Czech University of Life Sciences Prague

Faculty of Forestry and Wood Sciences

Department of Forest Management and Remote Sensing

Integrace Technologie UAV pro Udržitelné Lesní Hospodaření v Zambijském Lesnictví

Master thesis

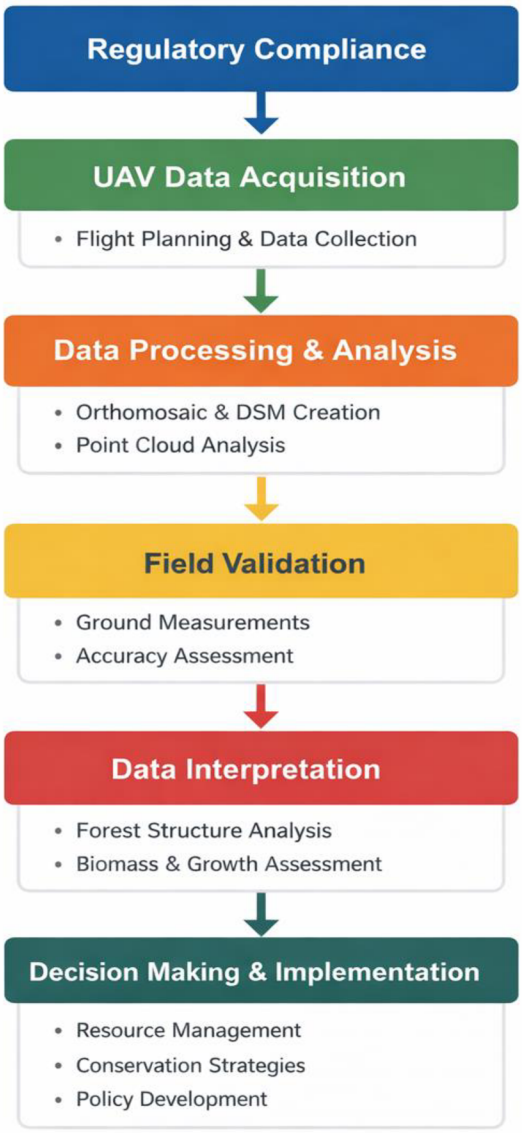
Author of thesis: Oze Makukula

Advisor: doc. Ing. Peter Surový, Ph.D

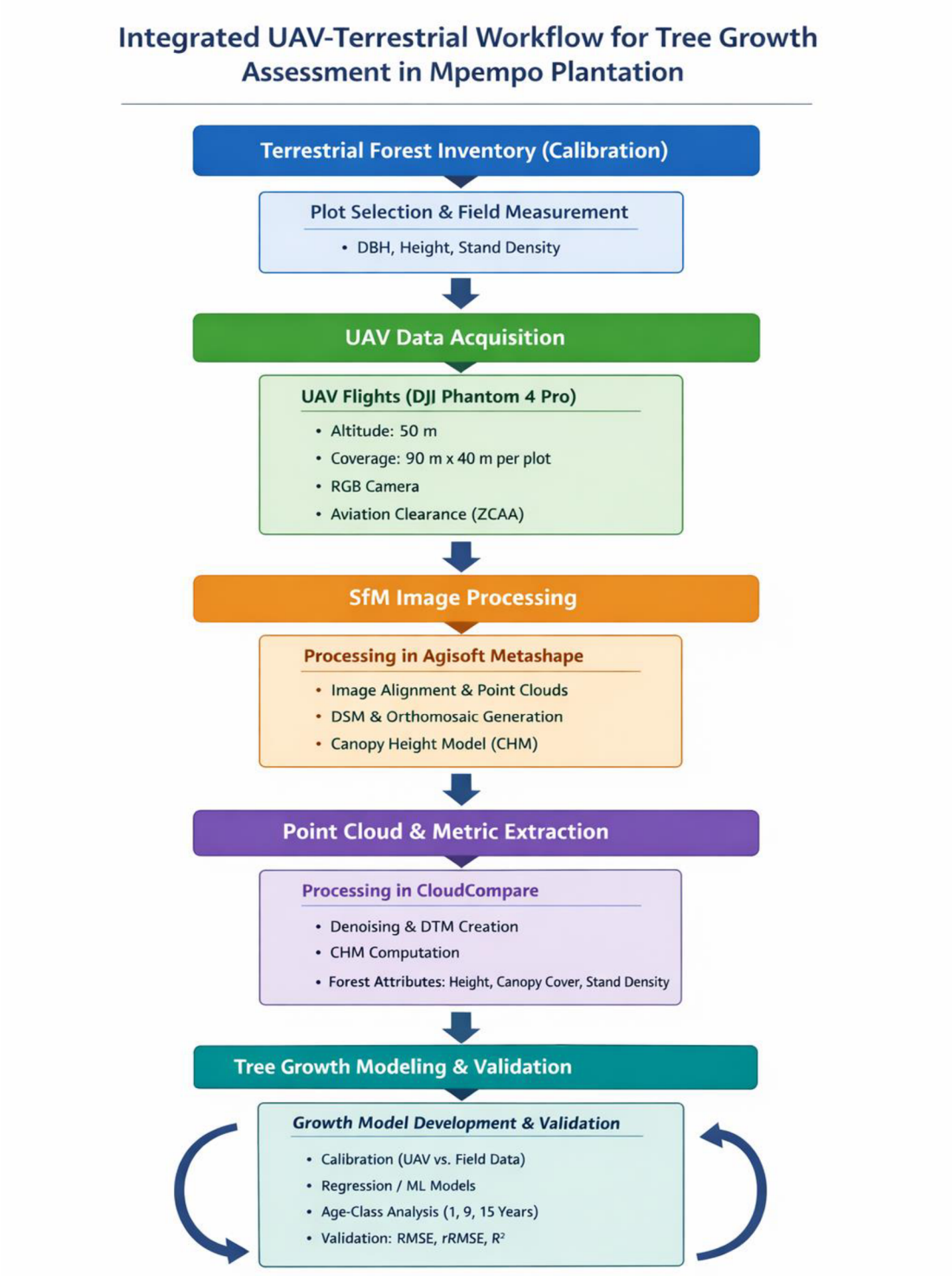
2026

Appendices

Annex I: Proposed framework for the integration of UAV technology in forest management in Zambia



Annex II: Workflow for tree Growth Assessment in Study Site



Annex III: Field Inventory – Based Results

Plot 1

Plot:1		tree	height
Spon: 2x2		1	0.46
Mortality:47%			
age: 1-2			

Plot 2

Plot 2		tree	height	diameter	volume				dg	11.74914		michajlov	
age: 9		1	8.3	13.1	0.044748	8.086025	-0.21398		hs	7.816655		a	9.651856
1 are		2	9	12.8	0.046325	8.030225	-0.96977					b	4.614932
basal area: 6,5		3	7	8.6	0.016265	6.943645	-0.05635						
		4	8.5	12.6	0.042395	7.991819	-0.50818						
		5	6	6	0.006786	5.772712	-0.22729						
		6	6.5	10.2	0.021245	7.43927	0.93927						
		7	8.5	13.8	0.050854	8.208378	-0.29162						
		8	7.3	11.8	0.031933	7.827697	0.527697						
		9	7.5	14.3	0.048182	8.28963	0.78963						

Plot 3

Plot 3		tree	height	diameter	Volume			dg	19.25409			michajlov	
age: 12		1	17.5	17.2	0.162647	15.47778	-2.02222	hs	15.47778			a	14.17778
1 are		2	18.5	19.7	0.225556	15.47778	-3.02222					b	0
basal area: 15		3	16	15.9	0.127076	15.47778	-0.52222						
		4	16.5	23	0.274214	15.47778	-1.02222						
		5	13.5	19	0.153106	15.47778	1.977778						
		6	16.5	18.3	0.173595	15.47778	-1.02222						
		7	14	22	0.212874	15.47778	1.477778						
		8	13	19.7	0.158499	15.47778	2.477778						
		9	13.8	17.4	0.131259	15.47778	1.677778						

