Sputnik and Satellite Communications

David J. Whalen
Space Studies Department
University of North Dakota
Sputnik

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A shock, but not a surprise
ATT’s Reaction

The necessary spurs to concrete action [on communications satellites] came with the successful launching of Sputnik I by the USSR on 4 October 1957

– John R. Pierce, Executive Director, Research - Communications Principles Division, Bell Telephone Laboratories
Pierce and Rudolf Kompfner see a picture of William O’Sullivan’s NACA Atmospheric Density Experiment Balloon.

At a USAF-Sponsored Woods Hole Conference on Communications, Pierce is offended by the extravagant USAF satellite communications proposals. He suggests to his friend William H. Pickering of JPL that ATT/BTL and JPL perform a communications experiment using NACA’s Balloon.

At another conference in Washington, DC, Pierce and Kompfner present a paper on “Transoceanic Communications by Means of Satellites”—in part to lobby for their balloon experiment.
Hughes Aircraft Company’s Reaction

- Harold A. Rosen and his colleague D. D. Williams are looking for some space project Hughes can pursue in the wake of Sputnik.
- They read Pierce’s paper in early 1959.
- Rosen and Williams decide that they can design a geosynchronous communication satellite—something Pierce had described as impractical.
- They produce their first satellite design and sell the idea to Hughes management.
Congress’ Reaction

- Creation of ARPA (February 1, 1958)
- Creation of NASA (October 1, 1958):
  - Three NACA Labs: Ames, Lewis, Langley
  - Vanguard project at NRL
  - JPL
  - ABMA
- Congressional Hearings held 3 and 4 March 1959 on "Satellites for World Communication"
1960

- AT&T files with FCC for permission to launch an experimental satellite
- Echo (AT&T, JPL, NASA) and Courier (USAF) launched
- NASA refuses to launch Telstar
- NASA prepares RFP for Relay
1961

- Army *Advent* program failing
- NASA releases *Relay* RFP
- Award to RCA
- Decision to launch *Telstar*—subject to reimbursement
- Hughes displays *Syncom* at Paris Air Show
- Joint NASA/DoD sole-source award to Hughes *Syncom*
Pierce and Traveling Wave Tube  Syncom being attached to Delta 3rd Stage
Telstar July 10, 1962; Relay December 17, 1962
Syncom July 26, 1963
COMSAT and Intelsat Success!

- Kennedy signs Communications Satellite Act in August 1962 creating COMSAT
- Interim Intelsat Agreements Opened for Signature August 1964
- Definitive Intelsat Agreements Opened for Signature August 1971
- Open Skies 1970/1972—Domsats
- Separate Systems 1984—Competition for Intelsat
- ORBIT 2000—destroys COMSAT
But Wait . . .

There’s More . . .
1957: The First ICBMs

SS-6 Sapwood (R-7)
- 1.5 Stages
- 280 T mass
- 390 T thrust
- 9000 km

Atlas (WS-107)
- 1.5 Stages
- 120 T mass
- 160 T thrust
- 10,000 km
ICBMs and Spy-Sats

- Both the R-7 and Atlas were accelerated in the 1953-1955 time frame.
- Gardner Committee on missiles 1953
- In February 1954, the von Neumann Committee (SMEC or teapot committee) recommends accelerating Atlas Program
- On St. Patrick’s Day 1955, the Killian Committee (TCP) recommends further acceleration of Atlas and development of a spy satellite.
Reaction to the ICBM

- The Soviet Union purposely misrepresented the locations of cities and facilities on maps.
- Differences of a few kilometers would not matter to a bomber, but a missile could not search for a target, it had to know the exact geographical location.
- A Spy Satellite was the best way to do this. Aircraft photographing the Soviet Union were often shot down.
AT&T’s Reaction to the ICBM

- John R. Pierce was invited by the Princeton Section of the IRE (later IEEE) to talk about space.
- RCA Astro-Electronics dominated the Princeton section of the IRE
- RCA was bidding a spy satellite using television cameras
Hughes’ Reaction to the ICBM

- Hughes Aircraft Company had become an electronics company by the early 1950s.
- In 1957, they were designing the radar and missile for the F-108.
- The F-108 and its radar/missile system were designed to shoot down the Soviet bomber fleet.
- In 1958, realizing that the Soviet threat was missiles, not bombers, the F-108 program was canceled.
- Harold A. Rosen was tasked with finding new work for the Hughes radar group.
Would It All Have Happened Anyway?

- AT&T would probably have been interested in a communications satellite anyway. Any launch would have probably motivated them.

- Hughes is less likely to have entered this field except in the extraordinary circumstances of 1958-1959. Their most important program, the F-108 radar was made obsolescent by the ICBM. They needed new work and space seemed to be where the money was going.