



Summary of COFES 2004

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(Underlined terms are hyperlinks to additional information)

I'm back from my trip to Phoenix and the COFES conference ([Congress on the Future of Engineering Software](#)) hosted by [Cyon Research](#). This invitation only event is in its 4th year and brings together many of the major players in the CAD and analysis industry and for the first time this year some of the "power users" for each of the major CAD packages.

Ominous thunderclouds began gathering upon my arrival at Scottsdale Palm Resort, the kind of clouds you see in my native Florida right before a monsoon. (This is the desert right?)

While the theme question asked for this year's COFES was "Is CAD finally good enough?" I was surprised to have little formal discussion about this topic. Most of my answers and discussion about this question stemmed from informal discussion with software vendors during the many socials and breaks from meetings and presentations.

Thursday afternoon began with a presentation on the new advances in technology. A study of Moore's law (that the number of semi-conductors on a chip will double every 18 months) in which the speed of chips was plotted on a log graph showed that not only was the result a linear line (which for a log graph means exponential growth) but was actually slightly hyperbolic and therefore exponentially exponential growth!! Storage capacity as a function of \$/bit of storage followed a similar growth trend. Unfortunately we all agreed that CAD software has followed a rather linear progression during this time and we all look forward to the beginning of exponential growth.

Thursday night the clouds gathered force and darkened as we began one of the many social meetings. Poolside, the attendees were encouraged to discuss matters in an unstructured environment with each other. I had many wonderful conversations and met some great people with whom I plan to follow up. The night was interrupted with a downpour, which sent many running for the table umbrellas and the rest of us (the lucky ones) for the small but well-stocked poolside bar. A slight drizzle the rest of the evening

did little to quell our conversations and in fact forced many to engage the person squeezed next to them.

I spent a lot of the night speaking with Randall Rath of Vbdesign.net and Rick Stavanja, Editor-In-Chief of CADWire.net about the state of the CAD centric Internet (or CADWeb as he nicknamed it). CADWire is coming out with a great new search tool (similar too Google) that only spiders CAD based web sites. Users will then be able to quickly get information on, for example, Inventor without finding info about patents or info about CAD without getting info on Coronary Artery Disease.

I awoke Friday morning to a steady rain. A rain we would soon learn that would not stop for some time.

A lovely breakfast was followed by a keynote speech by Stanford's [John Koza](http://JohnKoza). Dr. Koza's work is in Genetic Programming. Genetic Programming (GP) is the method of giving a computer program a goal, defining the tools it is allowed to use to solve the goal, an ability to measure results and the ability to mutate, combine, trim and discard the solutions until the best one is found. His work mainly focuses on electrical circuits where his GP computers has both recreated patented works as well as recently created two newly patented circuits. It is still a very young discipline, but amazing nonetheless.

After the keynote we had a great roundtable discussion with about 15 members to determine if we thought this type of GP could apply to mechanical systems. After a great debate we all agreed that high-level problems with very subjective goals (for example how does a compute determine what a "sports car" looks like?) would be impossible. Even defining simple machines such as a lawn mover or hairdryer would require us to spend so much time defining the characteristics of bolts, nuts, welds, pins etc.. (recall a resistor or transistor can be described very easily) that it would be quicker to design manually than to use GP. However we did agree that one day soon the mechanical community would need a language to somehow describe these mechanical systems in a structured and finite manner. We also all came to the conclusion that GP has it's best bet in succeeding in smaller optimization type problems. While current optimization software take s set of criteria and varies each one to find the best solution, GP would allow the configuration to change and even remove or add members to the set. A perfect example might be a linkage where mass is critical but strength is also required.

Running through the rain, I then visited Autodesk's tech suite where Dianne Li showed us the latest products in the DWF family. As many of you know I am not the biggest fan of DWF but it was refreshing to have a developer agree with many of my concerns about the product and note that Autodesk is currently working on those very issues.. Furthermore 3D DWF will be coming out very soon which will begin to sway the Inventor crowd over to DWF.

By this time the rain had flooded just about everything in sight. On the news, reports of roads washing out and rivers threatening to overflow their banks began to appear. At one point pea-sized hail began to fall; and that stuff **hurts!**

Lunch was a particular treat. I had the opportunity to hear [Joel Orr](#) of Cyon Research speak for the first time. Joel is a soft-spoken, jovial fellow who has a manner and speech pattern that can make you interested in almost anything. Add to this his dry wit and ability to make some wonderful observation about our natural and technological world and his lunchtime presentation became simply astounding to me. After lunch he gave away copies of his new book and I received a signed copy.

The afternoon continued with the first Mechanical Congress (there was an AEC Congress taking place at the same time). This was a great opportunity for all 80-100 of us to discuss the state of the CAD industry (ah! just what I was waiting for.) It was rather amusing to hear vendors taking pot shots (all in good nature) at each other while trying to make their points about the future of CAD. In particular the PLM vendors got the wrong end of the stick when a quote was recalled, “The only people who have a PLM problem are [UGS](#), [PTC](#) and [Dassault](#)” evoking a huge round of laughter from the crowd.

