

PESAWAT TANPA PEMANDU (*Unmanned Aerial Vehicle*) UNTUK SURVEY DAN PEMETAAN



A screenshot of a drone flight control software interface. The interface is divided into several sections. At the top, there are menu items: FLIGHT DATA, FLIGHT PLAN, INITIAL SETUP, CONFIG/TUNING, SIMULATION, TERMINAL, HELP, and DONATE. Below the menu is a toolbar with various icons. The main display area is split into two panels. The left panel shows a 3D terrain view with a flight path overlaid. It includes a compass, altitude scale, and various data points like 'ASX 0.5', 'CS 11.9', and 'GPS: 3D Fix'. The right panel shows a top-down view of the flight path with numbered waypoints (1-6) and a 'Home' point. The word 'Auto' is prominently displayed in the center of this panel. At the bottom, there is a status bar with coordinates, speed, and other flight parameters.

KELEBIHAN UAV

- Waktu dan Operasional Pemetaan Fleksible
- Pelaburan pembelian UAV Lebih rendah dibanding Pesawat biasa
- Terbang dibawah awan
- Resolusi lebih Tinggi/tajam
- Kos operasi lebih rendah dibanding survey tradisional/konvensional
- Sistem Cepat – Berkejituan Tinggi - Autonomi



Waktu Pemetaan Fleksible

- Persiapan sederhana
- Penerapan dapat berulang kali
- Dapat dilakukan tiap hari
- Tidak memerlukan landasan Take Off yang khusus



Pelaburan keatas UAV Lebih rendah dibanding Pesawat Biasa

- Harga pesawat UAV jauh lebih rendah dibanding pesawat biasa
- Penyelenggaraan relatif lebih mudah dan murah



Terbang dibawah awan

- Menghasilkan foto tanpa gangguan awan seperti yang terjadi pada data satelit dan foto udara pesawat biasa



Resolusi lebih tinggi/tajam

- Aras ketinggian terbang menghasilkan resolusi foto yang sesuai keperluan.

