Lander Radioscience - Rotation of Mars and Positioning of the lander.

Véronique Dehant (1,2), Sébastien Le Maistre (1), Rose-Marie Baland (1), Ozgur Karatekin (1), Michel Mitrovic (1), Marie-Julie Peters (1), Attilio Rivoldini (1), Tim Van Hoolst (), Marie Yseboodt (), William Folkner (3), Alexander Kosov (4), and William Bruce Banerdt (3)

(1) Royal Observatory of Belgium, Brussels, Belgium (veronique.dehant@oma.be), (2) Université catholique de Louvain, Belgium, (3) Jet Propulsion Laboratory, USA, (4) Space Research Institute Russian Academy of Sciences (IKI), Moscow, Russia

The Lander Radioscience (RISE on the NASA InSight 2018 mission and LaRa on the ESA-Roscosmos ExoMars 2020 mission) experiments are designed to obtain coherent two-way Doppler measurements from the radio link between a lander on Mars and the Earth over at least one Martian year. The Doppler measurements will be used to determine the orientation and rotation of Mars in space (precession, nutations, and length-of-day variations). Depending on the location of LaRa on the surface, the polar motion of Mars could be measured as well. The ultimate objective is to obtain information on the Martian interior and about the sublimation/condensation cycle of atmospheric CO_2.
Besides, Lander Radioscience allows to accurately locate the lander shortly after landing. A precise estimate of the lander's position improves the quality of the early science operations and allows high-resolution cameras from spacecraft to correctly target the lander.

RISE = Rotation and Interior Structure Experiment; https://mars.nasa.gov/insight/spacecraft/instruments/rise/
InSight = Interior exploration using Seismic Investigations, Geodesy and Heat Transport; https://mars.nasa.gov/insight/mission/overview/
LaRa = Lander Radioscience; https://lara.oma.be/ and https://www.youtube.com/watch?time_continue=4&v=GyU1aDaNES8
ExoMars; http://exploration.esa.int/mars/48088-mission-overview/