.

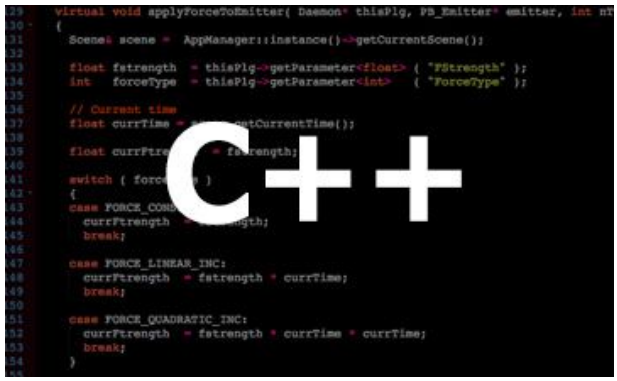


Simulation Passes

With this option it is possible to deactivate or activate all fluid dynamics or object dynamics simulation passes on demand.

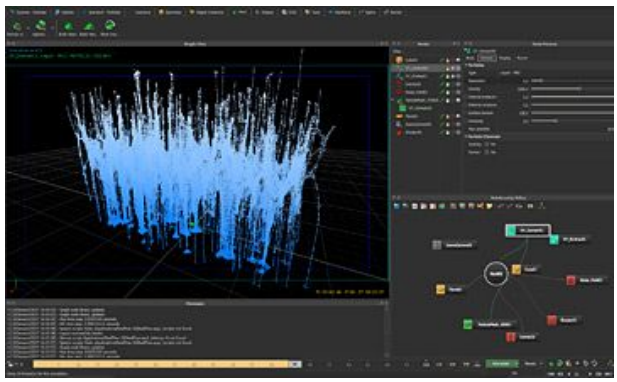
Python SDK

RealFlow offers an interface to Python 2.7 and includes commands for nearly any of the application's features and functions. Scripts can be created for repetitive batch tasks, custom forces, particle solvers, and wave deformers. Scripts can also be applied during simulations to manipulate the behaviour of all elements involved.



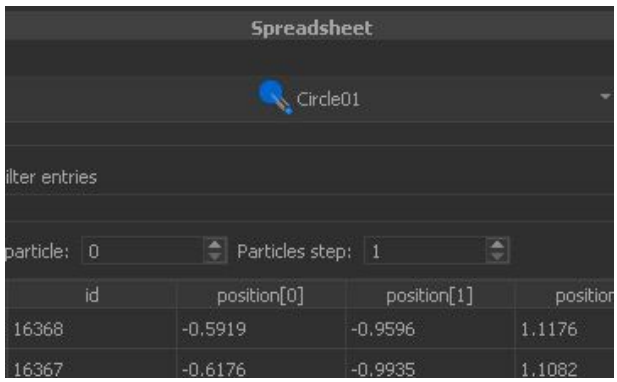
C++ SDK

RealFlow's C++ includes commands for nearly any of the application's features and functions. C++ are applied as plugins, and they are used for repetitive batch tasks, custom forces, particle solvers, wave deformers, and network managers. Plug-ins can also be executed during simulations to manipulate the behaviour of all elements involved.



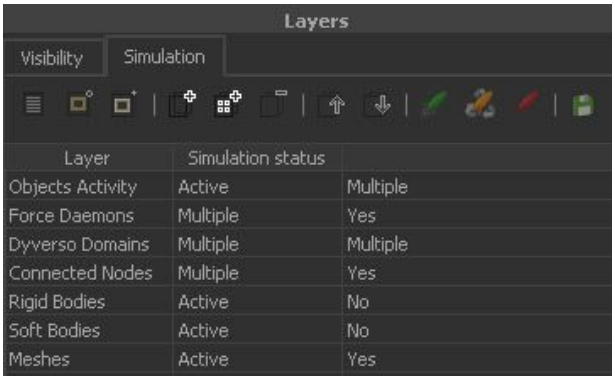
Customizable GUI

RealFlow user interface can be freely configured. The GUI includes customizable shelves, toolbars, panels, and keyboard shortcuts. It is possible to attach external scripts and plug-ins to the program's interface and multiple different layouts for different requirements.



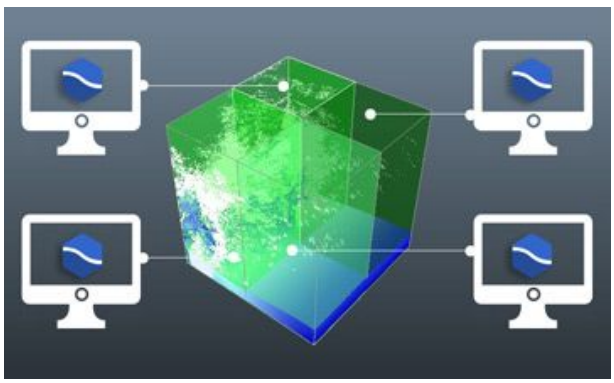
Spreadsheet Tool

Spreadsheets are indispensable for every technically-oriented user. They are a powerful information system with customizable particle and object filters, the possibility of visualizing results in RealFlow's viewport, and manipulating simulation elements.



Simulation and Visualization Layers

Layers help you to group simulation nodes and organize properties like data export, visibility in the viewport and renderer, shading modes, and many more.

