

FAIR UAV Metadata for a reproducible workflow: Leveraging GeoNetwork Opensource

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GeoGeeks - 10/04/2024



About myself



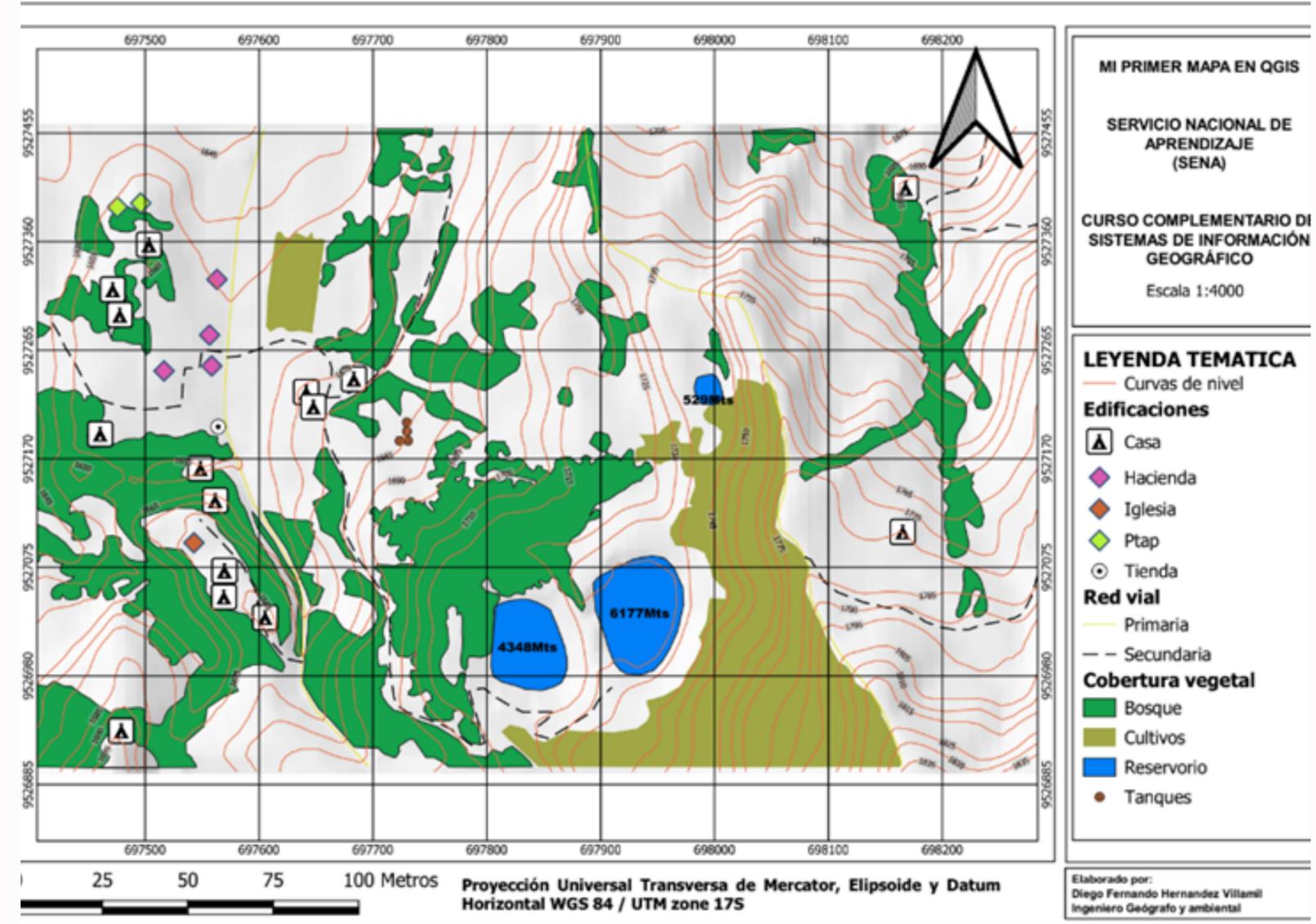
GAIA RESOURCES
ENVIRONMENTAL
TECHNOLOGY
CONSULTANTS



Curtin University

About myself

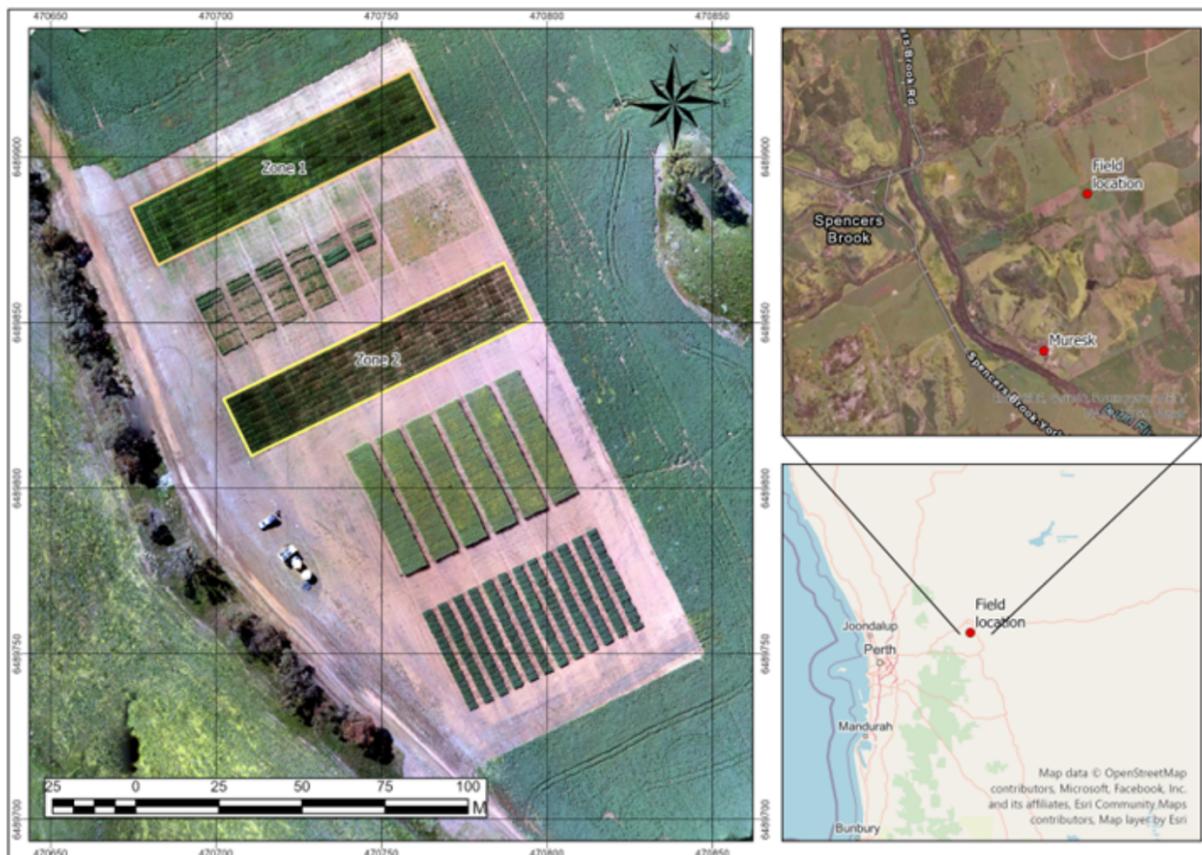
My experiences working with Drones



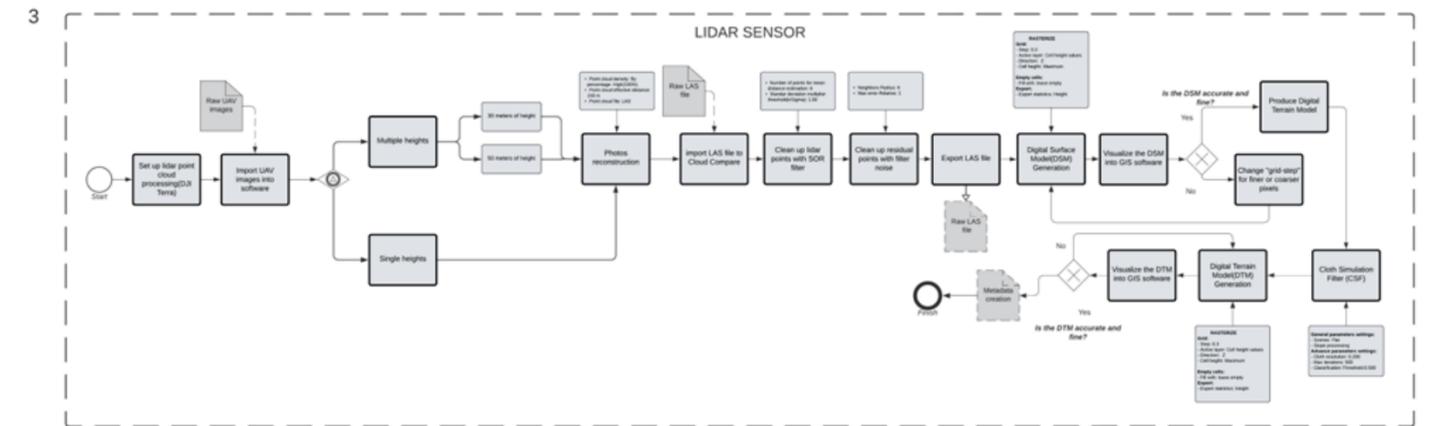
My First map using QGIS

Research project

STUDY AREA



