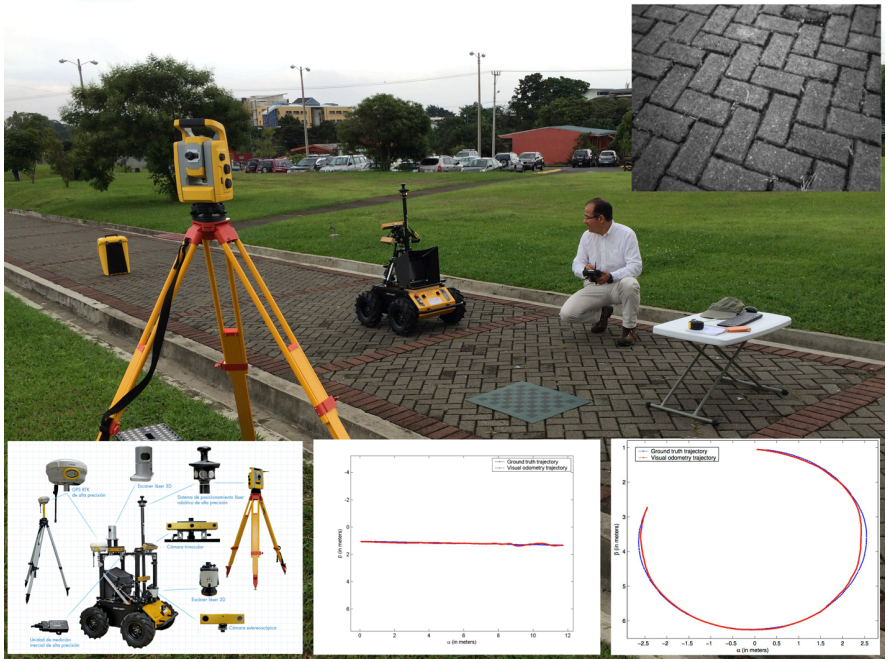
UNIVERSIDAD DE COSTA RICA

IPCV-LAB
robot VISION
Image Processing and Computer Vision Research Lab
University of Costa Rica

Intensity-Difference Based Monocular Visual Odometry Algorithm for Planetary Rovers

Geovanni Martinez Email: geovanni.martinez@ucr.ac.cr
WWW: http://ipcv-lab.eie.ucr.ac.cr

- **Alternative algorithm**: It was proposed as an alternative to the long-established feature based stereo visual odometry algorithms
- **Positioning computation**: The rover's 3D position is computed by integrating the frame to frame rover's 3D motion over time
- **Type of sensor**: The frames are taken by a single video camera rigidly attached to the rover
- **Direct motion estimation**: The frame to frame rover's 3D motion is directly estimated by evaluating the frame to frame intensity differences measured at the N key observation points
  - *without establishing correspondences between features or solving the optical flow as an intermediate step*
- **Compact and iterative solution**



Results of field tests on flat ground

- Absolute position error of 0.9% of the distance traveled on average
- real time operation possible

These results were recently presented at IAPR MVA-2017, Nagoya, Japan, May 8-10, 2017