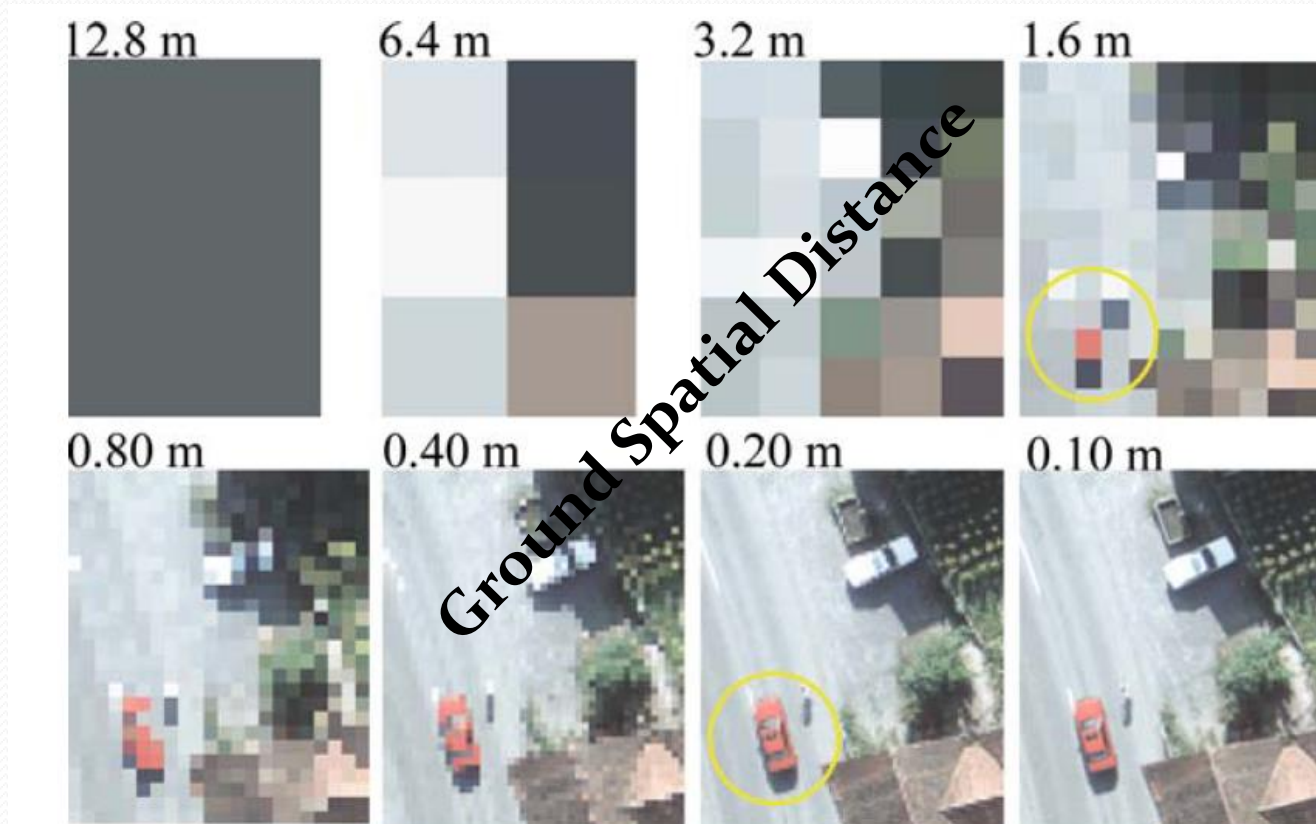


Fig. 1.3-6 GSD and object identification using a car about 5 m long (Leica, 2004)

Hubungan GSD dengan Skala Peta

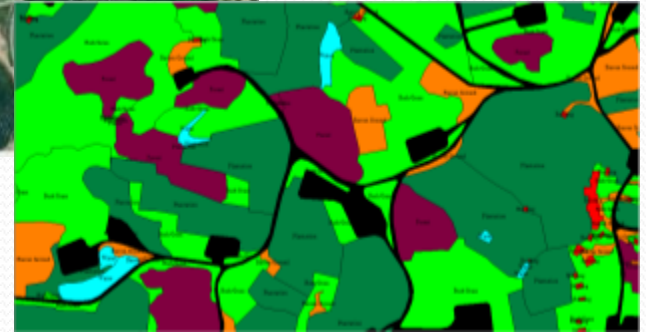
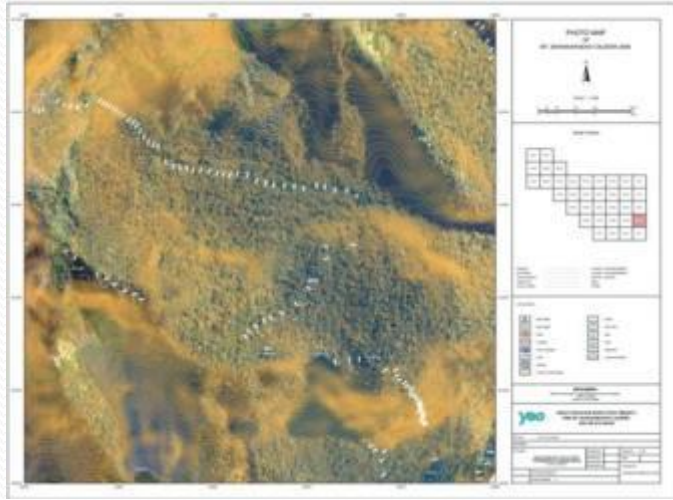
GSD: Ground Spatial Distance = Resolusi Spasial

GSD	Mapping scale
5 cm	1:500
10 cm	1:1,000
25 cm	1:2,500
50 cm	1:5,000
1 m	1:10,000
2.5 m	1:25,000
5 m	1:50,000
10 m	1:100,000
50 m	1:500,000

COVERAGE AREA (Ha) – CAMERA 20 MPx

GSD (CM)	ALTITUDE (M)	COVERAGE AREA (Ha) per flight
0.5	30	50 Ha
1	50	100 Ha
1.5	70	150 Ha
5	220	500 Ha
7	310	700 Ha
10	440	1000 Ha

MULTI PURPOSE ...