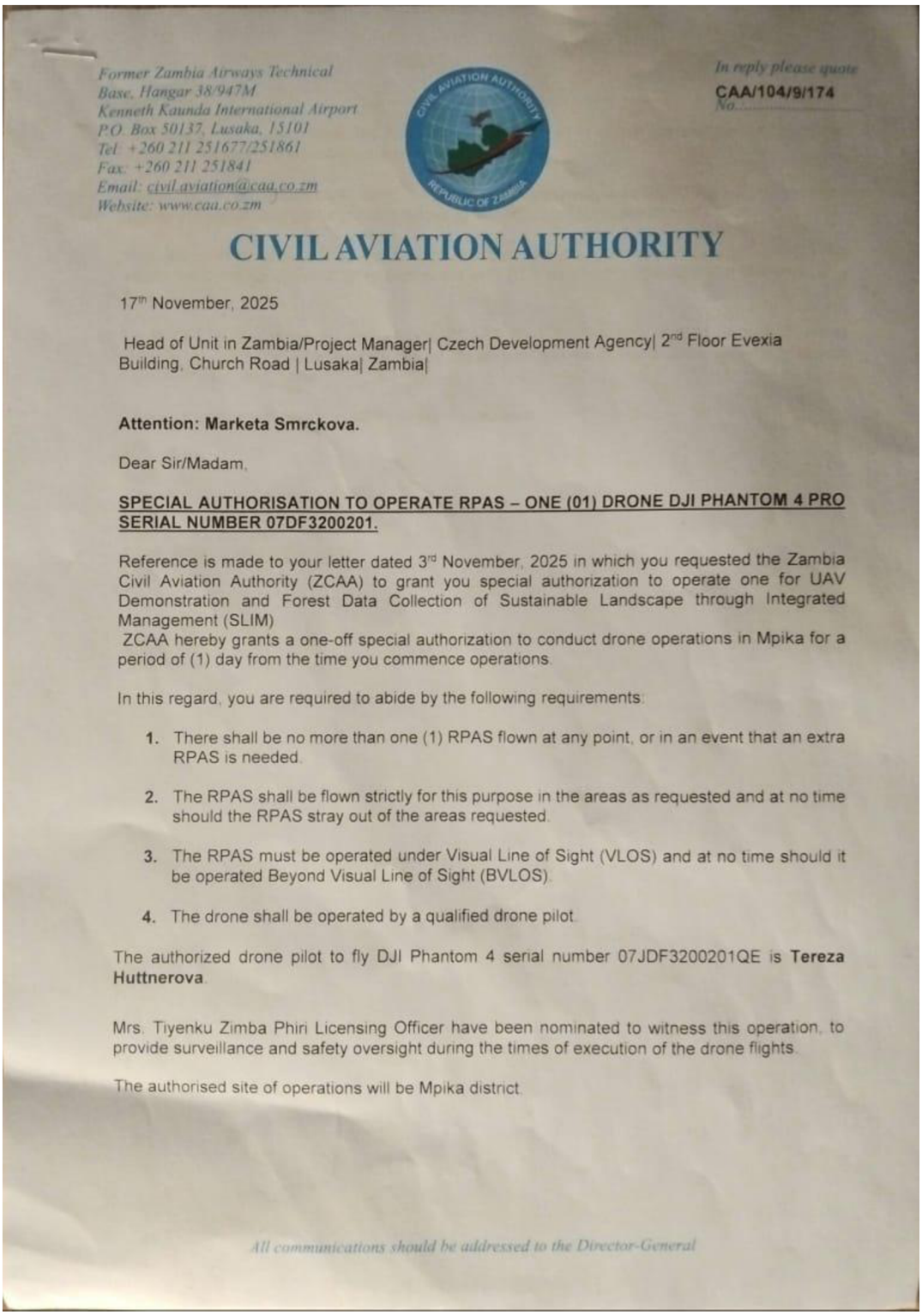
Plot 4

Plot 4		tree	height	diameter	volume							michajlov	
age:15-16		1	13	19.5	0.155297	13.65514	0.655139		dg	18.18758		a	15.3829
1 are		2	14.5	19.5	0.173216	13.65514	-0.84486		hs	13.46126		b	4.274102
basal area: 23		3	14.5	18.8	0.161003	13.55472	-0.94528						
		4	15	23.4	0.258032	14.11483	-0.88517						
		5	10.5	12	0.047501	12.07342	1.573416						
		6	11	18.8	0.12214	13.55472	2.554718						
		7	12	21	0.166253	13.85009	1.850094						
		8	10.5	7.9	0.020587	10.25517	-0.24483						
		9	15.3	15.2	0.111053	12.91231	-2.38769						
		10	14	17.2	0.130117	13.29827	-0.70173						
		11	14.5	21.2	0.204734	13.87421	-0.62579						

Plot 5

Plot 5		tree	height	diameter	Volume							michajlov	
age: 18-19		1	16.5	19.5	0.197107	14.96395	-1.53605		dg	19.14497		a	14.71899
1 are		2	14.8	13.3	0.082246	14.4983	-0.3017		hs	14.94511		b	1.450369
basal area: 26		3	16.8	17.4	0.159793	14.84184	-1.95816						
		4	14.5	19	0.164447	14.93723	0.437227						
		5	14.3	21.9	0.215464	15.07577	0.775775						
		6	15.8	21.9	0.238065	15.07577	-0.72423						
		7	13.8	13.2	0.07554	14.4874	0.687403						
		8	15.3	22.4	0.241178	15.09615	-0.20385						
		9	14.3	20.9	0.196236	15.03219	0.732192						
		10	14.3	20.1	0.181501	14.99432	0.694316						
		11	13.5	18.3	0.142032	14.89746	1.397465						

Annex IV: ZCAA Letter of Authorization to operate UAV



Former Zambia Airways Technical
Base, Hangar 38/947M
Kenneth Kaunda International Airport
P.O. Box 50137, Lusaka, 15101
Tel: +260 211 251677/251861
Fax: +260 211 251841
Email: civil.aviation@caa.co.zm
Website: www.caa.co.zm

In reply please quote
CAA/104/9/174
No.....

CIVIL AVIATION AUTHORITY

