

LAMPIRAN

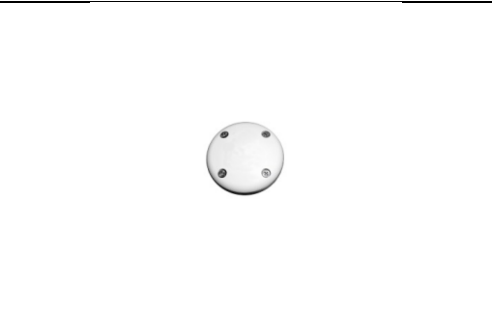
Lampiran A

Konfigurasi wahana terbang LiDAR

Lampiran A

Tabel Konfigurasi wahana terbang LiDAR

Nama instrumen	Jenis/type	Gambar
Wahana terbang	Piatu Porter PC6	
<i>Laser scanner</i>	Leica ALS70	
Kamera	Leica RCD30 (lensa: NAG-D 50 mm)	
<i>GNSS Base Station</i>	Trimble R7	

IMU	Honeywell CUS6-Micro IRS	
GNSS <i>Airborne Antena</i>	NovAtel L1/L2	

Lampiran B

Metadata citra satelit Pleiades

Lampiran B

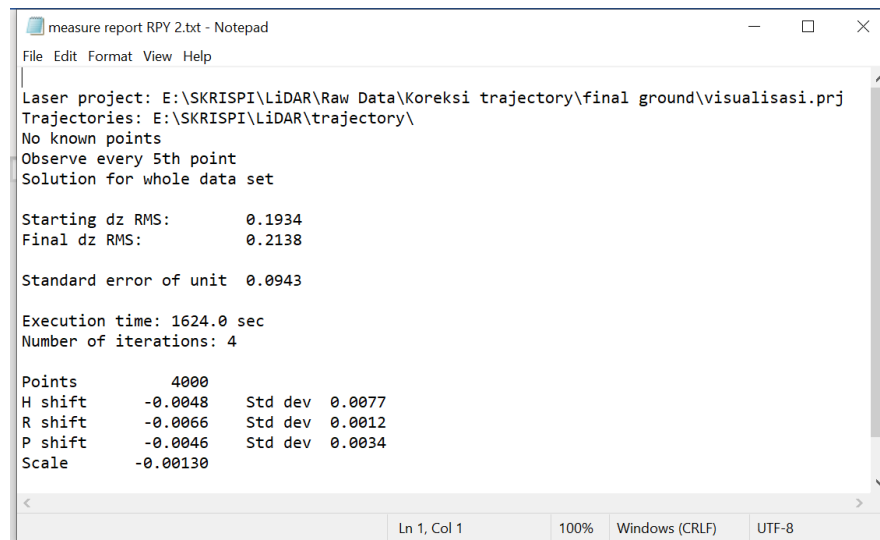
Tabel Metadata citra satelit Pleiades

ID katalog LAPAN	DS_PHR1A_201308180241399_SE1_PX_E119S06_0623_01804
Deskripsi	Pleiades Fused Imagery (0,5 meter, 4 band, level ortho)
Waktu perekaman	2:41:39 AM, 18 Agustus 2013
Konstelasi satelit	Pleiades
<i>Incidence Angle</i>	28,35941754341278°
Produk	Pleiades PMS
Resolusi	0,5 meter
Satelit	Pleiades 1A
Azimuth matahari	49.17618338472431°
Elevasi matahari	62.15201610813742°

Lampiran C

Report hasil koreksi geometrik point cloud LiDAR

Lampiran C



```

measure report RPY 2.txt - Notepad
File Edit Format View Help

Laser project: E:\SKRISPI\LiDAR\Raw Data\Koreksi trajectory\final ground\visualisasi.prj
Trajectories: E:\SKRISPI\LiDAR\trajectory\
No known points
Observe every 5th point
Solution for whole data set

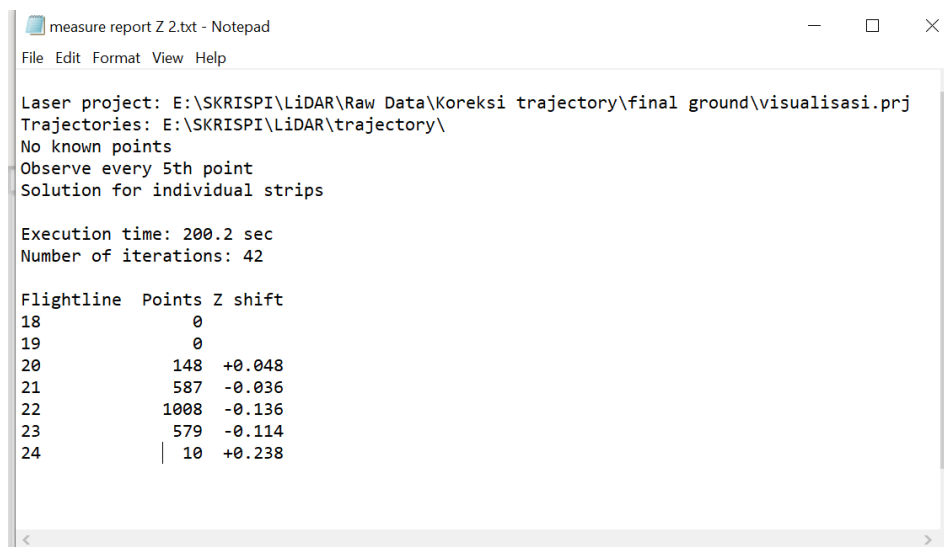
Starting dz RMS:      0.1934
Final dz RMS:        0.2138

Standard error of unit 0.0943

Execution time: 1624.0 sec
Number of iterations: 4

Points      4000
H shift     -0.0048   Std dev  0.0077
R shift     -0.0066   Std dev  0.0012
P shift     -0.0046   Std dev  0.0034
Scale       -0.00130
  