Contoh untuk perhitungan jumlah pohon

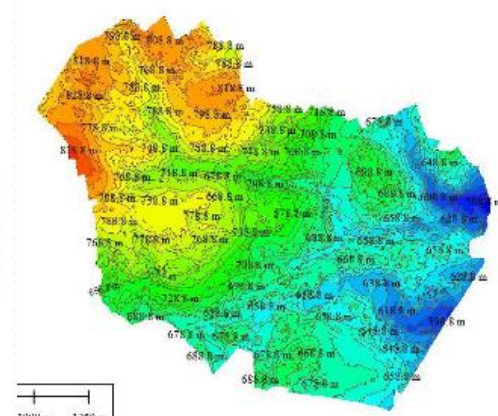
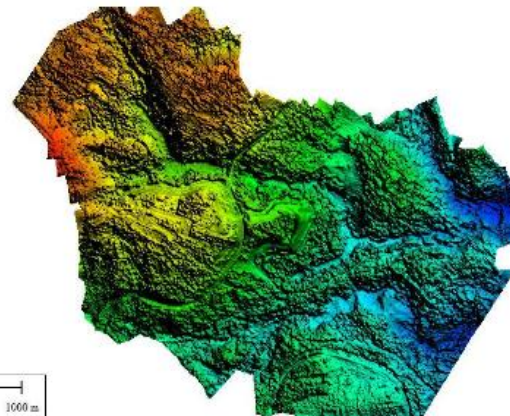
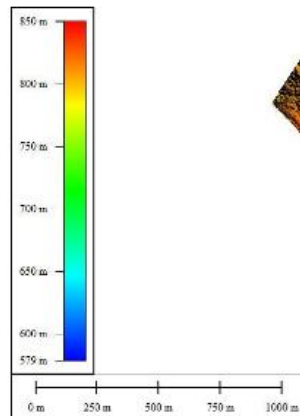
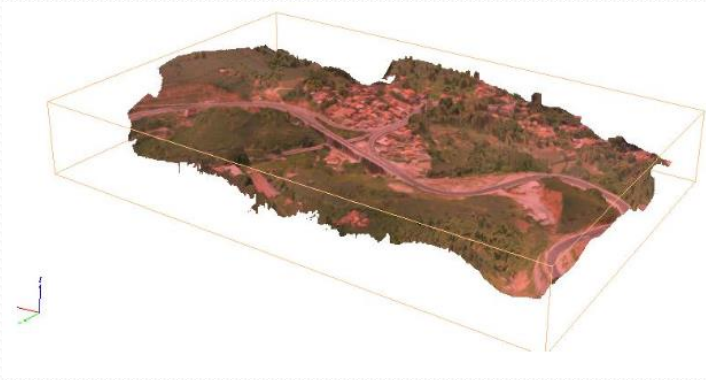


