Day One—Evening Session

Keynote Address

Welcome and Introduction of Keynote Speaker

The Honorable Diana E. Murphy, *Judge, U.S. Court of Appeals for the Eighth Circuit*
Chair, U.S. Sentencing Commission

Keynote Address

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WELCOME AND INTRODUCTION OF KEYNOTE SPEAKER

JUDGE MURPHY: It is a real pleasure for me to say a word of welcome to you, on behalf of the Sentencing Commission. I know that you have met probably all of the other commissioners, some of them you will see more of tomorrow.

But we regard this as a very important feature in our year's work because, under the Sentencing Reform Act, the Commission is supposed to receive viewpoints on important issues from a wide variety of groups and voices. Represented here at this symposium are many of those voices.

This year, a very major part of our priorities that we hope to promulgate—to submit to Congress, on May 1—is an Economic Crimes Package. In the course of these two days, as you already know from your breakout sessions and from the larger sessions, there are going to be a lot of viewpoints put forward, a lot of questions asked, a lot of suggestions made. And I know that what I have seen has been very stimulating, and it is going to help inform us as we try to work out these guidelines.

As a judge that used them for many years, I had no idea, of course, how difficult it would be to draft these guidelines. We all came thinking we wanted to make them as simple as possible, as usable, as flexible as possible, and the areas are so complicated. So this session is very important to us in that effort this year. We really appreciate your taking the time from your schedules to come here and to help us work on this.

I am not going to say anymore until I have the pleasure to introduce our speaker who is reputed to be a very entertaining speaker. I want you to settle down and enjoy your dinner, but I would also like to introduce Judge Billy Wilkins who is chairman of the Criminal Law Committee of the U.S. Judicial Conference. We work with him and his committee, and many of the members are here today. They are co-sponsors of this symposium. Judge Wilkins, of course, was the original, the first chair of the Sentencing Commission.

What kind of keynote speaker do we need for such a broad-based symposium dealing with economic crimes and high technology?

From the standpoint of the Commission and the other co-sponsors, we are here to think about how to punish this kind of crime, how to deter this kind of crime. And it varies so, from the most simple theft—and we have heard this in the small group discussions today—to theft of intellectual property using the newest technology, to invasion of commercial and securities markets, to complicated multi-million dollar frauds on the government, whether it is procurement or benefits. It is all a huge spectrum of human endeavor.

Our speaker is exceptionally well qualified to talk about any subject because he has been a real leader in the corporate and the industrial world. He has held high positions in government. He has had a toehold, at least, in academia. He is an author of some rather intriguing books.

I am happy to be able to introduce Norman Augustine. He is currently chairman of the Executive Committee of Lockheed Martin. He, formally, was the CEO of Lockheed Martin and of prior predecessor companies. He also serves on a number of corporate boards: Proctor & Gamble, Phillips Petroleum, Black & Decker—I think that company creates tools. That is a hobby of his—using tools. He did tell me that he

likes to choose boards. I am sure he is much sought after as a board member from what I know about him, the little research that I have done, and just talking to him this evening. He would be a very sought after board member, and he chooses boards that are in fields that he isn't working in all the time. That makes sense, you know, to broaden your experience. He has been Under Secretary of the Army. He was assistant director of the Office of Defense Research and Engineering in the Defense Department. He has won awards for his corporate work, his industrial work, his government work.

He graduated with Bachelor's degrees and Master's degrees from Princeton in Aeronautical Engineering, and he has gone back and taught at Princeton. He has been on the board at Princeton. Once people get to know him, they don't seem to let him loose. He has been on the board of other institutions of higher learning: M.I.T., Johns Hopkins. He is on the board of Colonial Williamsburg, just to throw out a few things. He is chairman of the board of the American Red Cross; has been chairman of the Boy Scouts of America, and so on.

One of the most intriguing things is that he has written a number of books. The books have intriguing titles. One has Shakespeare in it. One is about the defense revolution and the brave new world, written by—I am paraphrasing a little bit—an arms controller and an arms builder, so you see how he comes at it from more than two angles. *Augustine's Laws*, *Augustine's Travels*, these books—some of them deal with leadership in life and in business or how to succeed in both. It is not just leadership, but he has interesting things to say about leadership, both in these books and in his speeches that he has given at various events. So I would predict—and you will see if I am right—that he will have a particular saying from somewhere or a particular anecdote that will apply to what we are doing here because he seems to achieve that wherever he goes. He uses the great literature for illustrative quotes. He has got anecdotes that fit the theme, pithy aphorisms. This is going to be hard for you to give your talk, I think. [Laughter.]