```

Report hasil perhitungan nilai koreksi orientasi wahana terbang



```

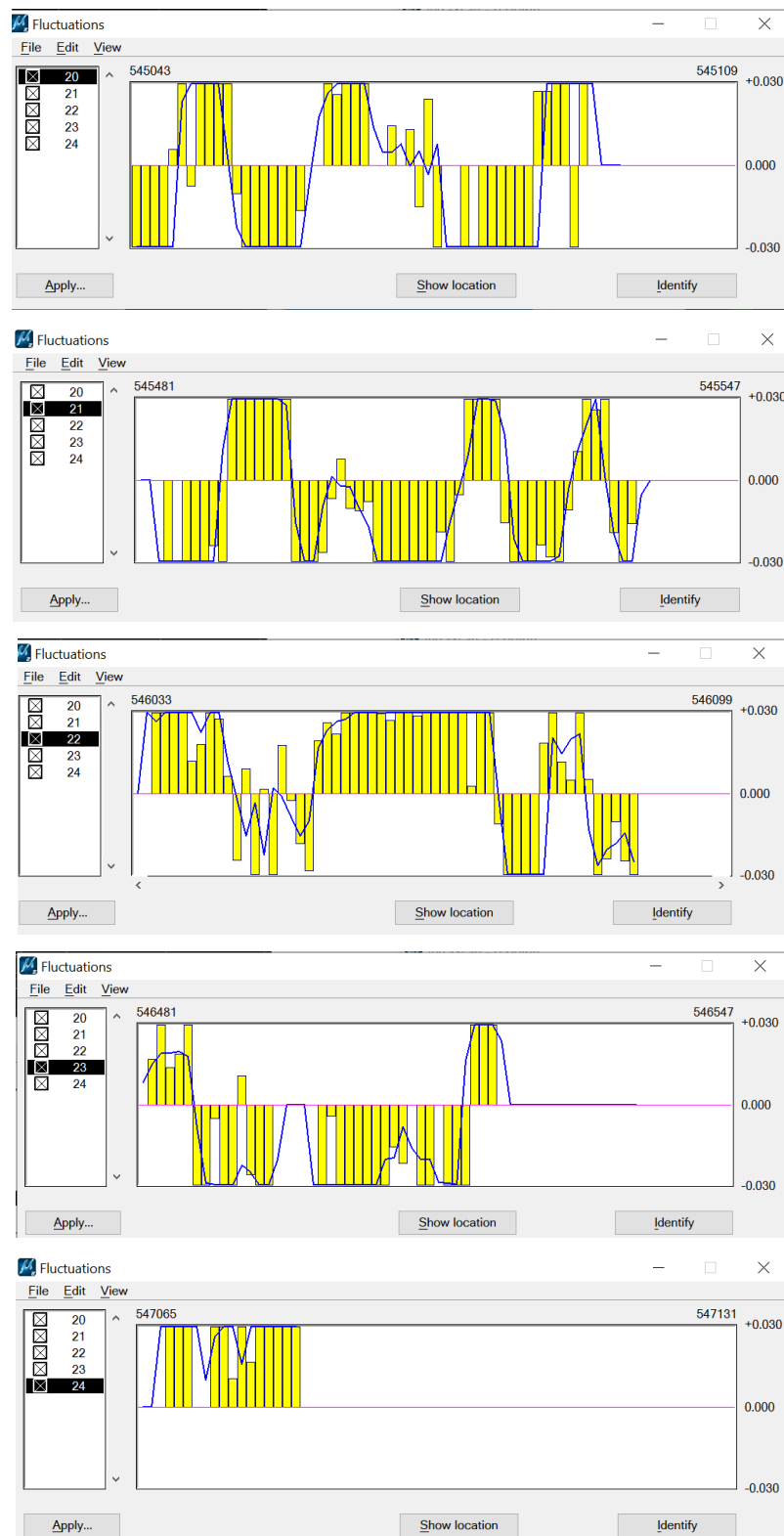
measure report Z 2.txt - Notepad
File Edit Format View Help

Laser project: E:\SKRISPI\LiDAR\Raw Data\Koreksi trajectory\final ground\visualisasi.prj
Trajectories: E:\SKRISPI\LiDAR\trajectory\
No known points
Observe every 5th point
Solution for individual strips

Execution time: 200.2 sec
Number of iterations: 42

Flightline  Points Z shift
18          0
19          0
20         148 +0.048
21         587 -0.036
22        1008 -0.136
23         579 -0.114
24          10 +0.238
  