Sistem Cepat – Akurat - Otomatis

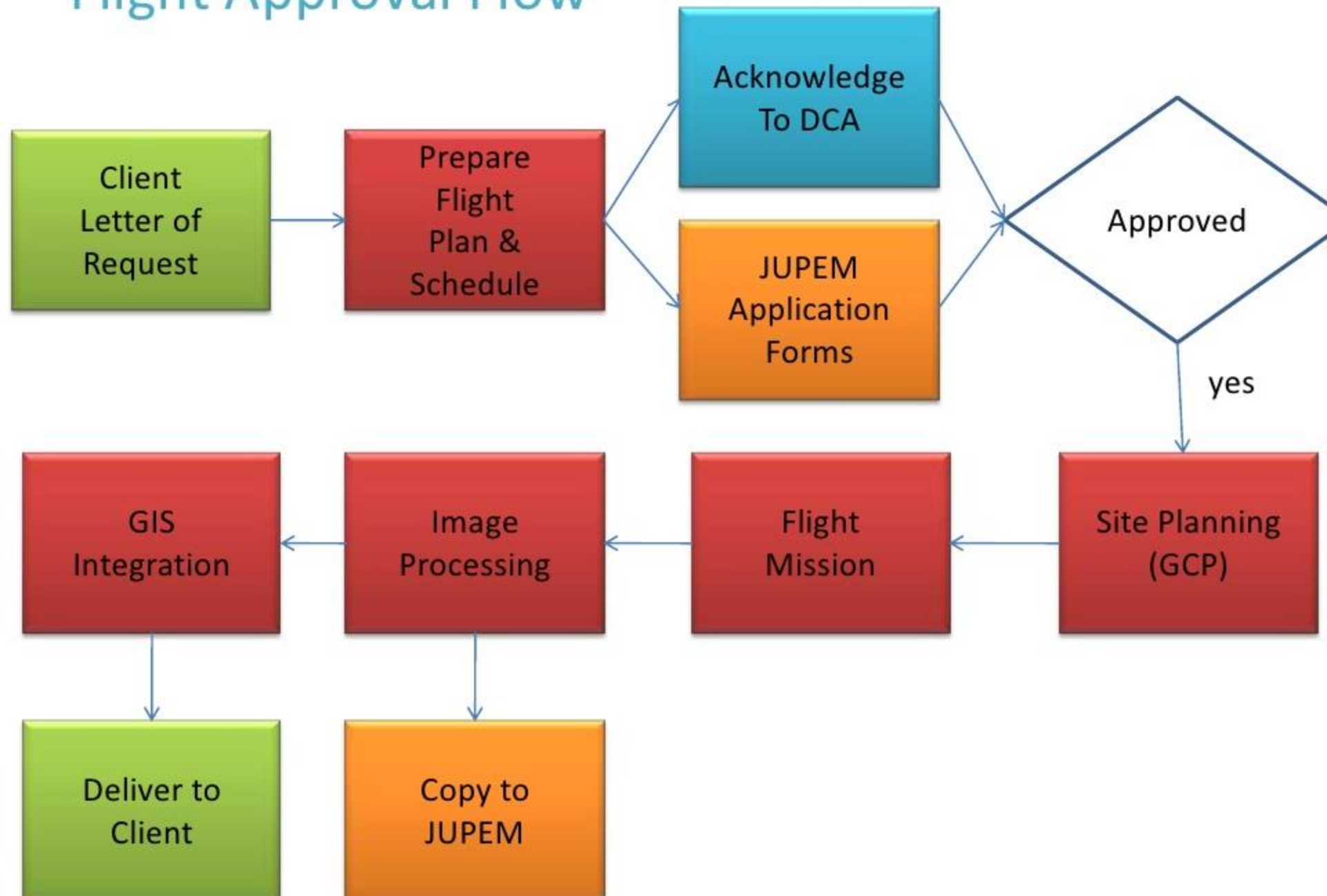
- Didahului dengan penentuan areal survey,
- Perencanaan jalur terbang dan resolusi foto
- UAV dilengkapi sistem Autonomous (full autopilot)
- Dalam 1 misi terbang :
 - Daya jangkau +/- 60 KM jarak tempuh terbang,
 - Areal +/- 600 Ha
- Banyak tersedia software photo processing di market.

