I'd like to talk today about what I think is significant about our CRAY-3 program. This has been going on now for 4 or 5 years. The interesting thing for an engineer is the fact that we are using gallium arsenide for the first time for our logic circuits. Customers could probably care less except as it affects them and how much computing they get done for their dollars. I'd like to start off with my perspective of what that is.

I've been building computers out of silicon for a long, long time and I was getting a little frustrated because of plateauing effects on the speed of silicon. We've gone through evolutions of vector processing and parallel processing and parallel vector processing. All these things are happening because we can't get the serial speed we'd like to get in individual processors. A few years back, almost a decade ago, when gallium arsenide became popular in communications work, and the telephone company adopted it for all their digital communications via satellite, it seemed like there was an opportunity there that computer designers were missing. When you talked to research people at that point in time, they said, "Yes, there's a factor of 3 in the speed of gallium-arsenide with respect to silicon." They thought over time gallium arsenide would probably make as much progress as silicon did, so the factor of 3 was probably real for some period of time. Well that's a pretty important number even if the cost were somewhat higher. It's hard to beat a factor of 3 in real speed. In the late 1970's I made an effort to build a CRAY-2 out of gallium arsenide and I found that the facilities doing the production work simply weren't equipped at that point in time to do the job. I was talking to Rockwell International. Rockwell was doing military work but the work was so oriented toward analog circuits and communication things that it didn't seem possible in the time scale of the CRAY-2 to do it that way. I postponed that effort and went on and used silicon circuits in the CRAY-2 which caused some trouble. The CRAY-2 is distorted in the sense of the speed of the device, the clock period which I wanted to keep, and it all resulted in a loss of scalar performance relative to vector, so that was a little disappointing. When we began the CRAY-3 program 4 or 5 years ago, I wanted to try gallium arsenide again. There was an interesting coincidence in time here because the group at Rockwell International that I had worked with earlier had just left and started their own company called Gigabit Logic. I thought what a wonderful opportunity that was because here were people who were going to work hard, were going to lose their jobs if they didn't succeed