```

Report hasil perhitungan nilai koreksi elevasi wahana terbang

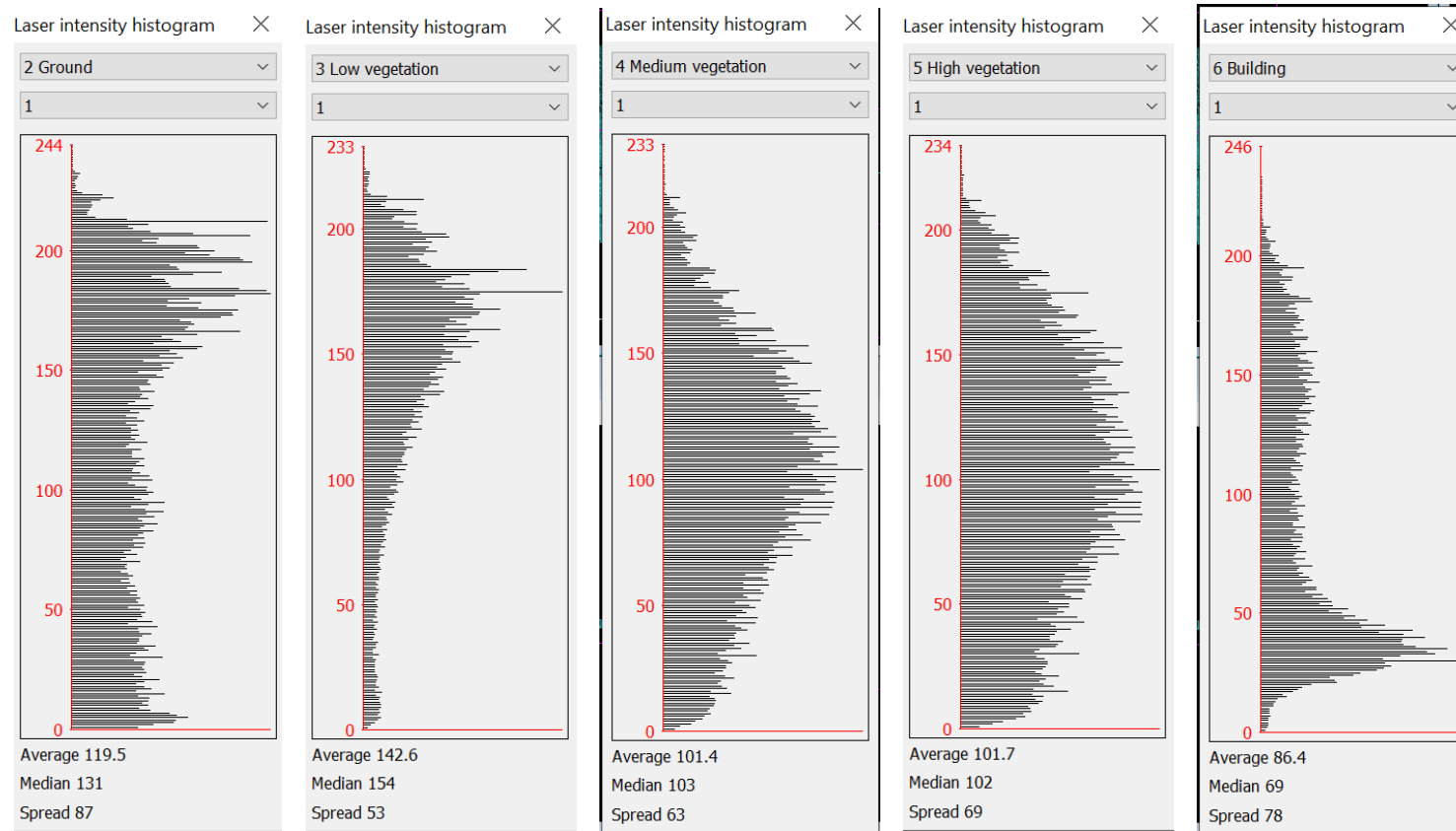


Grafik fluktuasi wahana terbang di setiap *flightline*

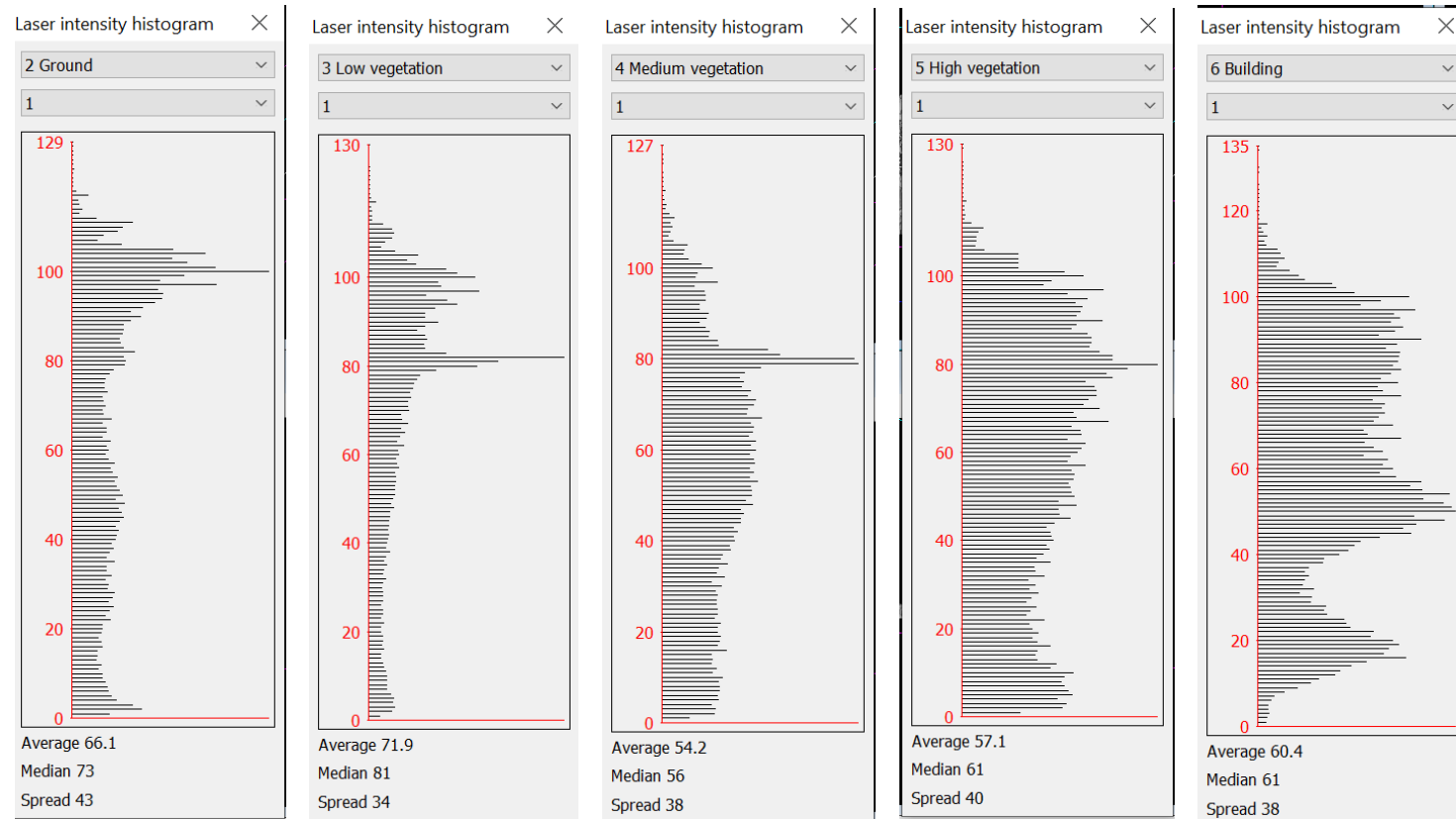
Lampiran D