Before I conclude, I just want to say, in looking at his speeches that just happened to be pulled off the Internet by our librarian for me at my request, there was one that he gave at West Point. In the course of it, he talked about a lot of things, but he talked about this paratrooper that he met that had made 1,000 jumps, and he was quite impressed with this guy. So he said, "You must really like to jump." And the guy said, "No, I hate to jump." He asked the obvious question, "Well, why do you do it?" And the guy said, "Well, because I like to be with people who do jump." [Laughter.] *There* is the connection with the Sentencing Commission. So I present to you with great pleasure, Norman Augustine.

KEYNOTE ADDRESS

MR. AUGUSTINE: My goodness, talk about pressure. Thank you, Judge Murphy. It is really a pleasure for me to be able to be here this evening. I thank you for having invited me. I know that what you are doing is terribly important, particularly at this critical time in the evolution of technology and the law.

I especially want to thank Judge Murphy for her kind words of introduction. I must tell you, though, that it reminds me of an introduction received by a friend of mine, David Roderick, who was then the CEO of U.S. Steel. The person who introduced David had said that he was one of America's most gifted business persons. To prove it, they cited one very simple example. They said that he had made $1 million in California oil.

When David came to the podium, he was obviously somewhat embarrassed and he began his remarks by pointing out that the introduction had been essentially correct, but it had not been California, it actually was Pennsylvania; and it wasn't oil, it was coal; and it wasn't one million dollars, it was $10,000; and it wasn't him, it was his brother; and he didn't make it, he lost it. [Laughter.]

I also have to confess that, as a person trained in aerospace engineering, I stand before you in this situation this evening. It at least strikes me as a bit incongruous that I should be here. This is, of course, an audience that is dedicated to the gravity of the law, and I spent my entire life trying to violate the law of gravity.

My appearing before you also reminds me a bit of my first day of teaching at Princeton when I was asked to give a freshman engineering class an introductory lecture, and I had spent my life in business and government. I was sitting on the podium while the dean was introducing me and I was not paying all that much attention; I was flipping through my notes. All of a sudden, I heard the dean say, "And now we will hear from *Professor* Augustine." Truly, for just an instant—this is true—a thought went through my mind that, "Geez, what a coincidence. They have got a guy here by the same name as me." [Laughter.] When you introduced me to this group, that was my reaction.

We all do know that we live in a period of remarkable technological developments. It is a period in which technology really underpins our economy which underpins our standard of living. So many of the opportunities that we face today have their roots in technology. But similarly, so do many of the problems that we face.

One of the underlying ingredients of technology that I think you have to contend with, as do the rest of us, has to do with the accelerating rate of change in technology today and our ability to absorb technology at the rate at which it is created.

George Will, the columnist, wrote recently that, after the invention of agriculture, "it took 4,000 years to supplant hunting and gathering as mankind's main source of food, 5,000 years for cities to emerge, 6,000 years for writing to develop, 7,000 for the invention of mathematics." And he points out that, after harnesses were devised to hitch oxen to plows, it took another 4,000 years to adapt harnesses to the long necks of horses.

Contrast those developments, that took literally several millennia, with the pace of change today. I will use my own field of aerospace as an example. This is a field that progressed from Kitty Hawk to the

moon in just 66 years, less than a single life span today. In fact, my own mother, who passed away this year, was fully ten years old at the time the Wright Brothers' famous flight took place.

As an illustration of the pace of change of technology today, I like to use an example that comes from the Space Shuttle program. That large orange fuel tank that you see is the structural backbone of the Space Shuttle stack. It is built in the Lockheed Martin plant near New Orleans. I have calculated that, if you put that fuel tank on its side, the Wright Brothers' famous first flight could literally take place *inside* the tank. That is how big it is. And it's a measure of the change we have seen.

And, if you turn to the space part of the aerospace world that I live in, consider the accomplishment of Dr. Robert Goddard whose acclaimed rocket was launched just 74 years ago in the cabbage patch that belonged to his aunt up in New England. Goddard's rocket, the famous flight, reached a peak altitude that was roughly half the altitude reached just 43 years later by the Apollo moon rocket—while the Apollo was still sitting on the launch pad at Canaveral!

Consider a different field related to technology. Consider computer engineering. An entire generation of computer chips is supplanted about every 30 months. That has been going on for over a quarter of a century now. Even more amazing is the fact that the cost of those circuit elements has been decreasing by a factor of one half. It halves about every 13 months over that same period of time. And that compounding produces some astonishing effects. I was pleased to see, just this morning, that Jack Kilby, one of the two people who are responsible for that, just won the Nobel Prize.

