

and more effective than doing this updating with photography from orbit could be.

We could also use this tool for oceanography, another important aspect of earth resources. Not only could we determine things like sea state and water temperature, but we could also measure, for instance, salinity of water and plankton content. These elements in combination have a direct effect on the habits of fish. Plankton is a basic food material produced by the sea, and wherever there is plankton, there you will find little fish. And where you find the little fish, you find the big fish. So if we keep an eye on the plankton distribution in the oceans, we can tell our fishing fleets where to go.

Now I don't want to mislead you in this area. We are not in a position to inaugurate, effective tomorrow, a complete worldwide resources control system that can do all these things. This is a very major research and development proposition. Much work would have to be done in what we call ground truth correlation tests. It is necessary to overfly accessible patches of land, for instance, not only in the United States, but also in other climatic regions to calibrate our sensors and photographs under conditions where we can compare the pictures with what we really find on the ground. And this procedure of calibrating sensors and cameras is the first step.

Now, the question may arise, "Why go into orbit to make these surveys? Can't we simply get this information by sending questionnaires to the Department of Agriculture?" Well, maybe in the United States we can, but we surely cannot do this in areas like India or central Africa, or northern Latin America. These data certainly have not been collected and organized, and the farmers individually don't know. So photography from above is necessary.

Then the question, "Why not take the pictures from an airplane?" Well, it's a question of cost, really. Whenever we want to continuously watch, record, or measure on a global scale anything that constantly changes, like crops, we would have to run up an exorbitant fuel bill if we did it with an airplane. On the other hand, sending a space system to orbit may be more costly, but once it gets up there, it stays there; and the longer it stays there the more economical it becomes. We can easily establish fixed points where we can say, for example, that a Saturn V, after half a year, breaks even with a DC-8; and after 1 year breaks even with a Cadillac; and after a year and a half breaks even with a Volkswagen; and beyond that, even beats a Honda scooter in miles to the gallon. So whenever we have need for a system that we need to do a job for a long, long time, such as constantly surveying vast expanses of earth, the space system is simply more economical.

You know, all these questions about one booster being a little cheaper than another are completely masked by this overall effect: that, if we extend the operating usefulness of the system, it will pay for itself. It will pay for itself just because of this basic feature that in orbit we don't have to burn fuel to stay there. So, I personally do not believe we can run a system like this any other way with anywhere near the economy than we can from space. This is a new capability that space is providing us.

The way we would do it would be to put a satellite, or several satellites, into orbits with sufficiently high inclination to the Equator, so