DEVELOPMENT REPRODUCIBLE WORKFLOWS



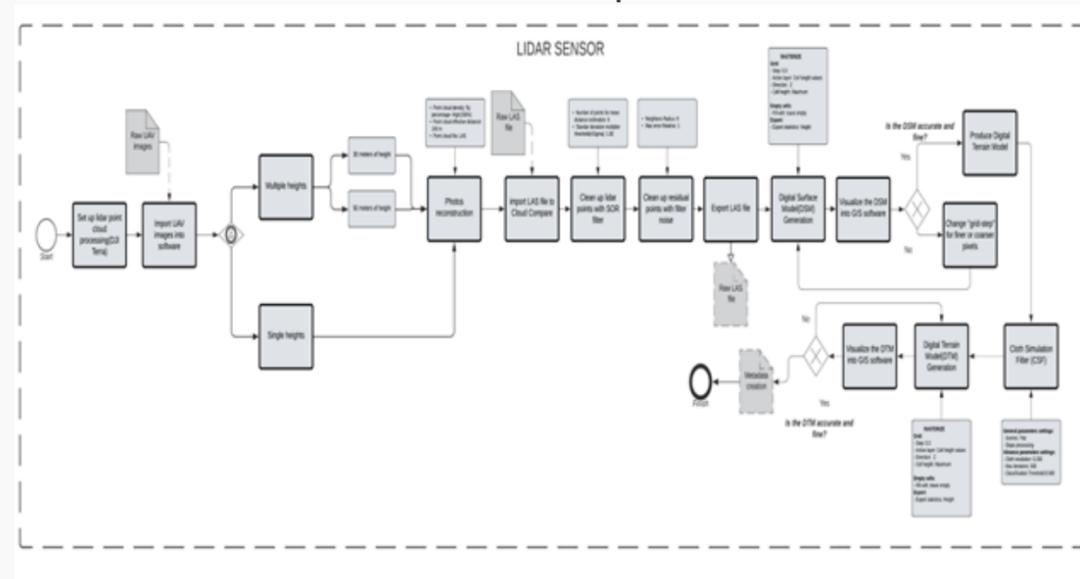
Instruments



FLIGHT 1	FLIGHT 2	FLIGHT 3	FLIGHT 4
11-Aug-23	8-Sep-23	29-Sep-23	13-Oct-23

The importance of constructing reproducible workflows

Workflow example



Workflow addressed by

Findable
Accessible
Interoperable
Reusable

ISO 19115-1:2014
Geographic information
Metadata
Part 1: Fundamentals

Metadata creation

Thermal Processed Data: Flight 4 Muresk, Western Australia (13-Oct-23)

This drone data contains the Thermal data regarding the drone flight conducted in Muresk, Western Australia, on October 13 2023. The data was collected using a DJI Matrice 200 v2, equipped with the Zenmuse XT2. The orthomosaic contains a single thermal band.

Keywords: Thermal, Thermal Data

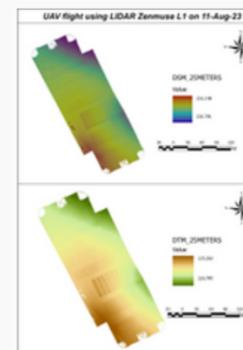
Identification info

Data identification

Citation

- Date (Publication): 21-03-2024
- Edition: 1.0
- Edition date: 2024-03-21T00:00:00
- Citation Identifier: Hernandez et al., 2024

