

# Technical Guidelines for Small Island Mapping with UAVs

© 2019 International Bank for Reconstruction and Development / International Development Association or The World Bank

1818 H Street NW, Washington DC, 20433 [www.worldbank.org](http://www.worldbank.org)

This work is a product of independent consultants working in collaboration with The World Bank and Humanitarian OpenStreetMap Team. Part of the funding that supported this work was provided by the Australian Department of Foreign Affairs and Trade (DFAT) through the Pacific Humanitarian Challenge. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent. The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

## Rights & Permissions

The World Bank and Humanitarian OpenStreetMap Team support the free online communication and exchange of knowledge as the most effective way of ensuring that the fruits of research, economic and sector work, and development practice are made widely available, read, and built upon. It is therefore committed to open access, which, for authors, enables the widest possible dissemination of their findings and, for researchers, readers, and users, increases their ability to discover pertinent information. The material in this work is made available under a Creative Commons BY 4.0 License. You are encouraged to share and adapt this content for any purpose, including commercial use, as long as full attribution to this work is given.

Any queries on rights and licenses, including subsidiary rights, should be addressed to the Office of the Publisher, The World Bank, 1818 H Street NW, Washington, DC 20433, USA; fax: 202- 522-2422; e-mail: [pubrights@worldbank.org](mailto:pubrights@worldbank.org).

## Attribution

Please cite the work as follows: World Bank and Humanitarian OpenStreetMap Team (2019). *Technical Guidelines for Small Island Mapping with UAVs*. Washington, DC. License: Creative Commons Attribution CC BY 4.0. **Table of Contents**

## Abbreviations

2D two-dimensional

ADS-B Automatic Dependent Surveillance–Broadcast

AGL above ground level

AOI area of interest

AT automatic triangulation

ATC air traffic control

CAA Civil Aviation Authority

CV computer vision

DSLR digital single-lens reflex

DSM digital surface model

DTM digital terrain model  
EXIF exchangeable image file format  
GCP ground control point  
GeoTIFF Georeferenced Tagged Image File Format  
GIS geographic information system  
GPS Global Positioning System  
GPU graphics processing unit  
HOT Humanitarian OpenStreetMap Team  
IMU inertial measurement unit  
LiDAR Light Detection and Ranging  
LiPo lithium polymer  
NIR near infrared  
NOTAM Notice to Airmen  
OAM OpenAerialMap  
OSM OpenStreetMap  
PacDID Pacific Drone Imagery Dashboard  
PIC Pacific Island Country  
PPK Post-Processed Kinematic  
RGB red-green-blue  
RTK Real-Time Kinematic  
SfM Structure from Motion  
SIDS Small Island Developing States  
SSD solid-state drive  
UAV unmanned aerial vehicle  
UAViators Humanitarian UAV Network  
Acknowledgments

This document was prepared by Cristiano Giovando, Patrick Meier, Joseph Mulhausen, and Denise Soesilo, with oversight from Keiko Saito and Michael Bonte-Grapentin. V-TOL Aerospace provided substantial inputs based on field work carried out in Tonga and Fiji.