CENTRIPETAL FORCE & GRAVITY

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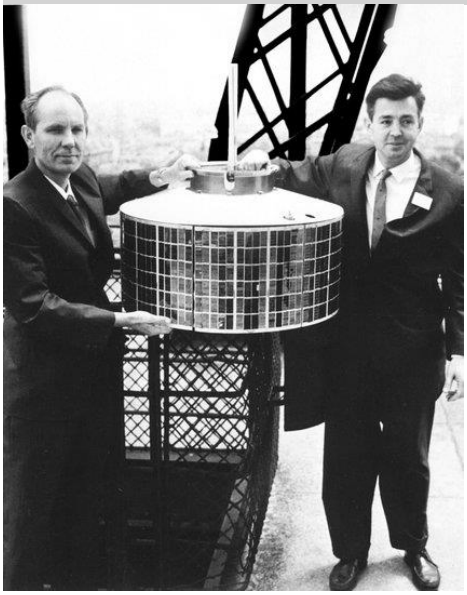
February 3, 2017 by Zack Wiichter , Dedicated to Johannes Kepler, German Mathematician & Astronomer , 1571 -1630

Harold Rosen, Who Ushered in the Era of Communication Satellites, Dies at 90



Harold A. Rosen, right, with the engineer Thomas Hudspeth and the satelliteprototype Syncom at the Eiffel Tower in 1961. Mr. Rosen was a driving force in the invention of modern communication satellite technology.

INTRODUCTION: The Syncom satellites appear stationary 22,300 miles above Equator(see article below). The satellites actually rotates in harmony with earth at 1 rev./day. This can be seen in article below. The Purpose of this application is to confirm the Syncom satellites must be placed at 22,300 miles above equator. H = 22,300 miles. 600 such geostationary synchronous communication satellites exist now in 2017.

QUESTIONS: (a) Find radius (R) from center of earth the Syncom satellite must be placed (in meters & miles) to appear stationary above earth ?, (b) Find height (H) Syncom satellite must be placed(in meters & miles) above earth surface ?, (c) Find tangential linear speed(m./s. & mph) of Syncom satellite at 22,300 miles?

HINTS: Satellites stays in orbit since gravitational centripetal force is provided by gravity: $G\,m\,M/R^2 = m\,V^2/R$, where $V = R\,\omega = 2\,\pi\,f\,R = 2\,\pi\,R/T$, T = period
Thus, $G\,M\,/\,R^2 = 4\,\pi^2\,R\,/T^2$, solving for $R = [\,G\,M\,T^2/\,4\,\pi^2]^{1/3}$, T = 1 day.
24 hrs./day , 3600 s./1 hr. , $G = 6.67 \times 10^{-11}$ N m.^{2}/kg.^{2} , $M_{EARTH} = 5.97 \times 10^{24}$ kg.
R_{EARTH} = 3,959 miles, 1609 m./miles , $R = R_{EARTH} + H$.

COMMENT BY AUTHOR: Thanks to Harold A. Rosen , PhD Electrical & Aeronautics from California Institute of Technology in 1951. If we did not have these geostationary satellites our "Smart Phones" would not properly.
Thanks you Harold……Dr. John P. Cise

Whether you are reading these words online or in print, there is a strong chance that Harold A. Rosen played a part in getting them to you. Mr. Rosen, who died on Monday at 90 at his home in Pacific Palisades, Calif., **was a driving force in the invention of modern communication satellite technology. His inspiration came in 1957, when, as a young engineer, he watched the Sputnik satellite, the first ever launched, streak across the night sky in Los Angeles on its historic journey.** From its orbit, the Soviet Sputnik could transmit only beeps back to Earth. But Mr. Rosen could see that the future of relaying information over long distances was in space, and he began imagining the possibilities. In those days, telephones were the best way to communicate between two points, but the terrestrial telephone system was reaching its operational limits. Some parts of the world were unreachable. **Mr. Rosen set out to design a satellite that would usher in a new era of telecommunications. He was working at the Hughes Aircraft Company laboratories at the time, and though his managers were skeptical, they approved his proposal to collaborate with his fellow engineers, Thomas Hudspeth and Don Williams, in designing a prototype. The team came up with a 55-pound cylindrical device that used solar panels for power and spun like a football to remain stable. (((*What made it revolutionary was that it would orbit the Earth at the same speed at which the planet was rotating*))). To an observer on the ground, the satellite would thus appear to be at a fixed point in the sky.**
John Rubel, the deputy research director at the Defense Department, helped secure NASA funding for Mr. Rosen's project, called a synchronous communication satellite, or Syncom. The Pentagon was working on similar research at the time, but the design proposed there weighed thousands of pounds. After the war, he completed his studies at Tulane in 1946 and went on to study at the California Institute of Technology. He earned a master's degree there in 1948 and a Ph.D. in electrical engineering and aeronautics in 1951. **He eventually oversaw the development of more than 150 communications satellites at Hughes and later at Boeing, where he worked until retiring in 1993.** Mr. Rosen received the National Medal of Technology and Innovation from President Ronald Reagan in 1985 for his work developing **geostationary communication satellites** Mr. Rosen's legacy can also be found **(((in orbit: in the approximately 600 geostationary satellites that today)))** handle all manner of communication data, such as television signals, GPS tracking information and telephone and internet connections, sending, among other things, these very words, by way of printing presses or digital devices, directly to readers.