INTRODUCTION

The Year 2000 (Y2K) technology problem started as an innocuous short-term solution to the oppressively high cost of computer memory in the 1950s and 1960s. Programmers expected that the problems created by the limited, two-digit method of date storage would solve themselves as companies, governments and other computer-owners updated their hardware and software. Fifty years after the introduction of the computer, the Y2K problem has the potential to develop into a worldwide crisis. Two common human failings contributed to the crisis—the tendency to follow a path of least resistance and the reluctance to champion difficult and complex issues. The Y2K problem does not have to be a story of failure, however. If addressed successfully, Y2K may encourage political and corporate leaders to better understand and protect the critical infrastructure.

FIFTY YEARS AFTER THE BIRTH OF THE COMPUTER, Y2K HAS DEVELOPED INTO A WORLDWIDE COLLECTIVE CRISIS.

As memory costs fell dramatically, software writers and hardware manufacturers did not immediately expand date variables. Newer versions of hardware and software needed to interface with older versions. While some programs were modified so that a new system could accept four-digit years and still exchange information with two-digit based systems, the extra effort required slowed the changeover process. Additionally, the equipment that earlier computer experts predicted would fall into obsolescence long before 2000 survived through layers of programming updates and modifications. Instead of solving itself, the Y2K problem self-propagated around the globe.

Y2K, AS THE FIRST CHALLENGE OF THE INFORMATION AGE, MUST LEAVE A LEGACY OF INCREASED AWARENESS AND APPRECIATION OF INFORMATION TECHNOLOGY'S ROLE IN SOCIAL AND ECONOMIC ADVANCEMENT.

Just as programmers found it easy to follow the tradition of using a two-digit date field, management and leadership have found it easy to defer addressing the Y2K problem. Y2K competes poorly against issues such as trade agreements, military operations, market share and product development. It lacks familiarity, and in a results-driven economy, Y2K remediation costs are difficult to justify to taxpayers or shareholders. Additionally, few wished to be associated with the potential repercussions of a failed Y2K remediation attempt.

At the heart of the problem lies a serious disconnect between those

who use technology and those who create it. On a worldwide scale, leaders of corporations and countries are struggling to understand the Y2K problem. In the process, they are receiving a crash course in the fragile mechanics of information technology.

The Committee feels strongly that Y2K, as the first widespread challenge of the information age, must leave a legacy of increased awareness and appreciation of information technology's role in social and economic advancement.

UNDERSTANDING THE PROBLEM

The goal of this section is to provide background on the Y2K problem and answer common Y2K questions.

What is the Year 2000 computer technology problem?

The phrases the "Year 2000 Computer Technology Problem," the "Millennium Bug," the "Century Date Change," or simply, "Y2K"[1] all refer to the same problem—a defect that exists in millions of computer programs worldwide that causes erroneous handling of date (i.e., day, month and year) information if not corrected. The effect of the Y2K flaw on computer systems is not easily predictable. It may bring a computer to a crashing halt. It may cause the computer to generate obviously incorrect outputs. Or alternatively, it could allow the computer to produce invalid data that will not be detected until much later, forcing users to correct a range of accumulated errors while searching for the source of the problem.

Why is two digit notation defective?

To save memory in the early days of computing, programmers represented four-digit years with only two digits. For instance, 1968 or 1974 would be stored and processed as 68 and 74, respectively. The number 19, indicating years in the 1900s, was implied, much as personal checks once had the number 19 preprinted on the dateline.

This worked smoothly until users started to input dates occurring after December 31, 1999. Computers ran into problems when required to calculate a number based on the difference in two dates, such as the interest due on a mortgage loan. Computers continued to assume that the prefix 19 was implied, so dates such as 00 or 01 were treated as 1900 or 1901. Consequently, computers could not correctly calculate the difference between a year in the 20th century and a year in the 21st century.

For example, we know that the time between July 1, 1998, and July 1, 2005 is exactly 7 years. However, a computer with a Y2K problem could calculate an answer of either 93 years or -7 years, depending on the specific program. Calculations that used either of these results would be in error and may themselves cause subsequent problems.

Another Y2K problem occurs in the storage of information. Many kinds