Histogram distribusi nilai intensitas per jalur terbang

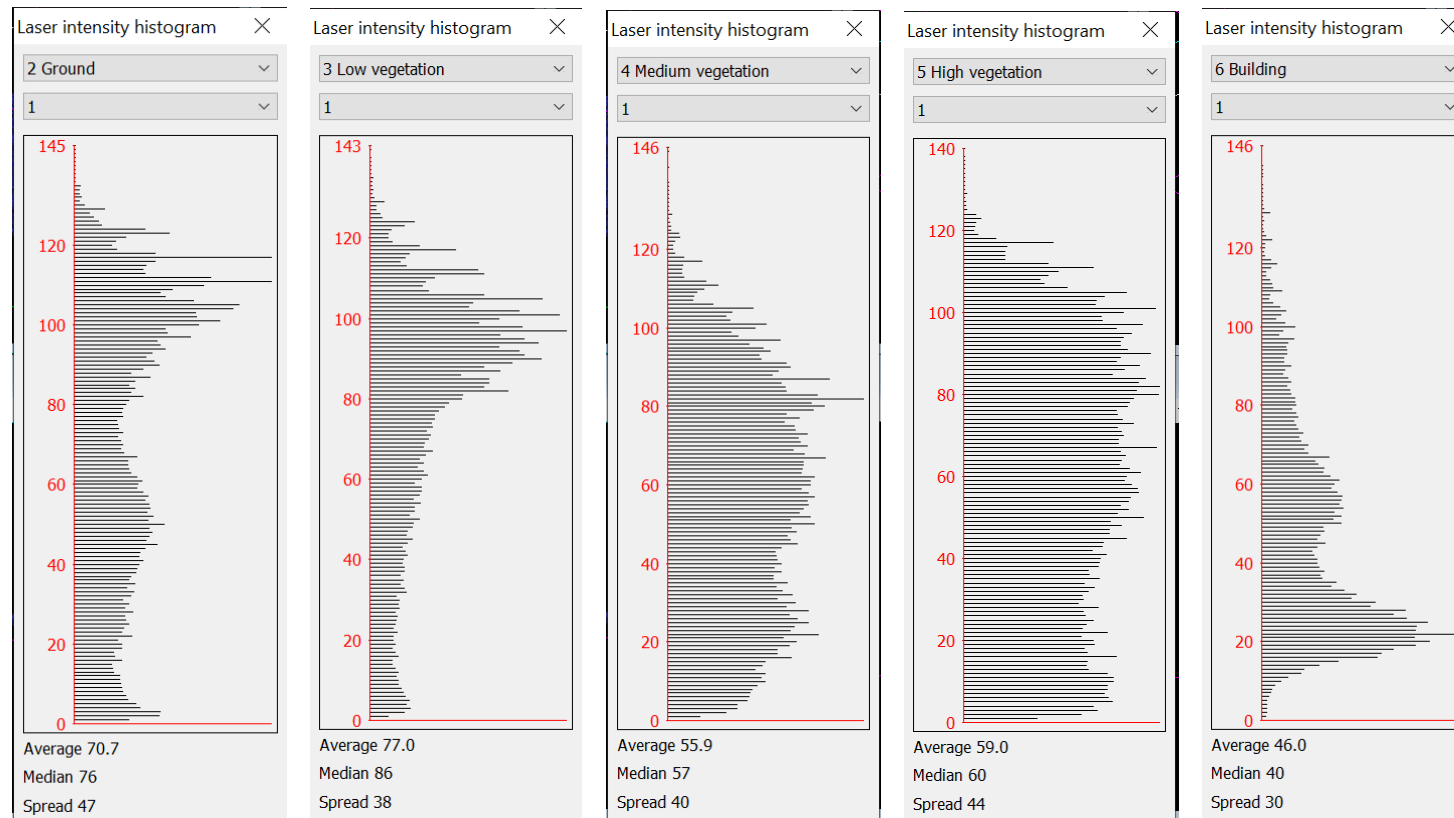
Lampiran D



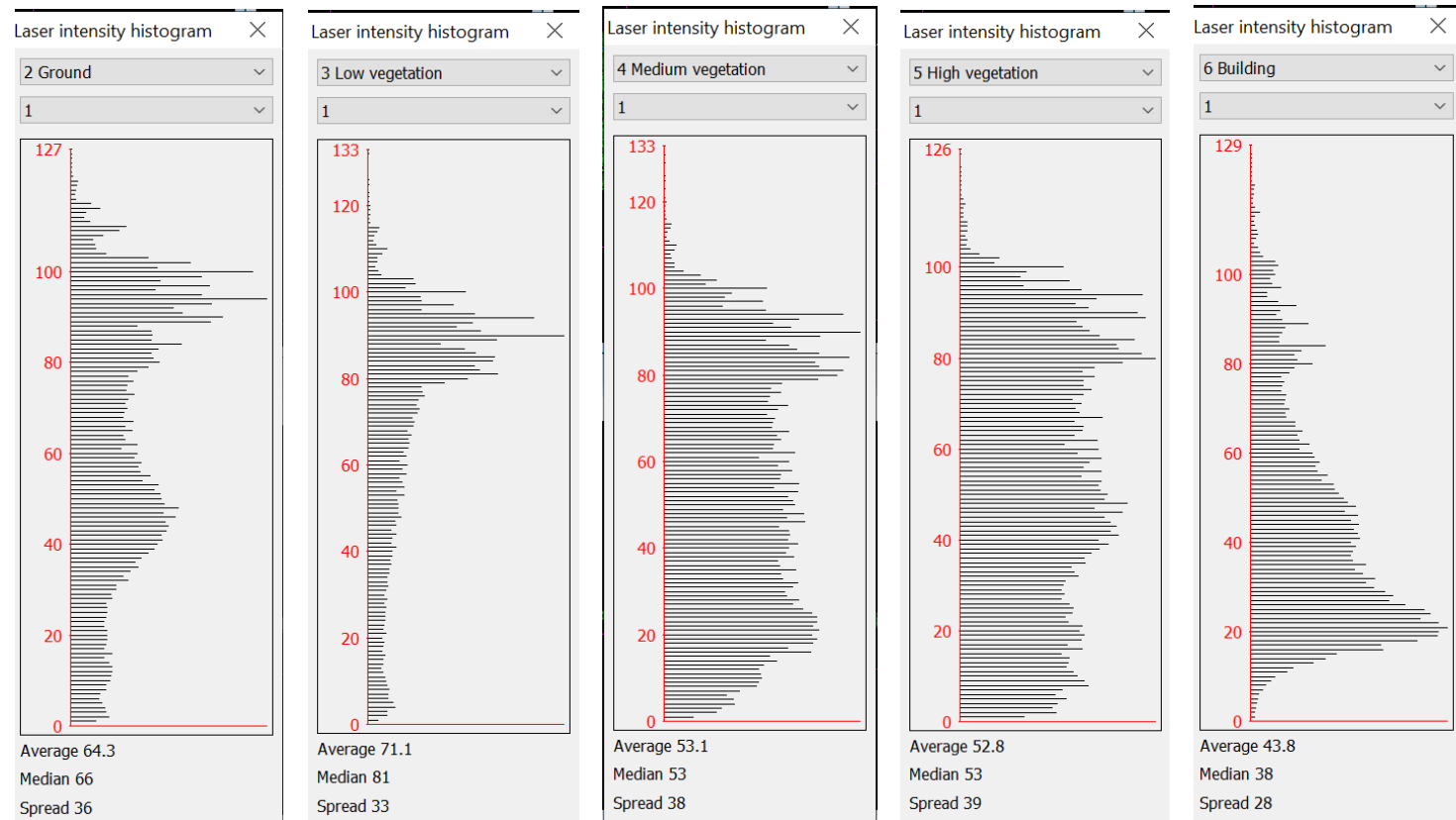
Histogram distribusi nilai intensitas terhadap kelas *point cloud flightline 20*



