

from the

SMITHSONIAN  
INSTITUTION



Washington 25, D. C.

NEWS RELEASE DATE

Tuesday, July 7, 1964

COMMUNICATIONS IN SPACE SHOWN  
IN NEW SMITHSONIAN EXHIBITION

Washington, D. C., July 7, 1964.--Another new exhibit in the Smithsonian Museum of History and Technology opens today when the communications satellites Score and Courier will be formally presented to the Institution by the United States Army.

Included in the exhibit, which will remain on view for about two years, are six other communications satellites: Echo, Relay, Syncom (National Aeronautics and Space Administration), Telstar (American Telephone and Telegraph Corporation), West Ford (U.S. Air Force and Lincoln Laboratory), and Oscar (Amateur Radio Relay League).

The exhibit stresses the historical development of this rapidly changing field of space communications, with special emphasis on the variety of techniques that have been attempted. Represented are all satellites which have been launched for communications purposes, including six active and two passive systems. All (except Echo) are fully instrumented back-up or test objects. Through artifacts the exhibit is thus able to document the evolution of this technology from the primitive Score with its brief career during the closing days of 1958 to the work of the Communications Satellite Corporation which is about to launch a complex system giving continuous world-wide coverage.

The opening of this exhibit also marks the opening of the Smithsonian's new Hall of Electricity in the Museum of History and Technology. Further exhibits, which will appear in the near future, will stress the



historical developments of various electrical fields. Here objects from the rich collections of the Smithsonian will be displayed in a context of scientific and technological change. The accomplishments of Edison and Morse and Bell will be related to the contributions of lesser known but not necessarily less important figures. Subjects treated in the next group of exhibits to be opened will be: the development of electrical measuring instruments, the history of the telegraph and telephone, and the evolution of the electric motor and generator. In a less advanced state of preparation are exhibits on radio and on the history of concepts of electrical charge.

The presentation ceremonies will be held at 11:30 a.m., Tuesday, July 7, in the Electricity Hall, Museum of History and Technology. Representatives of all the agencies and corporations named above will be in attendance.

FACT SHEET ON SATELLITES IN EXHIBIT "COMMUNICATIONS IN SPACE"

Satellite	<u>SCORE</u>	<u>ECHO I</u>	<u>COURIER</u>	<u>OSCAR I</u>	<u>TELSTAR I</u>
Launch date	12/12/58	8/12/60	10/4/60	12/12/61	7/10/62
Inactive date	12/30/58	---	10/21/60	1/2/62	2/22/63
Type	active repeater	passive reflector	active repeater	active transmitter	active repeater
Capabilities	teletype voice	teletype voice facsimile TV (before skin wrinkled)	teletype voice facsimile	code transmission	teletype voice facsimile TV
Weight	35 lbs.	130 lbs.	495 lbs.	10 lbs.	170 lbs.
Sponsor	U.S. Army	NASA	U.S. Army	Project Oscar, Incorporated	A.T. & T.
Builder	Signal Research & Development Lab., Ft. Monmouth assisted by RCA	G.T. Scheljdalh Company	Philco, Inc. (satellite) Radiation, Inc. (tracking system) I.T. & T. Lab. (ground station)	Project Oscar, Incorporated	A.T. & T.
Representative present at ceremony	Willis M. Hawkins Asst. Sec'y U.S. Army (R&D)	Robert F. Garbarini Dir. of Applications, Off. of Space Science & Applications NASA	(see Score)	Robert Booth General Counsel ARRL	Walter K. MacAdam Vice-president A.T. & T.

Satellite	<u>RELAY I</u>	<u>WEST FORD</u>	<u>SYNCOM II</u>	
Launch date	12/13/62	5/9/63	7/26/63	
Inactive date	---	---	---	
Type	active repeater	passive scatterer	active repeater	
Capabilities	teletype voice facsimile TV	teletype voice	teletype voice facsimile TV (with loss in quality)	
Weight	172 lbs.	42 lbs.	78.8	
Sponsor	NASA	U.S. Air Force	NASA	COMSAT Corporation
Builder	RCA	Lincoln Lab., MIT	Hughes Aircraft Co.	Communications Satellite Corporation
Representative present at ceremony	(see ECHO)	Harry Davis Dep. for Research Off. of Resc. & Development, U.S. Air Force	(see ECHO)	Matthew Gordon Dir. of Inf.
		Walter E. Morrow, Jr. Assoc. Head Communications Div. Lincoln Lab., MIT		



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RADIO CORPORATION OF AMERICA • 30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

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for release: Immediately

July 7, 1964

RCA COMMUNICATIONS SYSTEM IN 'SCORE' SATELLITE

RELAYED WORLD'S FIRST MESSAGE FROM OUTER SPACE

A communications system, built by the Radio Corporation of America and installed by the U. S. Army in the Project SCORE satellite, relayed the world's first message from outer space on December 18, 1958.