17th November, 2025

Head of Unit in Zambia/Project Manager| Czech Development Agency| 2nd Floor Evexia Building, Church Road | Lusaka| Zambia|

Attention: Marketa Smrckova.

Dear Sir/Madam,

SPECIAL AUTHORISATION TO OPERATE RPAS – ONE (01) DRONE DJI PHANTOM 4 PRO SERIAL NUMBER 07DF3200201.

Reference is made to your letter dated 3rd November, 2025 in which you requested the Zambia Civil Aviation Authority (ZCAA) to grant you special authorization to operate one for UAV Demonstration and Forest Data Collection of Sustainable Landscape through Integrated Management (SLIM)

ZCAA hereby grants a one-off special authorization to conduct drone operations in Mpika for a period of (1) day from the time you commence operations.

In this regard, you are required to abide by the following requirements:

1. There shall be no more than one (1) RPAS flown at any point, or in an event that an extra RPAS is needed.
2. The RPAS shall be flown strictly for this purpose in the areas as requested and at no time should the RPAS stray out of the areas requested.
3. The RPAS must be operated under Visual Line of Sight (VLOS) and at no time should it be operated Beyond Visual Line of Sight (BVLOS).
4. The drone shall be operated by a qualified drone pilot.

The authorized drone pilot to fly DJI Phantom 4 serial number 07JDF3200201QE is **Tereza Huttnerova**.

Mrs. Tiyenku Zimba Phiri Licensing Officer have been nominated to witness this operation, to provide surveillance and safety oversight during the times of execution of the drone flights.

The authorised site of operations will be Mpika district.

All communications should be addressed to the Director-General