Histogram distribusi nilai intensitas terhadap kelas *point cloud flightline 21*



Histogram distribusi nilai intensitas terhadap kelas *point cloud flightline 22*



Histogram distribusi nilai intensitas terhadap kelas *point cloud flightline 23*

Lampiran E

Tabel titik-titik *georeference* citra intensitas

Lampiran E

Link



Total RMS Error:

Forward:0,193446

	Link	X Source	Y Source	X Map	Y Map	Residual_x	Residual_y	Residual
☒	1	5088,977...	-627,247...	776073,4...	9433018,...	-0,141591	0,0691486	0,157574
☒	2	3544,662...	-468,313...	775345,2...	9433092,...	0,158261	-0,0579...	0,168535
☒	3	5423,802...	-1428,48...	776232,1...	9432640,...	0,0943232	-0,0765...	0,12147
☒	4	3715,519...	-1280,24...	775425,8...	9432709,...	-0,28698	-0,0100...	0,287157
☒	5	4058,601...	-1405,57...	775588,2...	9432650,...	0,175987	0,0754227	0,191468

☒ Auto Adjust

Transformation:

1st Order Polynomial (Affine)

☐ Degrees Minutes Seconds

Forward Residual Unit : Unknown

Tabel titik-titik *georeference* citra intensitas line 20

Link □ ×



Total RMS Error:

Forward:0,110043

	Link	X Source	Y Source	X Map	Y Map	Residual_x	Residual_y	Residual
☒	1	1853,628...	-2335,42...	774558,3...	9431824,...	0,0828458	0,089925	0,12227
☒	2	2403,361...	-629,267...	774817,1...	9432629,...	-0,0389...	-0,0615...	0,0728359
☒	3	3855,530...	-411,406...	775502,1...	9432732,...	-0,0091...	0,0159976	0,0184357
☒	4	5764,447...	-1308,44...	776402,9...	9432308,...	0,0829869	0,0732743	0,110707
☒	5	4273,538...	-2326,34...	775699,7...	9431828,...	-0,117677	-0,117678	0,166421

☒ Auto Adjust

Transformation:

1st Order Polynomial (Affine)

☐ Degrees Minutes Seconds

Forward Residual Unit : Unknown

Tabel titik-titik *georeference* citra intensitas line 21

Link

Total RMS Error:

Forward:0,125706

	Link	X Source	Y Source	X Map	Y Map	Residual_x	Residual_y	Residual
☒	1	5299,525...	-119,409...	776218,6...	9432282,...	-0,0185...	-0,0682...	0,0707645
☒	2	4897,662...	-1768,50...	776029,3...	9431504,...	-0,078979	-0,028803	0,0840672
☒	3	3119,570...	-1829,31...	775190,8...	9431475,...	0,185284	0,117918	0,219624
☒	4	1056,526...	-2246,47...	774217,4...	9431278,...	-0,0877...	-0,0838...	0,121357
☒	5	3548,505...	-504,342...	775392,6...	9432100,...	2,96859...	0,0630317	0,0630317

☒ Auto Adjust

Transformation:

1st Order Polynomial (Affine)

Degrees Minutes Seconds

Forward Residual Unit : Unknown

Tabel titik-titik *georeference* citra intensitas line 22

Link



Total RMS Error:

Forward:0,268657

	Link	X Source	Y Source	X Map	Y Map	Residual_x	Residual_y	Residual
☒	1	5771,619...	-188,565...	776429,2...	9431768,...	0,0258468	0,330594	0,331602
☒	2	4829,480...	-1147,37...	775984,9...	9431315,...	-0,117486	-0,139083	0,182063
☒	3	1816,930...	-1608,06...	774564,3...	9431099,...	0,120552	0,0393187	0,126802
☒	4	637,5844...	-797,162...	774007,6...	9431481,...	-0,10339	0,166384	0,19589
☒	5	3559,514...	-248,279...	775385,9...	9431739,...	0,0744777	-0,397213	0,404135

☒ Auto Adjust

Transformation:

1st Order Polynomial (Affine)

☐ Degrees Minutes Seconds

Forward Residual Unit : Unknown

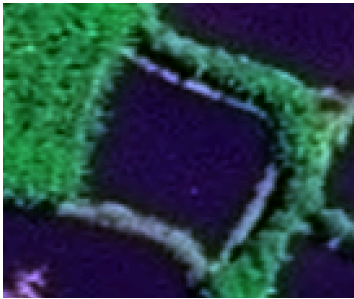
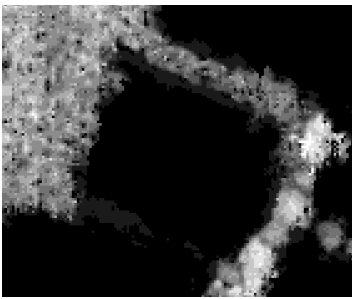
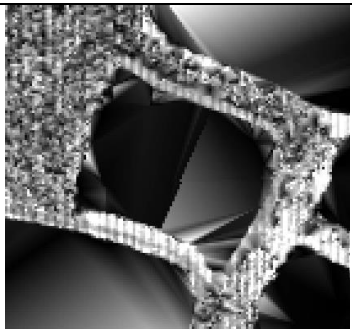
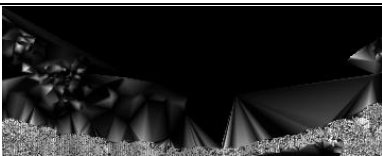
Tabel titik-titik *georeference* citra intensitas *line 23*