Another friend of mine told me that if the automobile industry had been able to match the semi-conductor industry, then we could all buy a Mercedes for $1.87. [Laughter.] Furthermore, there would be no traffic problems because each of them would be a quarter-of-an-inch on the side.

There is a certain irony that all this progress we have seen in the field of electronics stems from discovering that there is a use for sand other than lying on at the beach. Today, we are using sand factories to crank out transistors at the rate of 20,000 per day, per man, woman, and child on this Earth. The impact of these truly ubiquitous items in our society is really quite remarkable.

In England, for example, just recently they began using semi-conductor integrated circuits implanted in dogs to help keep track of the dogs for quarantine purposes. A rather frightening extrapolation of that sort of development probably should call all of us to ask, "Do you know where *your* transistors are this evening?"

When I studied engineering in college, and it hasn't been all that long ago, our principal calculating device consisted of two sticks of wood with marks on them and two pieces of glass. It was known as a slide rule, and it truly was an anachronism. It couldn't add or subtract. It could give you three significant figures at best. And it had no idea where the decimal point went. Yet we used slide rules to do a lot of the calculations that got us to the moon.

By today's standards, it really would be useless, except of course in times when there is an electric power failure. Then we old-timers can show those whippersnappers a thing or two.

Now let me do a comparison to where we are today. IBM just recently announced plans for a new super computer. It is going to be 500 times more powerful than the world's fastest computer today. The

new one has been nicknamed "Blue Gene." It will be dedicated to genetic research. It is going to be capable of a quadrillion operations per second. It will be two million times more powerful than today's desktops. It will be 1,000 times more powerful than "Deep Blue," which was the computer that gave a dose of humility to humanity a few years ago when it soundly defeated Gary Kasparov at chess.

The effects of these developments and their pace are really almost unprecedented in human history. Consider a few factoids:

- A decade ago, cellular telephones were really a novelty. Today, there are about 100 million in use in the United States alone—about half of which, I might add, were in the restaurant where I had dinner last night. [Laughter.]

- In 1993, there were 130 websites on the Internet. Today, seven years later, there are over ten million.

- In 1957, the year I graduated from college, there was one human-made object in Earth orbit. Today, there are 9,500, which is creating a monumental traffic jam in some of the more popular orbits.

A revolution of the type we are now seeing in information technology is really quite remarkable in its own right. It is the sort of revolution that we have seen in the past, maybe every 400 years or so in recent millennia. But, today, we have not one, but two simultaneous revolutions of that type.

The second that I refer to is the field of microbiology. If we think that issues are tough in information systems, I suspect microbiology is going to give us some of the most daunting ethical and legal questions that we have ever encountered.

This simultaneity of revolutions is about equivalent, I suspect, to inventing the printing press and having the industrial/agricultural revolutions all at the same time, with one of the world's two major geopolitical systems collapsing in the meantime for good measure.

That is not all. There are other revolutions in the wings. For example, the field of nanotechnology is going to involve the ability to build, molecule by molecule, new materials with properties that we can't even conceive of today.

These revolutions are all, obviously, having very far-reaching consequences. For example, they are making geopolitical borders much more permeable and much less relevant. And they also pose some very perplexing legal problems in that regard—problems as fundamental as a question of jurisdiction.

They have also had another effect that I think is very significant, which is that they have magnified the ability of any given individual to impact society. Once upon a time, you might say that the slingshot was sort of the limit on a person's ability to affect others. With the development of firearms, that distance became somewhat larger, but still rather limited.

But today, as we are beginning to realize all too well, technology is making it possible for the solitary 15-year-old in some remote place on earth to disrupt business and communications halfway around the globe, with financial consequences that eclipse any financial capability that individual has.

And, worse yet, individuals may be able to produce lethal biological agents that can be spread by unknowing citizens flying on aircraft around the world. Some say that such agents might even be tailorable to attack groups sharing a given biological heritage.

There is another concern I think we should have in mind with regard to this sort of terrorism, and that is that, once America suffers a truly great terrorist attack—something that is not a terribly remote possibility unfortunately—I would suspect that, in the resulting clamor, many of our citizens will more than readily sacrifice the freedoms that we have held so dear for so many years.

