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THE PERIGEO PROJECT: INERTIAL AND IMAGING SENSORS PROCESSING, INTEGRATION AND VALIDATION ON UAV PLATFORMS FOR SPACE NAVIGATION

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Abstract. The PERIGEO R&D project aims at developing, testing and validating algorithms and/or methods for space missions in various field of research. This paper focuses in one of the scenarios considered in PERIGEO: navigation for atmospheric flights. Space missions heavily rely on navigation to reach success, and autonomy of on-board navigation systems and sensors is desired to reach new frontiers of space exploration. From the technology side, optical frame cameras, LiDAR and inertial technologies are selected to cover the requirements of such missions. From the processing side, image processing techniques are developed for vision-based relative and absolute navigation, based on point extraction and matching from camera images, and crater detection and matching in camera and LiDAR images. The current paper addresses the challenges of space navigation, presents the current developments and preliminary results, and describes payload elements to be integrated in an Unmanned Aerial Vehicle (UAV) for in-flight testing of systems and algorithms. Again, UAVs are key enablers of scientific capabilities, in this case, to bridge the gap between laboratory simulation and expensive, real space missions.

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