The historic Christmas message of President Dwight D. Eisenhower, in his voice, was recorded and beamed from the satellite upon electronic command to ground stations as far apart as California and Georgia.

RCA President Elmer W. Engstrom, then Senior Vice President of the Corporation, described the event as opening a new era in radio communications. He said:

"The success of this experiment opens up the early prospect of revolutionary communications techniques, such as international television and microwave voice and code services on a global basis, using satellite relays capable of spanning the oceans.

"RCA is proud of its substantial part in this imaginative pilot project, which already has inaugurated a new era in radio communications."

RCA developed the SCORE communications equipment under the direction of the Army Signal Research and Development Laboratory, now part of the Army Electronics Command. Delivery was completed just 57 days after RCA received the contract to start work.

Engineers and scientists of RCA's Astro-Electronics Division, Princeton, N. J., designed and produced the communications system. It was contained in two packages, each consisting of a receiver, a transmitter, a tape recorder, and a control unit. Of these, all but the recorder came from RCA. The satellite also carried two Minitrack beacons from RCA.

The Army provided the tape recorder, also batteries and antennas. RCA supplied equipment for the four ground stations in the tracking communications system, plus a fifth ground station used at Cape Kennedy (then Cape Canaveral) for checkout.

SCORE functioned until December 30, 1958, when the batteries became exhausted. The system was the first to demonstrate the practical operation of a communications satellite system capable of relaying voice conversations and other real-time communications over inter-continental distances. In addition, voice, single and six-channel frequency division multiplexed teletype traffic was transmitted to the satellite, recorded, stored, and relayed individually to the ground stations at their command. More than 140,000 words were successfully transmitted to the satellite and relayed to earth.

FACT SHEET

SCORE SYSTEM PARAMETERS

	SATELLITE	GROUND
Transmit frequency	132 mc	150 mc
Receive frequency	150 mc	132 mc
RF power output	8 watts	1000 watts
Noise figure	10 db	6 db
IF bandwidth	40 kc	40 kc
Audio bandwidth	0.3-5.0 kc	0.3-5.0 kc
Antenna gain	-1 db	16 db @ 150 mc
FM threshold	10 db	10 db
Fade margin	39 db	19 db

SCORE COMMUNICATIONS EQUIPMENT

Two transistorized receivers, each weighing 10 ounces. Enclosed in special shock resistant covering, these receivers incorporated certain ruggedized devices employed in a belt-mounted two-way radio for police which RCA had introduced a short time before Project SCORE.

Two 8-watt transmitters, each weighing 2½ pounds. Developed in conjunction with the Radio Specialities Co., Portland, Oregon.

Two electronic control units -- 3/4 pound each -- which responded to ground commands to activate the receivers, transmitters, or magnetic tape system.

Two beacon transmitters -- 3/4 pound each -- that sent out a steady signal for tracking and temperature recording. Produced under a subcontract by Applied Science Corporation of Princeton (ASCOP), Princeton, N. J. These transmitters were picked up by International Geophysical Year "Minitrack" stations as well as SCORE ground stations.

Each of the five mobile, van-mounted ground stations included a 1-kw transmitter, a 250-watt standby transmitter, two receivers, and a control unit developed by RCA. Each also included a beacon receiver and a tape recorder developed by the Army Signal Laboratory. The RCA equipment for the ground stations included a 1-kw amplifier produced under subcontract by Industrial Transmitters and Antennas (ITA), of Upper Darby, Pa.

The ground stations were established and operated by the Army Signal Laboratory at Prado Dam, Calif.; Fort Huachuca, Ariz.; Fort Sam Houston, Texas; and Fort Stewart, Ga. The fifth was at Cape Canaveral, Fla., for checkout.

Teletype multiplexing equipment in ground stations could handle a total of 420 words a minute, plus the voice channel. The satellite recorder could store about 1680 telegraphic words in its 4-minute storage capacity.

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