partment of Defense, to further the exploration and beneficial uses of space. I would also like to give you some of my personal thoughts on nuclear energy in space and to suggest a number of future uses which, of course, do not yet represent in any sense our country's planned programs in this area.

Nuclear rocket propulsion

If we are to review all the aspects of the many space challenges that are brought about by our interest in space, or even just of those we will deal with in the next few decades, one fact would immediately become apparent: our success in space will depend to a major extent on energy—energy to conquer time and distance, energy to gain and communicate knowledge, and energy to protect and sustain life. I believe that nuclear energy in its many forms, working through the highly sophisticated engineering being developed today, holds one key to our ultimate success in space.

When we speak of nuclear energy for space, it is most important to emphasize at the outset its compact form. Its compactness means high energy and low mass, a combination essential for getting far into space and accomplishing many things there.

Our nuclear space programs take both these factors into account. We are developing, under our Rover program, systems for nuclear rocket propulsion and, under our SNAP program, systems for generating electric power in space. The letters S-N-A-P stand for Systems for Nuclear Auxiliary Power. Let me review these programs for you briefly—what we have accomplished to date and what might be done in the near and more-distant future.

First, look at nuclear rocket propulsion.

In earthly travel, some say "getting there is half the fun." In space travel, "getting there" is quite an effort. This is so simply because of a stubborn force called gravity. Gravity seems to insist that we earth-bound creatures remain earthbound. That is why it takes a two-stage chemical rocket 90 feet high and with about one-half million pounds of thrust to put two men packaged with some relatively light equipment into an orbit about 200 miles above the earth. Incidentally, such a launching requires more than 30,000 gallons of chemical propel-