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SHUTTLE ECONOMICS

On January 5 the President announced his decision that the major space program for this decade should be the development of an entirely new type of space transportation system -- a Space Shuttle designed to take men and machines to and from Earth orbit in a routine way and at much less cost than today's space rockets.

On January 24 the President sent to Congress a budget request for NASA that provides for funding the Space Shuttle and making steady progress in all the major areas of space activity -- space science, planetary exploration, practical applications, and advanced research.

And on March 15 NASA announced final decisions on all major questions of the Space Shuttle design. Two days later, the various companies of the aerospace industry were asked for their technical proposals and cost proposals for building the Shuttle.

These proposals from the aerospace companies are due in May. Sometime this summer, NASA will select the prime contractor for the Shuttle. The first horizontal flights are scheduled for 1976 and the first orbital flights for 1978.

Thus the major elements for NASA's most important space program for this decade are falling into place: Since the President announced the decision to proceed, NASA has made the necessary technical decisions and a prime contractor will soon be selected, and a strong bi-partisan majority in Congress is expected to re-affirm its support.

To reduce this progress report on the Shuttle to one sentence: NASA has invented the Space Shuttle and is getting ready to build it.

It will undoubtedly go down in history as one of the most outstanding and useful inventions of this century. In the first years of the century the airplane was invented. In the Twenties Dr. Goddard invented the liquid-fueled rocket which reached its peak performance in the giant Saturn V of the Sixties. By 1978 NASA will have combined the airplane and the space rocket in the first true aerospace vehicle.

The invention of a new kind of ocean-going ship, the caravelle, led to the great voyages of discovery in the 15th and 16th centuries. We are not yet ready to build the space age equivalent of the caravelle. We are not yet ready to build the space ships that will take men and women on the long voyages to the planets.

With the Shuttle, however, it will be possible to operate freely in what might be called the home seas of space.

Just as the early navigators moved freely about the Mediterranean Sea in Biblical times, the Shuttle will permit free movement in and out of the Supraterranean Sea of near-Earth space.

The pilots and passengers and payloads aboard the Shuttle in the Supraterranean Sea will be much safer and ride much more smoothly than the crews and cargoes on the Mediterranean Sea in Jonah's time.

It is important to be able to operate effectively in this medium where more and more manned and unmanned ships will sail to serve the science, the security, the commerce, and the culture of the modern world.

The key to the ability to open up this new sea and operate effectively there is the Space Shuttle. It is most important for the future of world civilization that this key will be in American hands and that we stand ready to share the adventures and the opportunities that this new realm of endeavor offers all mankind.

The decision to proceed with the Shuttle has profound implications for the future of this Nation. The Apollo program will end with one more flight to the Moon. Apollo 17, the final one, is scheduled for December.

In 1973, basic Apollo equipment will be used to send three different crews of three men each to live and work in the first U. S. experimental space station, called Skylab. Skylab is not intended to be an on-going program. It is designed to investigate and demonstrate the useful work that men can do in Earth orbit over long periods of time. When the three experimental flights* scheduled for 1973 are completed, it, too, will end.

Presently, there are no plans to go back to the Moon (after Apollo 17) in this decade; nor will a Space Station be built in this decade. And definitely, there are no plans for manned expeditions to the planets in this decade or the next.

The next step forward is to build the Space Shuttle. After very careful consideration over a number of years -- since 1965 to be exact -- it has been determined that without any doubt the Space Shuttle is the single most logical, most necessary, and most rewarding next step for this country to take in exploring and using space. This is a very positive decision. But it must be realized that, to keep space costs at a reasonable figure through this decade, it is necessary to put most of our eggs in the Shuttle basket.

Fortunately, a substantial bi-partisan majority in Congress is well aware of the fact that this country needs the Shuttle and that failure to act favorably on it now would be nothing less than a national disaster. The rest of the world, friend and foe alike, would interpret such a negative decision as the beginning of the end of the United States as a world power in this century.

The global importance of the Shuttle program at this time is almost beyond description, but its cost is quite modest for such a major national undertaking.

It is estimated that the Space Shuttle can be developed for \$5.15 billion, spread out over six years, so that the annual cost will not rise above \$1.2 billion in any one year.

This will permit the building of the Shuttle and the doing of the other high priority things that need to be done to maintain a well balanced space effort without any increases in NASA's annual budget. NASA's budget for the current fiscal year is \$3.3 billion, and the request for FY 1973 is less than \$3.4 billion. This level can be maintained throughout the decade and still start important new programs as current programs are phased out.

This compares very favorably with NASA expenditures of almost \$6 billion in the peak year of the Apollo program.

Public discussion of the Shuttle question has been complicated because it has taken place over several years during which plans for the system have shifted and changed in an effort to determine which of the many possible ways of building the Shuttle would be the best one to meet the Nation's present and future needs. Open discussion of the various alternatives within the aerospace industry and by the public has been encouraged. This may have created some confusion in the public mind, but it has also helped NASA arrive at what is now generally accepted as the best possible solution for the Shuttle design.

For planning purposes it has been assumed that NASA, the Department of Defense, and other users will fly 580 missions in the 12 years from 1979 through 1990. This is a conservative model, assuming about the same number and same kinds of missions that have been flown. It is known what it would cost to fly these missions with present day rockets. Careful studies of the costs of flying the same missions with the Space Shuttle have been made.

It is estimated that in this 12-year period about \$5 billion can be saved in launch costs by using the Shuttle instead of present-day one-way rockets. Under launch costs the cost of buying and operating the Shuttle vehicles and Shuttle ground facilities should be included. Nothing is left out.

And it is estimated that another \$8 billion can be saved in payload costs when the Shuttle is used, because payloads will be simpler and cheaper to build, payloads can be retrieved for repairs and re-use, and fewer payloads will be lost because of malfunctions in the launch vehicle or the payload itself.

Thus a total savings of \$5 billion on launch costs and \$8 billion on payloads is anticipated; or a total of \$13 billion over 12 years.

This saving of more than \$1 billion per year can be obtained with a normal number of missions during the first 12 years that the Shuttle will be in operation; and, these savings will be twice the cost of developing the Shuttle.

The estimates are based on data prepared by the independent and highly respected firm of Mathematica Inc., which is based in Princeton, N. J., and is headed by Oscar Morgenstern, who took an active role in the seven-month study for NASA. A 56-page "Executive Summary" of the Mathematica analysis of the Space Shuttle system is available to anyone who wishes to study it.

It is probable that the economic benefits of the Space Shuttle will be much greater than indicated in the conservative model of 580 missions used in the Mathematica Inc. study.