This revolution is giving rise to still other profound social issues. Standards of living, for example, are obviously increasing for many, far beyond what we could have imagined a generation ago. If you just think back to the beginning of the previous century 100 years ago, the average life expectancy in the United States was 47 years. I don't want to offend this audience, for sure, but I suspect that might be important to a lot of us in this room.

But the problem is that the gap between the "haves" and the "have-nots" is actually increasing, with all the consequences that that might have, not only for what is right as humans, but also for the impact on society in terms of unrest.

We have also learned over the years that technology is basically unpredictable over the long term. Consider some of the prognostications of the real experts from the past. I just picked a couple. Take Tom Watson, the founder of IBM, a remarkable man. Tom predicted, and I quote, "There is a world market for about five computers." It wasn't the best market research.

Then there is the magazine, *Popular Mechanics*, which some of you may remember. It was usually recognized as being quite a forward-looking publication in the area of technology. It predicted rather confidently in the late 1940s that, "One day computers will be built to weigh no more than 1.5 tons."

But, on the other hand, the so-called experts occasionally miss it in the other direction, too. My prize for predictive folly in that regard goes to Alexander Lewyt. He was the president of the home appliance company that bore his name in those days. In 1955, Lewyt assured us that, and I quote, "Nuclear powered vacuum cleaners will be a reality within ten years." Fortunately, that idea never reached critical mass. [Laughter.]

It seems to me that one of the rules of technological prognostication is that we *over*estimate the near-term impact of scientific breakthroughs, and we *under*estimate the long-term impact. That seems to be the pattern.

Interestingly, most citizens seem to take these technological developments pretty much for granted. It is much like the individual who complained to Dan Goldin—Dan is the administrator of NASA—this individual complained to Dan about the space agency spending so much money on meteorological satellites. The individual protested, and I quote, "Why do we need meteorological satellites? We have the weather channel."

Then there is the person I read about in the media who was complaining about the potential location of a new biological research laboratory, saying—I quote again—"They are trying to bring DNA into our neighborhood."

This then brings me to our legal system and some of the relationships with this new technology. And it would seem to me that the advancing technology has been especially difficult for our legal system to accommodate. The system, as I understand it, rests rather heavily on historical precedent, a rather time-consuming protocol. The law seems, by design and probably necessity, to be rather backwards-looking, whereas technology tends to look forward, sometimes at the speed of light.

The differences seem to make for some very complex problems. If you take antitrust law as just one example, antitrust cases tend to wind on for months, even years. In the meantime, they leave companies with hundreds of thousands of employees in a form of suspended animation, where the employees don't know who they work for, and customers don't know who they will be buying from, and the owners don't know what company they will own. Meanwhile, in Silicon Valley, for example, with the Internet speed of business, six months is considered to be a huge market advantage over a competitor.

Then there are the advances in information technology that are creating havoc with our ability to ensure individual privacy; other advances threaten our ability to monitor criminal activities. We have cookies being placed on our computers where people can monitor our interests and our habits. We have advanced encryption techniques which pose a whole plethora of new problems.

As I mentioned, difficulties in the field of biotechnology, in my opinion, eclipse these difficulties. For example, it is said that you may be able to extract DNA from fingerprints, which are associated with them. This gives rise to questions like: If we can predict a person's future health, to some degree, what should that imply about that person's access to health insurance or life insurance or, say, to certain kinds of jobs? Say a person who is heart-attack prone wants to become an airline pilot. What does that imply?

A few days ago, the media carried a story about the possibility of taking DNA from extinct species and recreating them through implanting in the womb of other, related species. In the not-too-distant future, it will perhaps be possible to tailor-make children just like you order features for a new car; simply go down to the local people dealer.

Then there is the question about bioengineered foods and all the promise that offers, but also the risks. Who should bear that risk? The developers? These and a thousand other questions lie out there. And all of this says nothing about the technology-related questions that lie within the law itself.

The advancement of technology is, of course, a risky business, whether you are building aircraft or flying people to the moon, or building artificial heart valves or new drugs or what have you. To me, a very disturbing trend is to apply rigid, punitive remedies to a widely differing set of problems.

In defense contracting, for example, companies are now subject to treble damages for errors in their reports on their contracts, even when those errors were clearly unintentional. Moreover, the defense contractor can be debarred now, which is the corporate equivalent of capital punishment, as a consequence of indictment, without waiting for a trial or conviction, even when there is no evident danger of ensuing harm.

Some of these things worry those of us in business, in terms of the responsibilities we hold. It is quite obvious that we have to prevent actions on the part of business that are willfully harmful to consumers, and we should have strong sanctions on those who act with wanton disregard.