PRODUK FOTO UAV

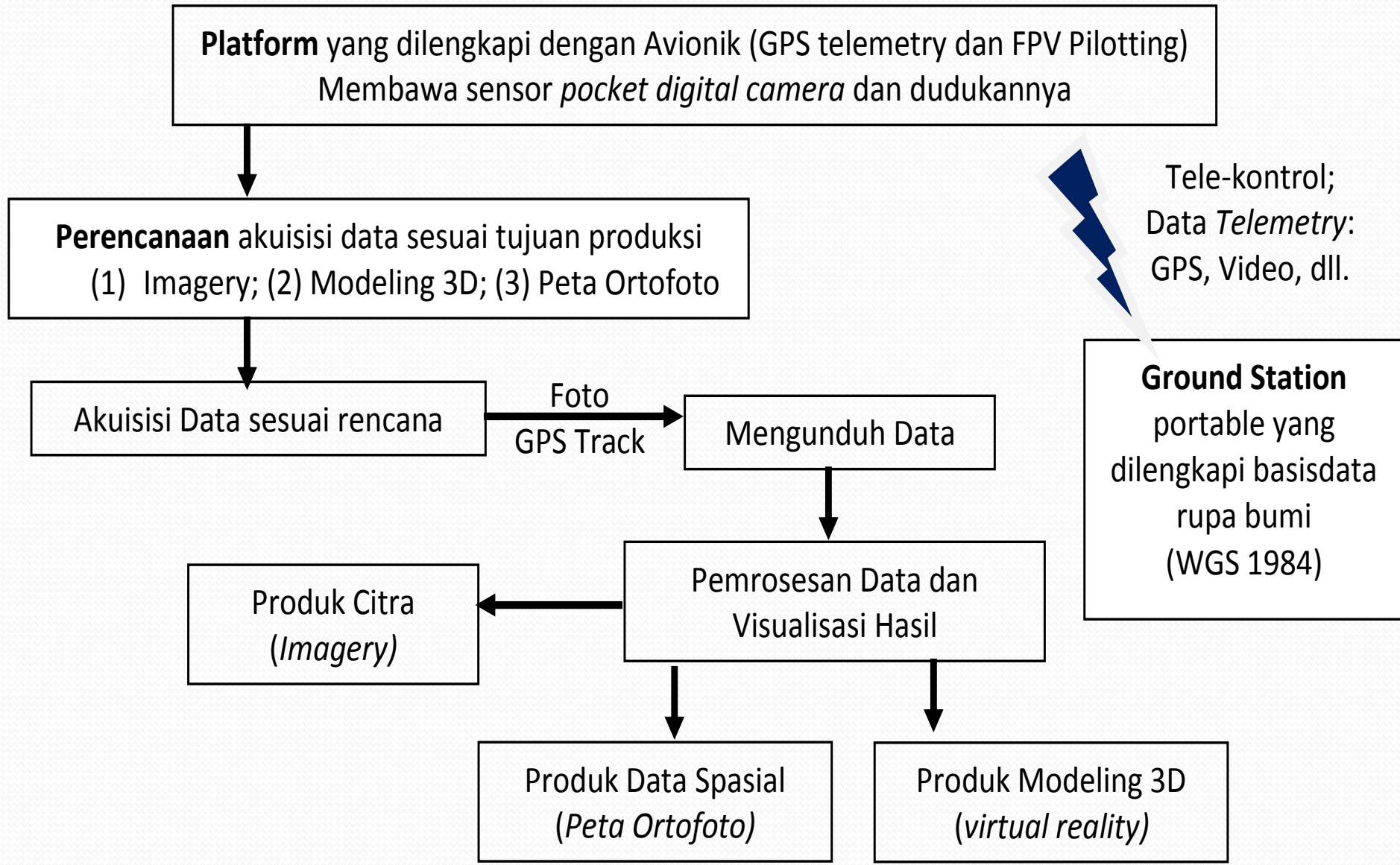
- Raster Orthomosaic (format geotiff)
- Digital Surface Model (DSM) – 3D–
- Proses lebih lanjut : Digital Terrain Model (DTM)
- Google Earth/ Maps overlay (format kml, html)