After hearing the CAD companies go at it for a bit another user, a Solidworks über-user (Ed, one of two whom I spoke with at length at this conference) and myself arose and asked essentially the same question. “Do CAD companies really know **how** we work? Ed asked if the CAD companies employ human factors engineers, anthropological psychologists or even ergonomic engineers to see how the CAD users **really** work. I quickly backed up his question with a comment. My comment referred to another statement that the tools were “sufficient”. I asked if you really wanted sufficient tools or tools that amazed and surprised you? I think we all want the latter. I closed with the statement that CAD currently still means **Computer Aided Drafting** Even though we are in 3D we are still just drawing the parts. “What we need”, I said, “is for CAD to come to truly mean **Computer Aided Design**”. At this moment Ed spoke and said, “If this were a user meeting Sean would have gotten a standing ovation”. Alas, this was not a user meeting but I would gladly give up many standing ovations for the opportunity to address the CAD vendors directly.

Unfortunately the rain ruined our evening plans. [Cyon Research](#) (the organizers of COFES) has planned to take us out into the desert, under the stars and grill steaks, chicken and other “cowboy food” and allow us to look at the heavens with telescopes. With all the rain, the spot had turned into a morass of mud and it would have been impossible to pull off. Furthermore the large pavilion tent where we had had breakfast that morning had also been flooded so we couldn’t even have dinner there. Some quick thinking and an accommodating resort allowed us to have dinner in a great hall. They brought the steak and chicken and other wonderful food to us and we were even serenaded with a country and western trio.

That evening I got the chance to sit down with Andrew Anagnost (Director MCAD Marketing) and Buzz Kross (VP of Manufacturing Solutions) of [Autodesk](#) to discuss the Inventor product line. What was wrong, what was right, what was up their sleeves. While I certainly can’t repeat everything we discussed, I think that users are going to be pleased with some of the features and refinements in R9 and even more so with R10.

One thing I can definitely say is that they are 100% committed to putting the Mechsoft functionality into Series (not PRO only). Andrew is a delight to speak to and I thank him for his time spent with me.

The sun peeked its head out Saturday morning and it ended up being a beautiful day. A double keynote speech on Engineering Outsourcing and Engineering Innovation was followed by more roundtable discussions. One was on user groups (both physical and virtual) and how they can work to communicate with the CAD vendors and how the CAD vendors can help support the users groups. Several of us “users” including a member of the SolidWorks user board, Richard, discussed these issues with the moderator Joe Greco, who is this year’s [CADSociety](#) president.

The second roundtable discussed the issue of why the number of engineering graduates was dropping. We decided there were many facets to this problem, including lack of respect for the profession, lack of introduction to what engineers really do and the fact that engineers are not considered role models. Dr. Koza asked the question “I can name a famous rock star, a famous athlete, a famous lawyer, a famous doctor, but can you name a famous living engineer?” We discussed ways to help fix this problem by introducing kids to engineering and to possibly go as far as recommending a PR campaign to focus on some young, “hip” engineers. One example was the 27 year-old engineer who was behind the styling of the [PT Cruiser](#). Kids will relate much better to someone like this than their current mental image of the nerdy, pale skinned guy who carries around a pocket protector and a slide rule.

The afternoon Congress was supposed to be on the business of CAD. However since our first Congress’ discussion was so lively it was decided to put users up on the panel and let them be asked questions by the vendors. When I heard this I got very excited. My excitement soon waned when I discovered the “users” were all Technical Fellows and/or Chief Scientists for Ford, GM, Daimler-Chrysler and Boeing. These guys did not represent the usual users. They were all in engineering managerial roles and in my opinion had as little idea about what the “grunt” engineer needed to do his job as the CAD companies do. The panel complained that the “CAD companies don’t listen to us”. I had to ask “If they don’t listen to you then what chance does the little guy ever have?”. I spoke to a large number of people who agreed that this group was looking at the problem from 30,000 ft. The CAD vendors need to be told what we want at a finer detail.

The book the [Innovator’s Dilemma](#) was a reoccurring theme throughout the conference. The author states that you cannot solely listen to your customers for if you do you will never be innovative. While I agree with this statement the CAD vendors in my opinion have taken this too far and rely ONLY on their internal judgment to make the decisions that involve the next generation of CAD tools. Regardless, the book is worth a read as it does raise some interesting points.

After the Congress the other “true” users and I discussed this topic. Many of us felt that as users we should have been the center of attention for an industry that was trying to figure out “what next?” Other users noticed that the CAD vendors did nothing to go out

of their way to approach us or “pick our brains”. This fact was very disconcerting and I was beginning to feel a bit depressed about the entire industry. However little did I know my attitude might soon change.

After the dinner yet another social event was held. It was at this event I was introduced to [John McEleney](#), CEO of [SolidWorks](#). John is a lively and energetic guy who was very easy with whom to talk. After trading a few barbs towards each other’s software of choice he began to ask not only the SolidWorks users present but of me, an Inventor user, about what both SolidWorks and the CAD industry in general could do to help users. He asked what SolidWorks could do for me as an Inventor user to help me get my job done. Such a fresh and customer driven attitude was refreshing to see. On the spot, he promised to implement several of the suggestions made by his users. He seemed passionate about his user base and excited about his product.

My flight out of Phoenix was uneventful and I finally got home around 5PM on Sunday night.

I would like to take a moment to thank [Brad Holtz](#) and Joel Orr of Cyon Research for their wonderful conference. They faced some big challenges and surprises thrown at them by the rain but pulled it off with minimal interruptions. I’d also like to thank them for my new Bluetooth capable HP IPAQ on which I began writing this article.

I look forward to returning to COFES in 2005 and renewing the friendships and relationships I made in 2004.