

TEACHING SEMINAR

Celestial Spacecraft Navigation

TUESDAY JANUARY 28TH 3:30PM-4:20PM
ARMS 1021 OR WEBEX

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ABSTRACT

Spacecraft positioning during the Apollo lunar missions relied heavily on celestial navigation, using both stars and the Moon to ensure precise trajectory determination. Apollo astronauts employed a sextant and star tracker to measure the positions of stars relative to the moon. These measurements allowed them to determine the spacecraft's orientation (attitude) and trajectory (navigation). The Moon itself served as a critical reference point for celestial navigation. This lecture will cover celestial navigation for spacecraft in cislunar space, including the Apollo and Orion designs.

BIOGRAPHY

Renato Zanetti joined the Department of Aerospace Engineering and Engineering Mechanics at the University of Texas at Austin (UT) in January 2017. Prior to joining UT, Renato worked for almost a decade in the private and government sectors.

From 2007 to 2013 Renato was an engineer at the Charles Stark Draper Laboratory. During this time he worked on every current and planned crewed NASA vehicle: the International Space Station (ISS), the Space Shuttle, and Orion. Renato was the lead relative navigation designer for Orbital Sciences Cygnus vehicle, which completed several successful cargo resupply missions to the ISS. From 2013 to 2017 Renato was an engineer at the NASA Johnson Space Center (JSC). During this time he served as one of the lead designers of the absolute navigation filter for Orion Exploration Flight Test 1 (EFT1), which successfully flew in December 2014. He was responsible for the design, coding, and testing of two navigation Computer Software Units (CSUs). During the EFT1 flight, he monitored the navigation telemetry from the engineering support room in Denver (Raptor). Prior to departing from NASA, Renato delivered the design and code of three CSUs for Orion's next flight Artemis 1, which successfully completed its mission in 2022. Renato is currently at Blue Origin leading the navigation design of the lunar Human Lander System.