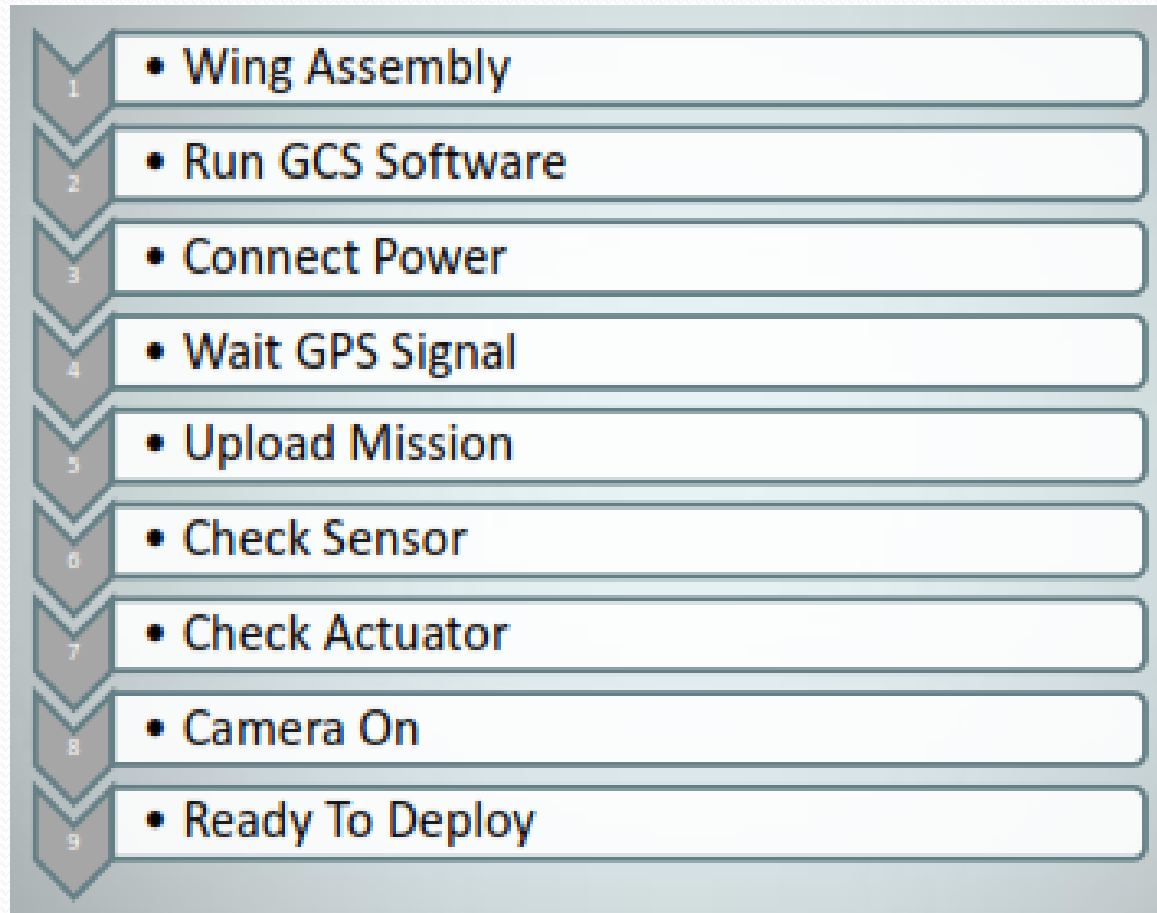
Flight Approval Flow



ALIRAN KERJA UAV

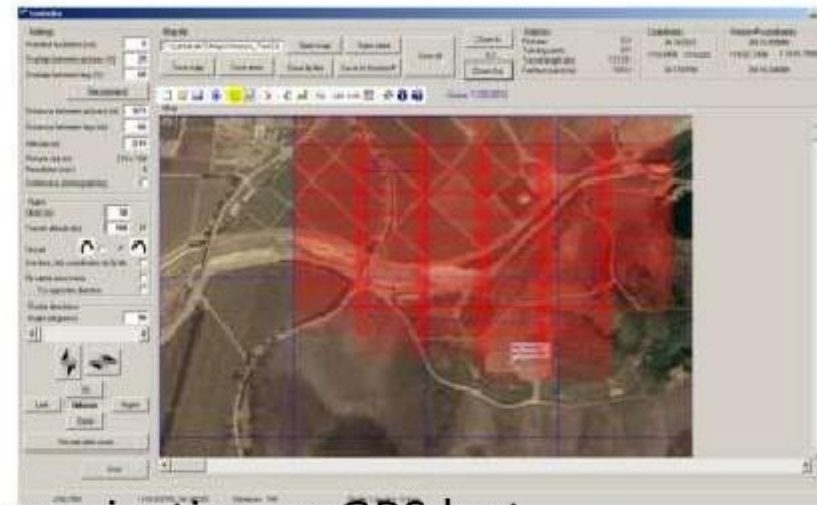


PERSIAPAN PENGGAMBARAN UDARA



Safety Procedures

1. Ground control to monitor UAV
2. Fail save system – Back to LP
3. Cockpit video monitoring
4. Manual take over in the case of lost communication or GPS lost
5. Intelligence system will automatically bring back UAV
6. Flight redundancy module
7. Safety procedure
8. Each mission - Fly only in smaller coverage area (2 sq km) – visual contact
9. Limit to 30 min fly even through the standard flying time is 45 min
