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# Telstar satellite: Proving the naysayers wrong

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INDUSTRY VOICES

Fifty years ago, on July 10, 1962, the first active relay communications satellite--Telstar--was launched into an elliptical orbit. It was the brainchild of Dr. John R. Pierce of Bell Telephone Laboratories, and showed the way for the host of geostationary and low-earth-orbit communication satellites that would follow.

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But what if the naysayers 50 years ago had their way? What hurdles and impossibilities would the naysayers have placed in the way of the implementation of Pierce's idea? Below are what some of the comments may have been:

"How will you power the thing? It will take an awfully long extension cord, and the cord will just get tangled as it wraps itself around the Earth. Oh, you propose to use the relatively new solar cells? They will disintegrate in the vacuum and cold of space and a tremendous number will be required to power the contraption."

"Some sort of telemetry will be needed to monitor the thing. And the contraption will need to be stabilized in orbit, which means it will have to be continuously spinning. The internal centrifugal force will likely destroy its contents, or everything inside will need to be bolted down."

"You propose to squeeze all the electronics into a sphere about a yard in diameter! Impossible. You will need a structure at least 10 feet in size to house all the stuff for it to have even the smallest chance of working."

"A glass travelling wave tube will be required to receive and amplify the faint signal from the Earth. Glass is fragile and all the vibration of the launch will destroy it and everything else in the contraption. If orbit is luckily achieved, the satellite will contain nothing but a heap of costly trash."

"Arthur C. Clarke was right in his proposal for the use of a geostationary orbit, but you propose a much lower orbit to minimize the delay for telephone speech. But that means that the satellite would be usable only about 20 minutes of each 2½-hour orbit. A telephone call would have to be cut short

Engineers prep the Telstar 1 satellite for launch. (Image courtesy of Alcatel-Lucent)

after 20 minutes. You would therefore need dozens of the satellites for practical coverage – too costly and impractical. Who cares about a delay of about a half second using a geostationary satellite for speech – people will get used to it."

"Hundreds of transistors working to receive the frequency-modulated signal will be needed, and they most likely will all be destroyed by the strong radiation of space, if the launch vibration and G-forces do not get to them first."

"The signal received back on Earth will be very weak and will require huge antennas to receive it. Worse yet, these huge antennas will need to move quickly to track too little thing as it rapidly passes overhead. It would be sheer luck if the antennas ever locked onto the faint signal – nevertheless tracked it across the sky."

"How do you propose to get it up there: a giant slingshot? Do you really think AT&T (NYSE: T) will ante-up the millions of dollars required to reimburse the government for a Thor rocket? Most likely it will just fizzle on the ground or be a spectacular fireworks display."

"An active communication satellite has never been constructed before. It is far more than just the satellite, but a complex system on the ground is also required. Furthermore all the components of the satellite itself must all be integrated together into a total system. This is a nearly impossible systems integration task."

"Hundreds of engineers and technologists will need to be diverted from other more essential work, just to work on this totally impractical and silly demonstration, mostly for publicity purposes. The budget will be astronomical – about the only really astronomical aspect of this crazed idea."

But in the end, the hundreds of people who worked on Telstar got it all done in only about two years; it was launched successfully into orbit; and all the electronics worked flawlessly. An impressive accomplishment! The naysayers were wrong – Pierce's vision was correct.

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