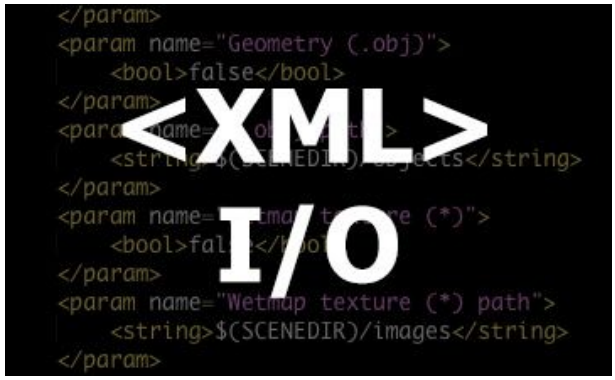


Network Simulations

RealFlow uses “Independent Domains of Computation” (IDOCs) to distribute simulations over a network. Separate “Job Manager” and “Job Node” applications help to manage and organize simulations. An open C++ plugin architecture makes it possible to customize the process of sending projects to the manager. The simulation progress can be monitored with every web browser or a built-in panel.

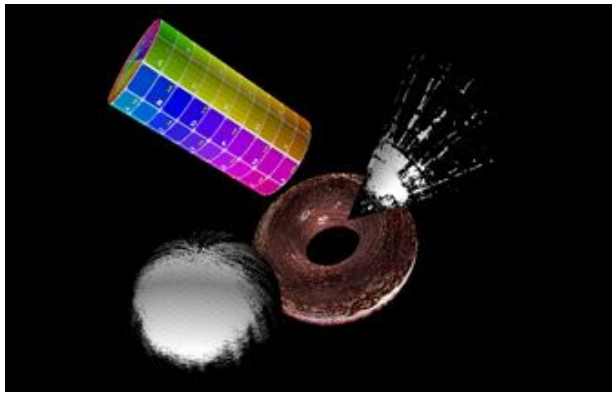
Inline Help System

This system includes a complete documentation and parameter reference with sophisticated search tools, parameter- and node-specific context help, and a complete reference for Python commands and Graphs nodes – RealFlow’s visual programming system.



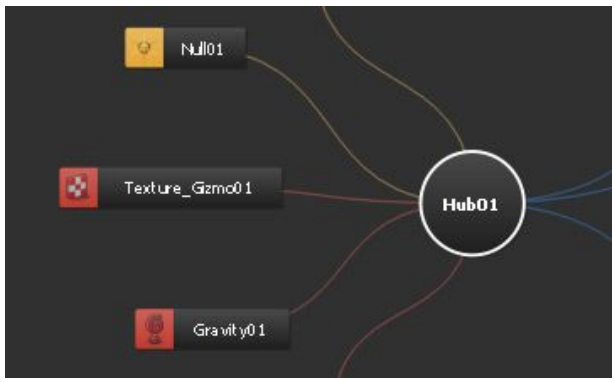
XML Project Import & Export

Fast, fully customizable, and resource-friendly export and import via XML files is available. Even scripts and graphs can be included with the XML files.



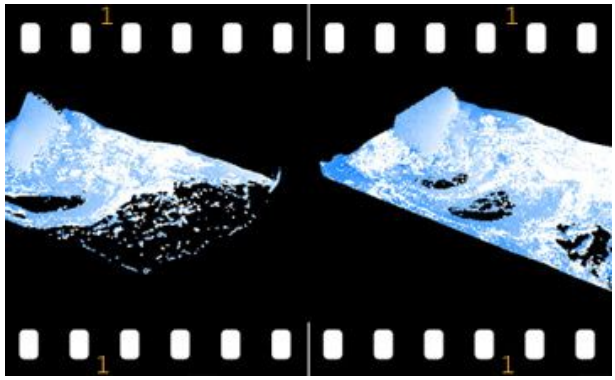
Textures

RealFlow supports a wide variety of different textures, for example displacement maps, wet-dry maps, parameter control maps (“interaction maps”), foam maps, and diffuse texture maps. Furthermore it is possible to create UV coordinates from particles, and use them to transfer channel information like velocity or age to meshes.



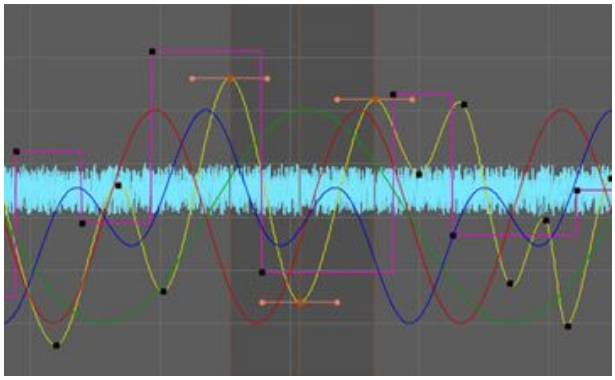
Relationship Editor

With this node-based tool users can define which simulation elements will be able to interact simply by drawing lines between the nodes.



Previews and Movie Player

OpenGL and Maxwell Render previews (image sequences and videos) from simulations can be generated with a single-click and viewed in the integrated player.



Curve and Expression Editor

This tool provides full control over animation keys. Main features are various curve types (TCB, Bezier, linear, stepped), tangent tools (break, unify, flatten), pre and post curve behaviours, multi-curve editing and mixing, and comfortable copy/paste functions for keys and entire curves.

An expression editor allows the definition of complex formulas to create motions, trigger events, or to control parameters. Curves can be saved and loaded via CRV and XML files.

Multi-Platform Availability

RealFlow is 64bit-ready and available for all major operating systems: Windows, Linux and OS X.

Simulation Export

RealFlow includes interfaces to the most popular 3D packages: Autodesk Maya, Autodesk 3ds Max, Houdini, Cinema 4D, and Lightwave 3D. Applications with I/O filters for Alembic and OpenVDB files can also be used to import and process RealFlow's simulation data.

Rendering

RealFlow contains an interactive preview render engine (FIRE™) and Maxwell Render™ for high-quality production renders.