

## OVERVIEW OF MSC'S PLANS AND PROJECTS

by

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A most important piece of news for this 1989 World Users Conference is that MSC has delivered production versions of software that we have promised you in the past. I will give you a broad overview to serve as an introduction to the following presentation and share with you the strategic thinking behind our corporate thrusts.

The big news is that we have delivered Version 66 of MSC/NASTRAN. Version 66 represents the biggest level of effort from one version to the next in the entire history of NASTRAN. This was not a casual commitment - Version 66 represents nearly a decade of planning for the future in key areas of advanced computer hardware, data base management, and a highly professional approach to design optimization.

In 1982 when we were busy adapting MSC/NASTRAN to run on the CRAY-1, we experienced the implications of rapidly-changing computing architecture on MSC/NASTRAN. The highly touted vectorizer certainly represented an opportunity and a challenge. The opportunities presented themselves by being able to calculate long strings of data an order of magnitude faster than existing hardware. The challenges came in recognizing the performance degradation suffered by allowing the compiler to arbitrarily decide when to invoke vectorized operations especially for short strings.

At around the same time, several of us were working very carefully with one of our major clients to better understand their data management problems connected with the use of MSC/NASTRAN. We were also seeing large volumes of data being generated and archived. Serious concern was expressed about having a uniform approach for restarts across all solution sequences. It was clear that we had to provide better data utilities and offer improved interfaces into the various CAD/CAM packages for which MSC/NASTRAN was being used in various client installations.

Some of you may recall a presentation several years ago by a client from the U.K. on his approach to design optimization in which MSC/NASTRAN served as a sub-routine within an overall design loop. One could best describe this approach as a "black box" technique which was guaranteed to generate lots of CPU usage but not necessarily likely to take a short path to an optimal structural design. We teamed up with the University of Iowa, Ford Motor Company, and Northrop Corporation to develop Design Sensitivity analysis which became available in 1983. We knew that this was the necessary first step if we were to have a coherent approach to optimal structural design.

Mike Gockel is going to give you far more detail on what this has all led to in Version 66. I do feel that this typifies MSC's long range outlook and our commitment to continually improving MSC/NASTRAN. There are few companies that I know of that consistently operate with such commitment and long term planning. I know that many of you are disappointed at how long it took us to get Version 66 out of the door, but I also hope that you will appreciate the new functionality and quality while also providing a migration path.

You may recall that at last year's Users Conference we had the opportunity to introduce our newest team member, Dr. Sam Key. Many of us at MSC have known Sam for many years because of long-term contributions to high impact nonlinear transient response problems during his tenure at Sandia National Laboratories. I had the good fortune to meet Sam in the early 1970's through our early involvement in SMiRT, an international organization dedicated to the safety and standardization of nuclear power plants.

Under Sam Key we have formed a so-called "Center of Excellence" for the highly specialized and challenging field of nonlinear analysis. Among Sam's responsibilities are our efforts connected with adapting the public domain DYNA3D code into our own product, MSC/DYNA. This is a proven tool for the highly challenging problems involving automobile crashes, pipes banging into each other and impact studies involving bird strikes on aircraft canopies and projectiles striking armor plated vehicles. Our Marketing organization reports that there has been more interest in MSC/DYNA than in any other new product offering in our history and Sam is here to explain that in further detail.

Our most visible new product offering is MSC/XL, an interactive pre- and postprocessor for MSC/NASTRAN. I can remember just a couple of years ago giving Paul Zelenski a carte blanche charter to go out and create the world's best interactive graphics capability for

MSC/NASTRAN's input and output. It was an unusual approach for a company which rigorously follows very detailed product definition and design reviews. It was a gamble that we had to take. It is extremely difficult to convert instincts and intangible human interface requirements into crisp design documents. By following our normal rigorous path we might not have come up with an acceptable product as quickly as needed. Instead, Paul created a prototype system that would offer sufficient tangible evidence of his design objective to enable our internal and external critics an opportunity to do a hands-on assessment of what he would eventually create. There were a number of occasions when we thought we were pretty close to having something we could deliver to our clients, but further evaluation revealed the need for more work. Our strongest critics were the Regional Managers, which is not too surprising. Since our field sales personnel have had extensive experience in using MSC/NASTRAN, they have an excellent insight into what our clients expect in the way of user interfaces and system functionality - and they would not be satisfied with less than what they felt was essential to make for an MSC class product. We held an extensive training program on MSC/XL two months ago and the response was unanimous - even the harshest critics came to me and said MSC/XL is ready for the marketplace.

In face-to-face meetings and telephone conversations with our user community, the lack of availability of MSC/XL has perhaps been the cause of some of the most serious complaints I have had presented to me. Now that it is available for your first-hand viewing in our display area I trust you will concur with me that we have come up with an excellent product - the engineering interface, I believe, is the best anywhere. This is a product that takes advantage of the latest in technology and offers a very intimate communication link with MSC/NASTRAN.

For many of you, A. O Smith has been synonymous with DMAP expertise in MSC/NASTRAN. I don't know which leaves me the best memories - Vern Overbye's heroic DMAP exposures or Larry Larkin's two-fisted approach to jumbo shrimp eating at our Users Conference cocktail parties.

Fifteen months ago we acquired what was then called the CADCOMP Division of A. O. Smith which consisted of twenty-seven (27) employees. Part of their organization was committed to providing consulting services - structural analysis using MSC/NASTRAN and other competitive codes, and electromagnetic analysis using their own self-developed software. The rest of the organization was pretty much dedicated to developing and supporting their electromagnetic software products.

At earlier Users Conferences we listed electromagnetic analysis as something that could be done with MSC/NASTRAN with heroic efforts and that we would eventually improve in the future. This acquisition enabled us to fulfill this commitment.

Dr. Robert Y. (Bob) Bodine is the Director of E/EAD (Engineering / Electromagnetics Applications Department). I have been most pleased with the manner in which the old CADCOMP operation has been assimilated to become a full-fledged member of MSC's family. Bob's right-hand in the electromagnetic software development is Dr. Nancy Lambert. Later on this morning you will hear a brief overview of our existing electromagnetic software product line, MSC/MAGNUM, MSC/MAGNETIC and MSC/MAGGIE; and you will also hear about MSC/EMAS which is being developed around a "tool kit" version of MSC/NASTRAN.

The frosting on the cake this morning will be Dr. Richard H. MacNeal's discussion on finite elements in MSC/NASTRAN and some of his plans for the future. Those of you that know your history are aware that Dr. MacNeal contributed the underlying theory for what came to be known as NASTRAN. Fortunately for all of us he has never stopped to rest on his laurels - instead, he continues on his never ending quest for the Holy Grail of finite element theory - seeking approximations which lead to almost guaranteed accuracy with optimal efficiency.

We have tried to come up with a World Users Conference that will be truly a valuable experience for you. When Bob Louwers sent me the list of fifty-eight (58) papers that had already been submitted last month I must admit that I was somewhat startled by the sheer number of presentations. A quick review of the titles and origins of the authors added to the pleasant surprise.

I think you will find that we have a truly excellent client representation here - not just in geographic terms but more importantly in the broad number of subjects being discussed covering a good cross-section of industries. I encourage you all to take advantage of the vendor exhibits during your breaks. Please also use this opportunity to give MSC your candid inputs covering any subject area of interest and concern to you. The free and open exchange of ideas is one of the most important functions of this gathering and we encourage you to continue to be open and forthright in letting us hear your views - either in face-to-face meetings or during our public presentations.