Datasets

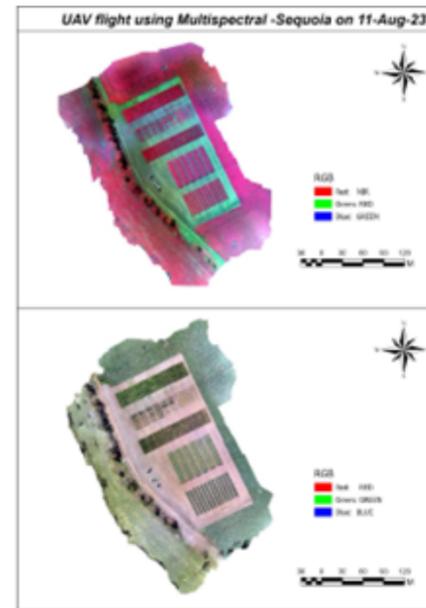


How do we construct a reproducible workflow?

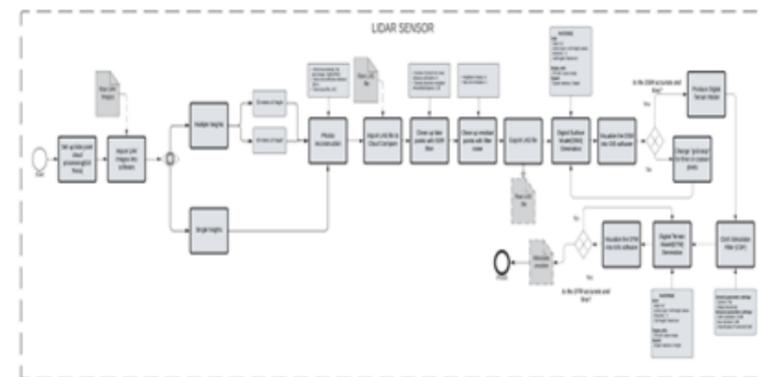
1. FAIR PRINCIPLES



Datasets

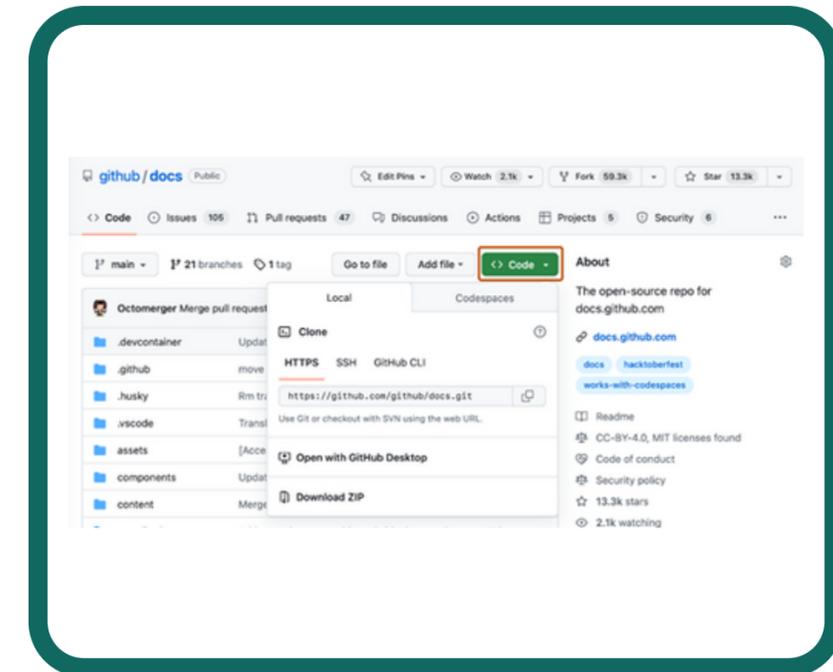


Workflows models



2. WEB ACCESSIBLE

Repositories



GeoNetwork and its significant role in this research

ISO STANDARD

ISO 19115-1:2014	
Class	Attribute Name
Identification information	Citation
	Title
	Abstract
	Point of Contact
	Resource Maintenance
	Date
	Identifier
	Resource Constraints
	Descriptive keywords
Spatial Representation Information	Spatial resolution
	Topic category
	Extent
	Temporal extent
Reference System Information	Geographic Extent (Geographic bounding box)
	Reference system identifier
	Coordinate system
	Codespace
	Version
Data Quality information	Authority
	Lineage
Distribution Information	Data quality scope
	Distribution format
	Distribution contact
	Online resource
Content information	Transfer options
	Coverage description
	Feature catalog description
Portrayal catalogue information	Image description
Application Schema info	portrayal catalogue info
	Citation
	Schema language
	Constraint language
	Schema ASCII
	Graphics file
	Software development file
	Software development file format
	Maintenance and update frequency
	Date of next update
User-defined maintenance frequency	
Maintenance information	Update scope
	Update scope description
	Maintenance note
	Contact
Constraint information	Legal constraints
	Use Limitations
	Security constraints
Metadata extension information	MD_MetadataExtensionInformation
	Metadata standard name
	Metadata standard version

