

**IEEE Simon Ramo Medal***Sponsored by Northrop Grumman Corporation***Byrana N. Suresh and K. Sivan**

**For outstanding leadership in developing  
a national space program and pioneering  
space technology**

Significantly impacting the development of launch vehicle technologies, the space systems engineering expertise and leadership of Byrana N. Suresh and Kailasdivo Sivan have been instrumental in the Indian Space Research Organization (ISRO) becoming one of the world's top space agencies known for launching successful missions at low cost. Suresh and Sivan joined ISRO in 1969 and 1980, respectively, and at different points in time served as Director of Vikram Sarabhai Space Centre, a lead center for development of launch vehicles. Suresh led the development of their navigation guidance and control systems, including the polar satellite launch vehicle (PSLV), which has been ISRO's workhorse for satellite launches. He led the design and development of the electrohydraulic and electromechanical control systems, which are flying in all launch vehicles. He was also responsible for establishing a full-fledged vehicle simulation laboratory with sensors and actuators for evaluating the vehicle system performance under varying conditions of flight. He also developed a number of critical components for actuation systems, eliminating the high cost of importing these components. Sivan was chief architect of the 6D trajectory simulation software SITARA used for mission planning of ISRO launch vehicles and of the day-of-launch

wind-biasing strategy that has allowed all-weather launches. He guided the development of the reusable launch vehicle RLV-TD, which was flown successfully. He took over the GSLV project team and guided it to successful launches. Sivan also implemented the strategy for the upper-stage (PS4) restart capability for the PSLV, which improves mission versatility by injecting different payloads in different orbits during a single mission. The contributions of Suresh and Sivan have enabled ISRO to achieve success in several complex missions, including the 2014 Mangalyaan vehicle, which was successful in orbiting Mars in its very first attempt. Sivan played a key role in ISRO setting a world record by launching 104 satellites from a single rocket in 2017.

Recipient of the 2018 International Council of System Engineering's Global Pioneer Award and Lifetime Achievement Award for 2016 from the Space Department, Suresh is an Honorary Distinguished Professor with the Indian Space Research Organization, Bangalore, Karnataka, India.

Recipient of the 2018 Lokmanya Tilak Award and 24th HK Firodia Vijnan Ratna Award for the year 2019, Sivan is Chairman of the Indian Space Research Organization, Bangalore, Karnataka, India.

*Scope:* For exceptional achievement in systems engineering and systems science.