On the other hand, I think that the important words were "willful" and "wanton," and I don't use them in any legal sense, but rather in a common sense meaning. To disregard this consideration, I think leads to some difficult consequences. For example, some of the recently introduced strict-liability proposals could have secondary and unintended chilling effects on the willingness of companies to come forth with information that could be very important to the public. But if they carry criminal liabilities, the companies will, I think, be more reluctant.

Over the years, I have always been quite struck and amazed at the attitude taken by engineers when I have been involved in accident or failure evaluations. Unfortunately, I have been in a lot of those in my career. But I have been struck by the candor that engineers tend to display in approaching those investigations. They tend to approach them as a fascinating puzzle, without a great deal of concern about the possible legal or business consequences.

In fact, I have often been reminded in those reviews about the old story that I am sure you have heard about the French Revolution, when the law professor is saved from the guillotine because the blade failed to drop. Under the law of the day, he was released a free man. Next it was the engineer's turn on the guillotine, and as he climbed the steps, he shouted, "Wait, stop, I see what's wrong. It's the rope on the pulley." [Laughter.] I think there is more truth to that than I wish there were.

I don't pretend to have all or even hardly any of the answers to the issues I have raised. In fact, I don't even pretend to know most of the questions. I do know that they are going to challenge some of the best minds in a whole host of fields.

I also hope that it is clear to you that we need the involvement of policy makers in our government and our legal system, who are knowledgeable, not only about law and finance and public policy, but also about science and technology.

Unfortunately, we seem to be doing all we know how to do to keep people like that out of government. We have the well-meaning, yet overreaching, conflict of interest laws. There is the exhausting and sometimes-humiliating confirmation process that we have created. There is the unreasonably duplicative and time-consuming process of conducting background investigations.

One consequence is that it is rare, indeed, for a technically trained individual to be attracted to the Congress or the Cabinet or other senior government positions. The result can sometimes be stunning. A few years ago, for example, a major company—happily, not the one I serve—submitted a bid to the government to process high-level nuclear waste. They lost their bid, and they protested formally. At an ensuing hearing, the firm's representatives were permitted to question the source selection official who was an assistant secretary of the department, which will be unnamed, that was overseeing the contract award. The first question that was posed to the source selection authority, given the topic of the procurement, seemed fairly reasonable to me. The question was: "What is high-level nuclear waste?"

The source selection official's response, as recorded in the official transcript, goes as follows: "Well, it is a weighing that is applied to it on a high level in a way that you are going to treat that way, and the way that you are then going to process it. So, at the end of that, on a high level, let's say you might have to—after processing that, you may—before you put it in permanent storage, that may be something that you have to transport to let's say—to where we are putting storage in New Mexico. Some other kind of

waste you will be able to put in the cement and store it right there on the site. High level, we would handle that with care. We handle all of it with care."

This is obviously an egregious example, but it does illustrate, I think, why we need a greater degree of scientific and technical literacy shared throughout our government and our legal system. I would be the first to admit that much of the problem is associated with scientists and engineers because, by and large, they are at least as inept at communication as most in society are at quantum mechanics.

But, for now, I would like to conclude by suggesting that the most workable solution is probably for government and industry to try to work more closely together. The field of cybercrime is a classic example. The government has the responsibility and the means to enforce and interpret the law. But increasingly the state of the art of knowledge in these fields is not in government but in the private sector.

In that regard, I will note with a great deal of satisfaction the inclusive approach that you have taken as described to me in the work that you are doing. You might also want to consider creating some sort of an industry/government advisory group to help advise you on the sentencing implications of new technology and their impact.

At the same time, it might be appropriate for companies to form coalitions to address some of these issues themselves or compliance—based on the model of either the Defense Industry's Initiative or the accounting profession's Public Oversight Board or such as that.

Charles Darwin, I think said it best. He said that, "It is not the strongest of the species which survives, nor is it the most intelligent. It is the one that is most adaptable to change."

I will conclude by thanking you, once again, for the work you are doing. Our nation, very properly, is built on the rule of law, not on the rules of technology. But technology happens, and technology will continue to happen, and it will be in the best interest of everyone if the law is not permitted to fall behind this on-rushing wave of technology.

Thank you very much for your courtesy.

JUDGE MURPHY: I thought unwittingly, but I realize—knowingly, Mr. Augustine has hit on the head one of the challenges we have, and that is trying to comprehend all of the technological changes as we are dealing with sentencing guidelines. I speak on behalf of everyone in thanking you very much for coming and taking the time and sharing this evening with us.