

## INTRODUCTION TO THE CONFERENCE

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As we open our Seventh NAVTRAEQUIPCEN/ Industry Conference with the slogan "Training Economy Through Simulation," don't let us forget the trueness of last year's slogan, "Man--The Focus of the Training System;" for a training system or program can only be economical if it focuses on the man, if it provides the required transfer of training.

The acceptance of training in a simulated operational environment in lieu of training with operational equipment in the operational environment has made considerable progress during the last year. Though the continually rising cost of operating weapons systems and platforms and the energy shortage contributed heavily to this change in attitude, the effort of many of those who for a long time were already convinced of the effectiveness and the economy of training in simulators and in a simulated operational environment led to a large extent to last year's progress.

The high cost of training with operational equipment is, as many of you know, not only due to the high acquisition cost of the operational equipment and its attendant operating costs, but, in general, even more due to the very high maintenance costs, especially those for major military combat and surveillance platforms such as aircraft, ships, and tanks.

The trend to move more and more training from the operational environment into a simulated environment and moreover the recognition of the need to achieve, if possible, full mission training in training simulators have led to an increased program in training device development. This increase in the program, especially the increase in mission capability with resultant increase in complexity, however, must be carefully controlled to assure a convincing return on the investment.

Design-to-cost is the mandatory approach in today's budgetary climate, and an increasing training device budget must not be misconstrued, but be viewed in this vein.

The achievement of full mission capability demands the simulation of the visual environment for many training devices. And this, as most of you know, is still one of our major problems, especially if we try to keep the cost of visual systems to an acceptable level.

We at NTEC have been experimenting in our laboratories with the apparently cheapest computer-generated image approach, the so-called calligraphic or line drawing system. Though we do not always expect to achieve a satisfactory transfer of training by this approach, we nevertheless are hopeful that this approach will give a satisfactory visual environment simulation for many exercises. Its technology certainly does not pose the problem of too long a delay between trainee action and change in scene presentation, a problem that still confronts many of the more sophisticated computer-generated image systems, for the time required to generate the display of a computer-generated image of good resolution and image content is still too high for many training exercises and must be brought down at least to 50 milliseconds or less.

We have also built at NTEC a feasibility model of a holographic system displaying a carrier landing approach. This again is a promising economic solution for certain visual environment simulation training problems. You will hear more about this in one of the presentations.

In the area of television insertion technology, we have built in our laboratories a feasibility model of a high resolution television picture insertion into a low resolution background, another relatively low-cost approach to satisfy many visual environment simulation requirements.

The tremendous progress in digital computer technology including the introduction of minicomputers has led to more and more applications of digital approaches to basically analog simulation problems. However, in spite of the many advantages of the digital approach, we must not lose sight of the design-to-cost mandate which may lead us to a satisfactory cheaper analog solution.

In many cases digital computers in training devices have to be reprogrammed in the field. Shortage of sufficiently skilled personnel make it highly desirable to have a standardized computer language available applicable to all training device computers, a language which could be easily learned in a short time by enlisted personnel of high-school graduate level. To achieve such a standardi-

zation, cooperation between government and industry is of great importance. Even more important is the cooperation and coordination among the members of the training device industry.

This year's program, we hope, will present to you a large variety of solutions to many training system and methodology problems. Several of the presentations deal with areas that the Center has promoted for several years, such as digital radar land-mass simulation, adaptive systems, and per-

formance measurement.

The papers selected by the committee for presentation, we feel, describe the latest state of the art in our field and should give guidance for the future.

I would like to take this opportunity to gratefully acknowledge the active participation of the Air Force in our program and I hope that all of you will leave here with the conviction of having acquired new knowledge and new ideas about how to achieve training economy from simulation.

#### ABOUT THE AUTHOR

*DR. HANNS H. WOLFF was born in Berlin, Germany, and came to the United States in 1947. For 16 years he was a Chief Engineer and Executive of the Loewe-Opta Radio AG. After the war he joined the staff of the Technical University of Berlin and was in charge of the Chair for Theory of Electricity. In 1947 Dr. Wolff became the Chief Electronics Engineer of Lavoie Laboratories. He has held thereafter other high technical positions in American industry. He served as Chief Engineer of the Electronics Laboratory of the Paul Moore R&D Center of the Republic Aviation Corporation prior to his assignment as Technical Director of the Naval Training Equipment Center in 1963. Dr. Wolff has a Bachelor, Master, and Doctorate Degree in Electrical Engineering as well as a Dozent Doctorate Degree, all from the Technical University of Berlin. He has been awarded many patents from the United States and various other countries. He is also the author of many technical papers, mostly in the electrical/electronics field. From 1959 to 1966 he was an adjunct professor at the Polytechnic Institute of Brooklyn. He is a Fellow of the IEEE and a member of the American Physical Society, the Research Society of America [Sigma XI], and the Board of Visitors of the Florida Technological University. As Technical Director of the Naval Training Equipment Center, Dr. Wolff serves as the principal scientific and engineering advisor to the Command. He is responsible for the planning, direction, implementation, review, and evaluation of the training technology and methodology, especially the research, scientific, engineering, test and evaluation, and all other technical work and activities of the Center.*