19115-2:2019	
Class	Attribute Name
Acquisition information	MI_AcquisitionInformation
Instrument	MI_Instrument
	Type
Platform	Description
Platform	MI_platform
	Type
Platform	Description
acquisition plan	ML_AcquisitionPlan
	Type
Objective	Status
	MI_Objective
Objective	Type
	Function
Operation	MI_Operation
	Description
Operation	Status
Environmental conditions	MI_EnvironmentalRecord

METADATA CONSTRUCTION

The screenshot displays the GeoNetwork metadata construction interface. It features two main panels for editing metadata fields:

- Platform Panel:** Contains fields for Citation, Platform, Identifier, Authority, Code (DJI Matrice 200 V2), Codespace, Version, and Description.
- Identifier Panel:** Contains fields for Identifier, Authority, Code (Multispectral-CAMERA), Codespace, Version, and Description.

The right sidebar includes sections for:

- Validation:** A dropdown menu to check metadata validity.
- Associated resources:** A section to add or manage resources, showing an entry for "MULTISPECTRAL DATA FLIGHT 1/11-08-2023" with a "REPOSITORY LINK BY REQUEST" note.
- Suggestions:** A section for finding related metadata records.

At the bottom, there are navigation buttons for back, forward, and home.

Raw Dataset metadata

My GeoNetwork catalogue Search Map Contribute Admin console admin admin ADMINISTRATOR English

Back to search Edit Delete Manage record Download Display mode

Multispectral Raw Data: Flight 1 Muresk, Western Australia (11-Aug-23)

This drone data contains the raw Multispectral data regarding the drone flight conducted in Muresk, Western Australia, on August 11 2023. The data was collected using a DJI Matrice 200 v2, equipped with the Parrot Micasense Sequoia. The raw data contains the images in each band such as Green, Red, Red Edge, Near Infrared and RGB. Also, the raw data has the calibration files.

Identification Content Distribution Quality Lineage Ref. system
Acquisition info Metadata Portrayal Md. constraints Md. maintenance
Schema info

Identification info

Data identification

Citation

- Date (Publication)**
21-03-2024
- Edition**

Spatial extent

Keywords: Crop diseases, FAIR data, MULTISPECTRAL RAW DATA, Multispectral, Reproducible Workflow

Provided by: Access to the catalogue
Read here the full details and access to the data.

Associated resources

Powered by GeoNetwork 4.2.8.0 About Github API



Workflow metadata

Workflow of Multispectral data processing

The present model explains the steps to process Multispectral information, aiming at obtaining the Orthomosaic product. Importantly, some relevant steps are conducted such as reflectance calibration, and GCP points placement. The parameters of the workflow for each step are specified through the use of "mri.rationale".

Identification Content Distribution Lineage Acquisition info Metadata
Md. constraints Md. maintenance Schema info

Resource lineage

Lineage

- Statement**
The raw Multispectral data is acquired by flying the DJI Matrice 200 at an altitude of 30 meters over the study area, maintaining a flight speed of 3.4 m/s, with a side overlap of 75% and a forward overlap of 70%.
- Process step**
 - Description**
Set up image processing software (Agisoft)
- Process step**
- Process step (imagery)**
 - Description**
Import multiple bands into Agisoft
- Source (imagery)**
 - Description**
Raw Multispectral UAV images

Spatial extent

Keywords: Crop diseases, FAIR data, Raw Multispectral data, Reproducible Workflow

Provided by: Access to the catalogue
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Associated resources

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An aerial photograph of a lush green tropical forest. In the lower-left quadrant, a small cluster of buildings with brown and yellow roofs is situated near a dirt road. A winding dirt road cuts through the forest, leading towards a larger, more complex structure in the lower-right. The forest is dense with various shades of green, and a small stream or path is visible in the upper-left. The image is overlaid with several bright green circular and semi-circular graphic elements: a large semi-circle in the top-left, a smaller circle on the left, and several overlapping circles and a semi-circle on the right side.

**THANKS FOR YOUR
ATTENTION**

Any questions?