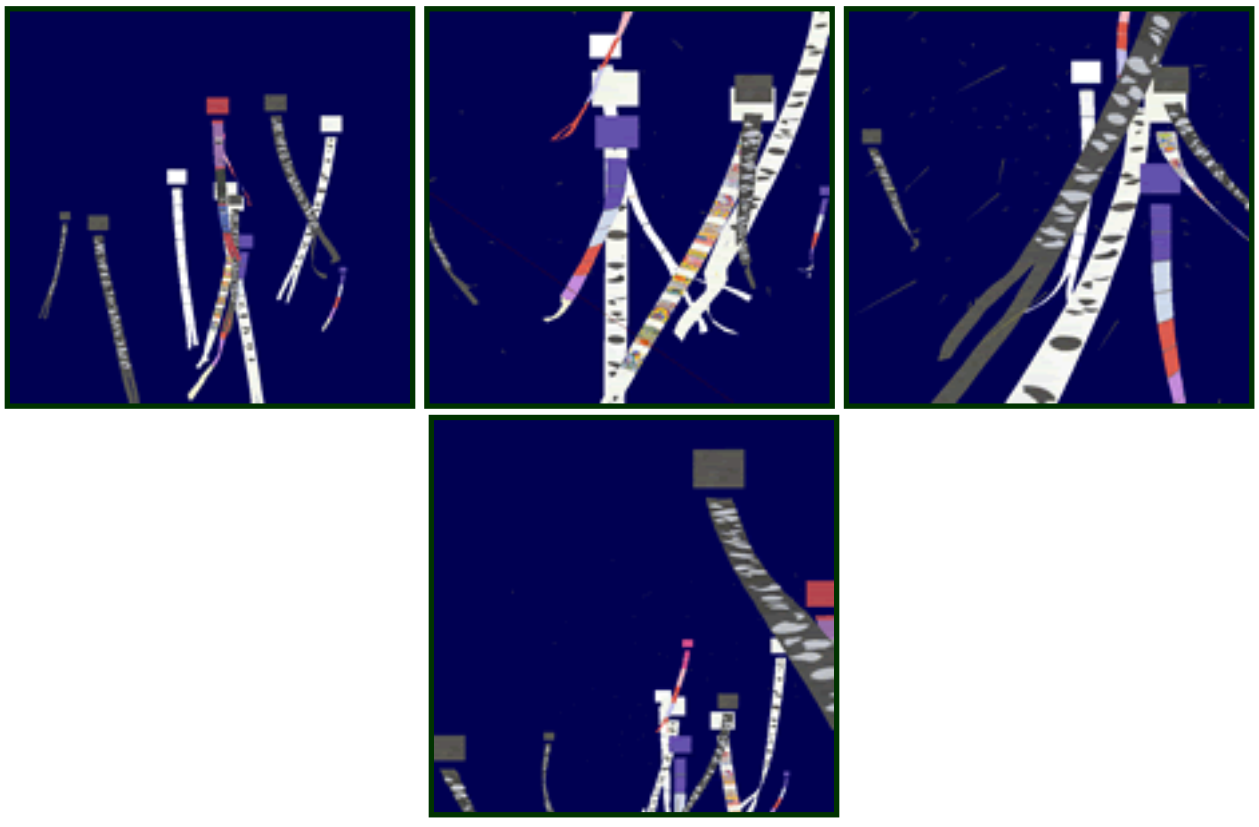
Kites Flying In and Out of Space

[project description] [people] [mt. lake workshop movie] [igrid2002 movie]

Kites Flying In and Out of Space

By Jackie Matisse, in collaboration with: Tom Coffin, Ray Kass, Ulrike Kasper, Jason Leigh, Francis Thompson, Shalini Venkataraman, and Paul Weilinga. *With special thanks to the following Institutions: The Mountain Lake Workshop of the Virginia Tech Foundation, SARA (Amsterdam, Netherlands), Electronic Visualization Laboratory at the University of Illinois at Chicago, National Center for Supercomputing Applications at the University of Illinois Urbana-Champaign, Alliance Center for Collaboration Education Science and Software (Arlington, Virginia), Sorbonne and La Cite Museum de Musique (Paris, France), New Media Innovation Center (Vancouver British Columbia), Virtual Reality Development and Research Laboratory, Tohwa University (Fukuoka, Japan), Institute for High Performance Computing (Singapore) and Starlight (Chicago).*



Jackie Matisse's "Kites Flying In and Out of Space" is the first high bandwidth art piece ever created. Exhibited at the iGRID2002 Conference September 23-26th 2002, hosted by SARA in Amsterdam, Netherlands, September 23-26, 2002, "Kites Flying In and Out of Space" utilizes a "Grid" model for real time steering of calculations on computers distributed over high-speed networks. Each of the 12 kites appearing in the piece utilizes up to 15 megabits per second. This art piece uses a total of approximately 180 megabits per second in calculating the forms and theoretically could utilize even more. CAVEs around the world could potentially view this application through a connection to the Starlight high-speed networking program. The kite structures are so complex to simulate that a distributed computational model using processors on multiple machines is needed. "Kites Flying In and Out of Space" enlists servers distributed across the globe in Chicago, Canada, Japan, Singapore and Virginia to calculate its forms. Each of these servers "stream" a single kite to SARA in Amsterdam where they are then displayed in a CAVETM.

A participant in the CAVE presentation can manipulate the kites and control the wind. When a person injects wind into the scene, messages are sent to all the servers. These messages contain information regarding wind direction and strength. The servers then calculate the modifications to their individual kite structures. That information is then streamed back into the CAVE. This process is called real time simulator steering and it is the basis for the steering of high performance calculations on super computers distributed over a high-speed network. This "grid" model has never been used for art prior to "Kites Flying In and Out of Space". It is an example of "Grid" computing, resulting in an original work of art.

"Kites Flying In and Out of Space" is a collaborative art piece initiated by the Mountain lake Workshop of the Virginia Tech Foundation in 1999. Jackie Matisse was invited to participate in an experiment in virtual reality using her imagery.

Jackie Matisse speaks of the piece: "These kites are evolved from my use of the sky as a canvas and from my need to use movement in my work. The square head is a homage to Malevich the Russian suprematist painter of the black square. The kites have very long tails, which are derived from a Thai serpent kite which I lost over a forest and which flew with unbelievable ease. It had such lift and in my mind it became a flying carpet and with it I could travel in the air. I began making tails and this enabled me to put color and line into the sky. I have always been interested in the connection between art and science. Since my kites were very hard to fly in all conditions, I experimented with alternative spaces

such as underwater, video, and now virtual reality. The networking has enabled me to compose and fly many more kites than I would have been able to fly in real space."

The movement of the kites uses a physically based simulation technique called "mass spring" model. A mesh of approximately 250 points constructs each kite. The movement of the mesh translates to the movement of the kites.

"Kites Flying In and Out of Space" is scalable computationally as well as geographically. It is a very good test of high-speed networking because the application requires a multicast enabled network to accomplish communications. The kites have become a visual metaphor for network performance. The kites have different sections and the movement of these sections indicates the size and latency of the network data. A fast and smooth moving kite represents a good connection. A slow and jerky moving kite indicates a network connection with a problem. In this way, network performance can be visualized.

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