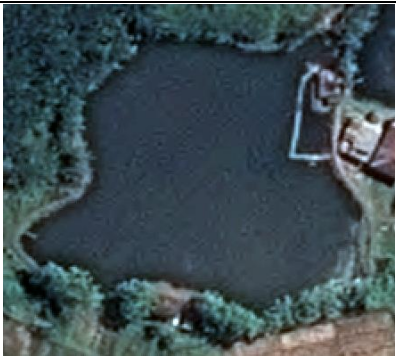
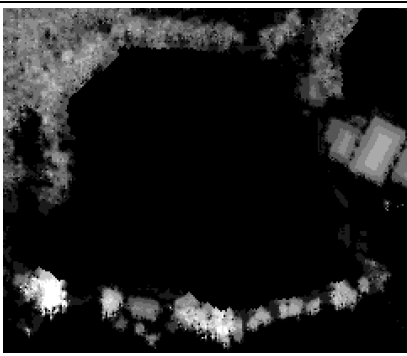
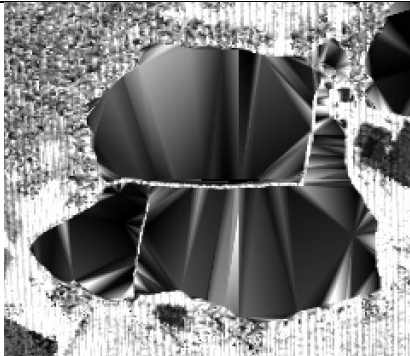
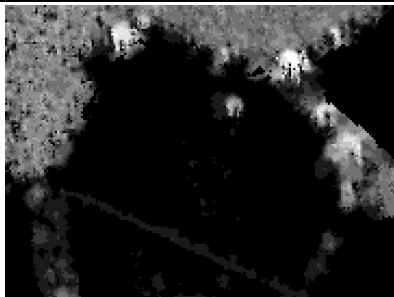
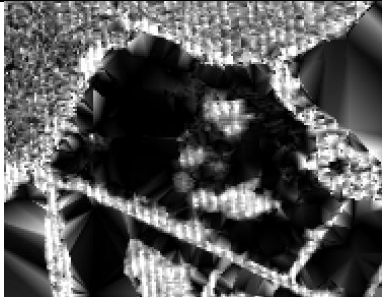
Lampiran F

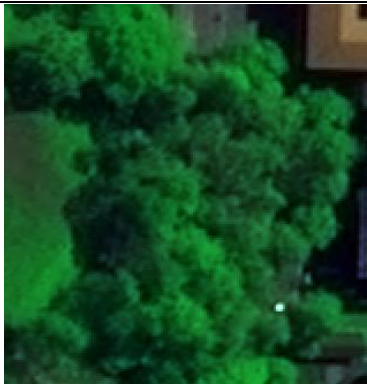
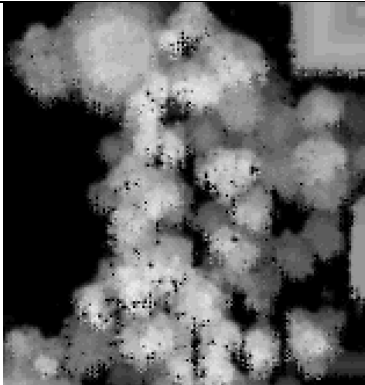
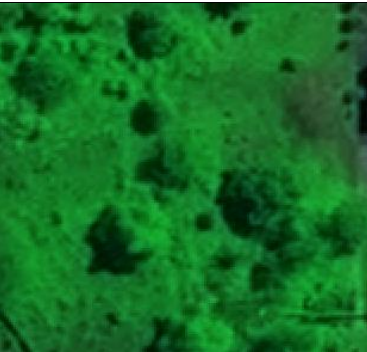
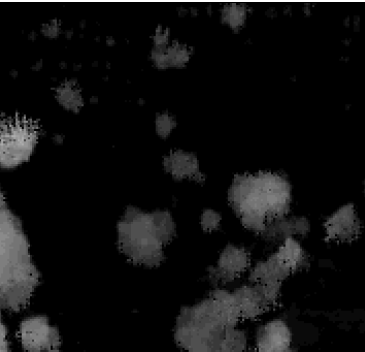
Tabel perbandingan karakteristik objek antarsensor

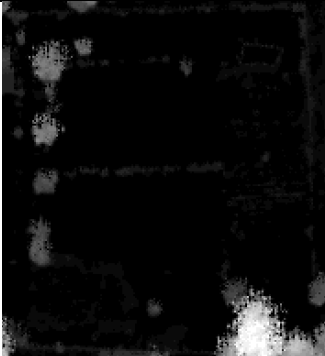
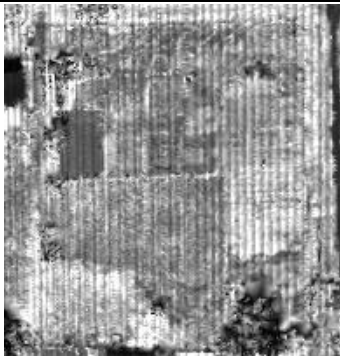
Lampiran F

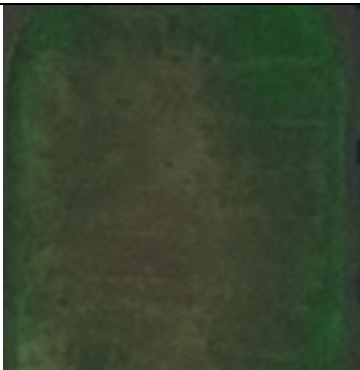
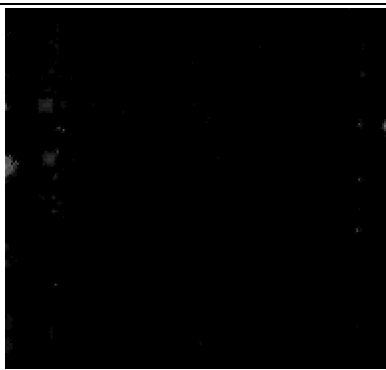
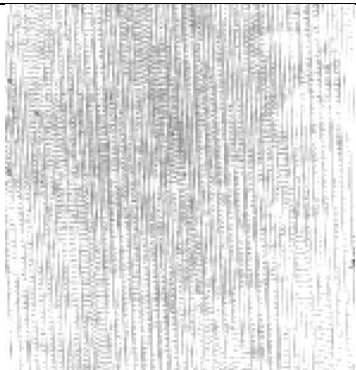
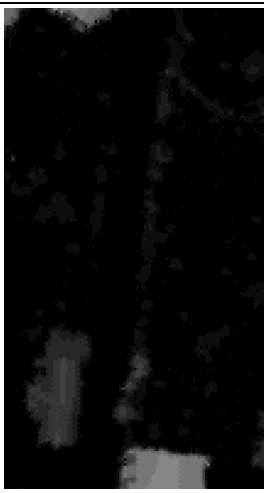
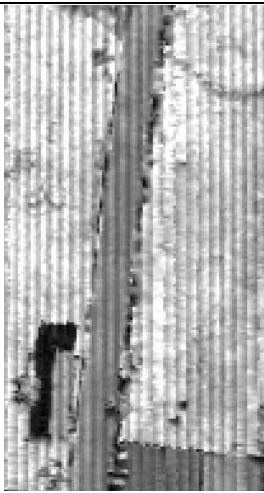
TABEL PERBANDINGAN KARAKTERISTIK KELAS OBJEK TUTUPAN LAHAN ANTARSENSOR

