

3rd International conference on

ARTIFICIAL INTELLIGENCE & ROBOTICS

June 28-29, 2017 San Diego, USA



Ashitey Trebi-Ollennu

NASA Jet Propulsion Laboratory-California Institute of Technology, USA

The InSight mission: Instrument deployment robotic system

The InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) Mars Lander Mission science goal is to understand the formation and evolution of terrestrial planets through investigation of the interior structure and processes of Mars. The science payload for InSight consist of a seismometer, heat flow probe and a precision tracking system to measure the size and state of the core, mantle and crust. Additional payload includes a meteorology package, a magnetometer, two color cameras and a 4 DOF robotic with a grapple at the end-effector. The InSight Instrument Deployment System (IDS) is comprised of the Instrument Deployment Arm (IDA), arm-mounted Instrument Deployment Camera (IDC), lander-mounted Instrument Context Camera (ICC) and control software. The IDS is responsible for precision instrument placement (seismometer and heat flow probe) on a planetary surface that will enable scientist to perform the first comprehensive surface-based geophysical investigation of Mars. IDA has 1.9 m reach with four degrees of freedom: Yaw (shoulder azimuth) and three pitch joints (shoulder elevation, elbow and wrist). Each joint has a temperature sensor and heater with a dust seal to prevent contamination of the motor and gearbox. IDC allows visual confirmation of deployment steps, as well as acquisition of the stereo image pairs used to create a 3D map of the workspace. IDC also provides engineering images of solar arrays, payload deck and instruments. ICC provides context images and redundant worksite imagery. This talk will give a brief overview of InSight IDS and present test results and operations challenges for this first of kind instrument placement and installation on the Martian surface.

Biography

Ashitey Trebi-Ollennu is the Product Delivery Manager for the InSight Mars Mission Instrument Deployment System, Instrument Deployment System operations Team Chief and a technical Group Lead in the Robotic Manipulation & Sampling Group at NASA Jet Propulsion Laboratory, California Institute of Technology, where he has been since 1999. He has received his PhD degree in Control Systems from Royal Military College of Science, Cranfield University, UK in 1996 and BEng from Queen Mary College, University of London, UK in 1991. He was a Research Scholar at Institute of Complex Engineered Systems, Carnegie Mellon University from 1997 to 1999. He is a recipient of over a dozen NASA Group Achievement Awards. He is a Fellow of the Institution of Engineering and Technology, UK and a Fellow of the Royal Aeronautical Society, UK, Senior Member IEEE RAS and IEEE SMC. He is also a Fellow of the Ghana Academy of Arts and Sciences and has served as a Guest Editor of the IEEE Robotics and Automation Society Magazine, Special Issue on Mars Exploration Rovers (June 2006). He has been on PhD committees at the Robotic Institute of Carnegie Mellon University, Pittsburgh, USA and is the Founder of the Ghana Robotics Academy Foundation.

ashitey.trebi-ollennu@jpl.nasa.gov

Notes: