pneumatic and electronic drive systems confer a definitive kinetic ability and geometric aesthetic. As the polished stainless steel tubes move, light and image is mirrored back to an observer in kaleidoscopic fashion. Looking at the sculpture one sees the tubes emerging from a 27" stainless steel pedestal resting on a 30 foot black granite base. This is an illusion, however, as the black granite is only a cap covering an underlying vault housing the true support and motion elements of the sculpture. What lies below the surface is as fascinating in its own way as what is familiar and visible in the world above.

In researching what might lie beneath the trap door in the granite base we were routed to local electronics designer Gary Christiansen. Christiansen had worked on the design and implementation of the satellite and video distribution systems in the 35,000 square foot main house during its construction. In 1986 soon after installation it became apparent that control of the sculpture was not quite working out as planned and the vision of a functional kinetic sculpture remained in doubt. At that point then owner Ken Good approached Christiansen to evaluate the situation and to provide a local liaison with the designers. Over time and through three owners, plus a receivership, Christiansen remained the default caretaker and keeper of the vault's secrets. Eighteen years later he still has enthusiasm for the project and provided us with an artisan's eye view, and tour, of the inner workings of the sculpture. He also gave the insight of an observer whom for the last three decades, has designed and coordinated hundreds of non-conventional electronic system melds for Denver area homes and businesses through his company CAI Electronics.

DTrends: Can you provide us some of the little known history on automation of the sculpture and of the vault?

Christiansen: French craftsman that did the welding for the Concorde were used to weld the stainless steel tube jackets for the sculpture. This was done to insure a nearly seamless 90-degree connection in the stainless steel coverings for the tubes. Dider Presle was the French electronics engineer who worked with Agam to design and configure the original mechanical, pneumatic, and electronic systems. Alan Reinarz of Chrismon Systems in Omaha, Nebraska created the original computer motion control program. Alan was very interesting person and programmer. He was able to fit the full motion program for the sculpture into the 128K of memory on an Apple II computer, which by today's standards seems almost inconceivable. The intent of the system was to have the larger sculpture emulate the settings of a maquette (model) located at an observation point overlooking the sculpture in the main residence. Due to the technical and budgetary limitations this idea was reluctantly abandoned in favor of a computer only display.

One story related to me has it that the outside sculpture exists in its present dimensions due to a conversion error between feet and meters, with the original design being 6 feet in height, not 6 meters. It happened to a Mars probe so I'm sure that it's possible with a sculpture. At least the sculpture survived!

DTrends: Tell us what happened when you came on board in 1986.

Christiansen: It was pretty interesting. Alan had written an exercise program for the sculpture. The idea was to have all eighteen movable tubes come to a position called "coplanar". This represented the default calibration point for everything. This aligned the tubes in a vertical plane. From that configuration any one tube could be moved through its full 330 degrees of arc with out crashing into any other tube. What I found was that Dider and Alan had pretty well stretched the Apple II and its I/O (input/output) hardware to its limit. They were trying to detect tiny voltage variations out of the