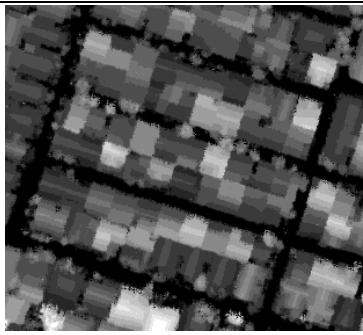
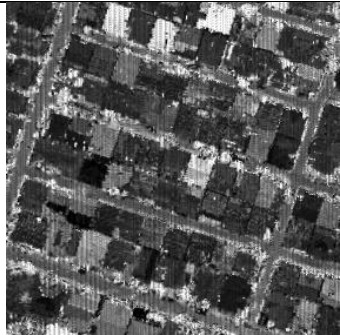
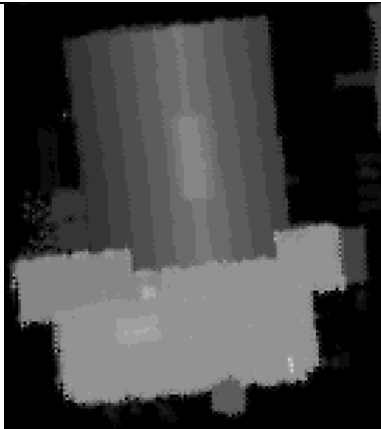
Kelas	Subkelas	Pleiades	nDSM	intensitas
Tubuh air	kolam			
	sungai			

	danau			
	rawa			

Vegetasi	pepohonan			
	semak			

	ladang			
	pekarangan			

Lahan terbuka	tanah kosong			
Lahan terbangun	jalan			

	bangunan / bangunan pemukiman			
	Bangunan imfrastruktur			

	permukaan diperkeras lain			
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Lampiran G

Skema klasifikasi penutup lahan dimensi spasial Danoedoro (2006)

Lampiran G

TABEL SKEMA KLASIFIKASI MULTIGUNA DIMENSI SPASIAL

	Tingkat I		Tingkat II		Tingkat III		Tingkat IV
S1	Water Bodies	S11	Sea	S111	open sea		
				S112	bay		
				S113	strait		
		S12	Lake	S121	inland lake	S1211	oxbow lake
						S1212	crater lake
						S1213	others
				S122	atol/lagoon		
		S13	River and channel	S131	river		
				S132	rivulet and channel	S1321	irrigation channel
						S1322	drainage network
						S1323	irrigation and drainage
						S1324	creek/rivulet
		S14	Pond	S141	coastal pond		
				S142	inland pond		
		S15	Other water bodies				
S2	Vegetation Structure and Composition	S21	Block coverages	S211	specifically shaped homogeneous	S2111	specifically shaped, homogeneous, regularly shaped
						S2112	specifically shaped, homogeneous, irregularly shaped
				S212	specifically shaped heterogeneous	S2121	specifically shaped, heterogeneous, regularly shaped
						S2122	specifically shaped, heterogeneous, irregularly shaped
				S213	non-specifically shaped homogeneous irregularly spaced		
				S214	non-specifically shaped heterogeneous irregularly spaced		

		S22	Field pattern	S221	Large-vegetated field pattern	S2211	homogeneous
						S2212	Heterogeneous, interleaved planting
				S222	Small-vegetated field pattern	S2221	homogeneous vegetation
						S2222	heterogeneous vegetation without trees border
						S2223	heterogeneous vegetation with trees border
				S223	mixed of large and small-size vegetated field pattern		
		S23	Vegetation mosaic	S231	mosaic of mixed vegetation and non-vegetation	S2311	mosaic of mixed vegetation and barren land
						S2312	mosaic of mixed vegetation and built-up features
				S232	mosaic of trees and herbaceous vegetation	S2321	mosaic of trees and grass
						S2322	mosaic of trees and shrub
		S24	Other vegetation features	S241	herbaceous vegetation with trees strip		
				S242	trees strip		
S3	Barren Land/Open Soils	S31	Coastal barren land	S311	coastal sandy surface	S3111	coastal volcanic island
						S3112	coastal coral island
						S3113	others
				S312	coastal mudflat		
				S313	coastal rocky surface	S3131	coastal coral rocks
						S3132	others
		S32	Fluvial barren land	S321	riverside sandy area		
				S322	sandbar		
		S33	Volcanic barren land	S331	lahar field		
				S332	lava field		

		S34	Other barren land	S341	large bare land associated with built-up features	S3411	bare land interleaved by buildings
						S3412	large size bare land surrounded by buildings
						S3413	bare land alongside road
				S342	bare land with field features	S3421	small size bare fields
						S3422	large size bare fields
						S3423	bare fields with various sizes
				S343	small size bare land area with regular/specific shapes		
S4	Built-up/Paved Surface	S41	Non-isolated built-up area	S411	built-up area with heterogeneous features	S4111	irregular small size blocks, interleaved by vegetation and/or barren land
						S4112	irregular with various size blocks, interleaved by vegetation and/or barren land
				S412	built-up area with homogeneous features	S4121	regular, small sized blocks/units
						S4122	regular, medium sized blocks/units
						S4123	regular, large sized blocks
						S4124	irregular, with various size blocks
		S42	Isolated built-up area	S421	isolated built-up area with large blocks/units		
				S422	isolated built-up area with small blocks/units	S4221	isolated built-up area with regular small blocks/units
						S4222	isolated built-up area with irregular small blocks

				S423	isolated built-up with irregular, mix-sized blocks/units		
		S43	Built-up features with linear shapes	S431	built-up features with network pattern	S4311	wide road with divider
						S4312	wide road without divider
						S4313	small road and others road with unclear boundary
						S4314	railway
				S432	others	S4321	with strip pattern
						S4322	with rounded pattern
						S4323	others
		S44	Built-up features with moveable units	S441	built-up area with cars		
				S442	built-up area with containers		
				S443	built-up area with other movable materials		
				S444	built-up area with aeroplanes		
				S445	built-up area with ships		

Lampiran H

Detail hasil perhitungan matriks kesesuaian subkelas

Lampiran H

Detail hasil perhitungan matriks kesesuaian subkelas dataset B blok area 002

	002	Pleiades														
		kolam	sungai	danau	rawa	pepohonan	semak	ladang	pekarangan	tanah kosong	jalan	bangunan	permukaan diperkeras lain			
intensitas	kolam	2	0	0	5	12	8	0	65	0	0	13	1	106	50	156
	sungai	1	0	0	1	6	2	0	3	0	0	2	0	15	1	16
	danau	0	0	0	3	3	0	0	8	0	0	4	2	20	12	32
	rawa	8	0	0	2	19	6	0	39	0	0	18	2	94	48	142
	pepohonan	2	0	0	0	168	60	0	51	0	0	11	3	295	21	316
	semak	0	0	0	0	78	19	0	28	0	0	2	5	132	12	144
	pekarangan	2	0	0	0	137	41	0	40	0	0	4	1	225	12	237
	tanah kosong	0	0	0	0	22	6	0	2	0	0	0	1	31	2	33
	jalan	1	0	0	0	24	12	0	15	0	0	3	0	55	11	66
	bangunan	2	0	0	1	322	91	0	75	0	0	3	2	496	21	517
	permukaan diperkeras lain	2	0	0	1	93	23	0	25	0	0	4	0	148	9	157
		20	0	0	13	884	268	0	351	0	0	64	17			
		5	0	0	3	60	8	0	36	0	0	7	2			
		25	0	0	16	944	276	0	387	0	0	71	19			
	intensitas							Pleiades								
	total subclassified	1617						total subclassified	1617			persentase keseluruhan	0,76%			
	unsubclassified	121						unsubclassified	199							
	total	1738						total	1816							
	persentase objek tidak tersubklasifikasi	6,96%						persentase objek tidak tersubklasifikasi	10,96%							

Detail hasil perhitungan matriks kesesuaian subkelas dataset B blok area 012

	012	Pleiades														
		kolam	sungai	danau	rawa	pepohonan	semak	ladang	pekarangan	tanah kosong	jalan	bangunan	permukaan diperkeras lain			
intensitas	kolam	5	12	0	0	0	1	0	11	0	0	0	0	29	17	46
	sungai	1	1	0	0	0	0	0	1	0	0	7	1	11	7	18
	danau	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	rawa	1	4	0	0	0	0	0	2	0	0	0	0	7	3	10
	pepohonan	10	2	0	0	49	88	1	101	7	124	306	24	712	144	856
	semak	4	0	0	0	16	39	4	68	2	45	143	14	335	78	413
	pekarangan	1	0	0	0	20	26	1	22	2	17	41	5	135	14	149
	tanah kosong	0	0	0	0	9	15	0	13	0	2	4	0	43	6	49
	jalan	2	2	0	0	9	9	0	20	2	8	60	5	117	19	136
	bangunan	10	12	0	0	47	130	0	113	11	91	324	35	773	126	899
	permukaan diperkeras lain	0	0	0	0	17	42	2	31	5	25	86	6	214	19	233
		34	33	0	0	167	350	8	382	29	312	971	90			
		0	0	0	0	13	12	0	16	4	11	38	5			
		34	33	0	0	180	362	8	398	33	323	1009	95			
	intensitas							Pleiades								
	total subclassified	2376						total subclassified	2376			persentase keseluruhan	0,62%			
	unsubclassified	99						unsubclassified	433							
	total	2475						total	2809							
	persentase objek tidak tersubklasifikasi	4,00%						persentase objek tidak tersubklasifikasi	15,41%							

Detail hasil perhitungan matriks kesesuaian subkelas dataset C blok area 005

		nDSM														
	005	kolam	sungai	danau	rawa	pepohonan	semak	pekarangan	tanah kosong	jalan	bangunan pemukiman	bangunan infrastruktur	permukaan diperkeras lain			
Pleiades	kolam	4	0	2	2	1	7	8	76	4	0	0	0	104	26	130
	sungai	2	0	1	5	14	17	4	52	3	4	0	0	102	80	182
	danau	0	0	3	0	2	12	5	18	0	1	0	0	41	7	48
	rawa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	pepohonan	3	0	0	0	5	4	0	9	0	1	0	0	22	1	23
	semak	2	0	1	0	1	6	8	10	2	1	0	0	31	5	36
	ladang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	pekarangan	11	0	7	1	25	54	22	76	5	9	0	0	210	28	238
	tanah kosong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	jalan	5	0	3	0	1	4	1	16	5	1	0	0	36	5	41
	bangunan	13	0	2	1	3	5	4	38	3	0	0	0	69	21	90
	permukaan diperkeras lain	3	0	0	0	0	0	0	0	2	0	0	0	5	0	5
		43	0	19	9	52	109	52	295	24	17	0	0			
		13	0	4	3	15	25	19	77	9	5	0	0			
		56	0	23	12	67	134	71	372	33	22	0	0			
	Pleiades							nDSM								
	total subclassified	620						total subclassified	620			persentase keseluruhan	4,69%			
	unsubclassified	170						unsubclassified	173							
	total	790						total	793							
	persentase objek tidak tersubklasifikasi	21,52%						persentase objek tidak tersubklasifikasi	21,82%							

Detail hasil perhitungan matriks kesesuaian subkelas dataset C blok area 004

		nDSM												total subclassified	unsubclas sified	total
	004	kolam	sungai	danau	rawa	pepohonan	semak	pekarangan	tanah kosong	jalan	bangunan pemukiman	bangunan infrastruktur	permukaan diperkeras lain			
Pleiades	kolam	4	0	0	1	12	12	13	73	4	13	5	0	137	98	235
	sungai	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	danau	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	rawa	0	0	0	0	1	1	2	1	0	0	0	0	5	2	7
	pepohonan	3	0	0	5	2964	745	681	504	56	43	136	0	5137	260	5397
	semak	1	0	0	0	1023	189	239	253	28	23	57	0	1813	101	1914
	ladang	1	0	0	0	295	61	81	101	11	9	11	0	570	58	628
	pekarangan	11	0	0	0	2077	495	572	468	53	50	162	0	3888	317	4205
	tanah kosong	1	0	0	0	113	28	54	43	9	21	49	0	318	33	351
	jalan	1	0	0	0	220	69	56	56	9	29	98	0	538	48	586
	bangunan	5	0	0	0	1722	649	637	527	125	380	719	0	4764	468	5232
	permukaan diperkeras lain	0	0	0	0	57	18	22	9	1	7	46	0	160	9	169
		27	0	0	6	8484	2267	2357	2035	296	575	1283	0			
		3	0	0	0	590	212	184	177	43	115	234	0			
		30	0	0	6	9074	2479	2541	2212	339	690	1517	0			
	Pleiades							nDSM								
	total subclassified	17330						total subclassified	17330			persentase keseluruhan	0,61%			
	unsubclassified	1558						unsubclassified	1394							
	total	18888						total	18724							
	persentase objek tidak tersubklasifikasi	8,25%						persentase objek tidak tersubklasifikasi	7,44%							