10. Constant communication with RC pilot and ground control officer
11. Telemetric monitoring
12. 12.1 monitor battery life
12.2 Throttle
13. Maintenance procedure – wear & tear standard, eg Battery , engine, ESC, et
14. Flight landing in case of 50 or more

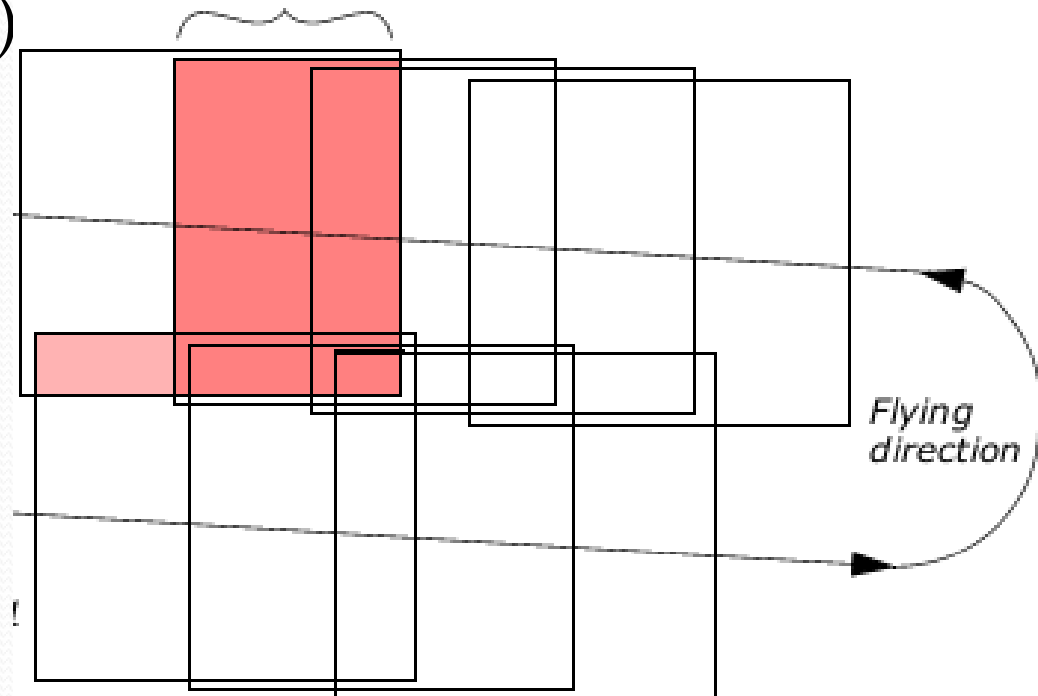


KOMPONEN UAV

- Airframe
 - Fix Wing
- Autopilot : auto navigation
- Ground Control Station : laptop, remote control, radio data communication
- Payload : camera

PENGATURAN PHOTO UNTUK PROCESSING

- Image overlap 80%
- Image sidelap 60%
- Image GPS XYZ
- Georeference (optional)



SOFTWARE UNTUK MEMBANGUN ORTHOMOSAIC

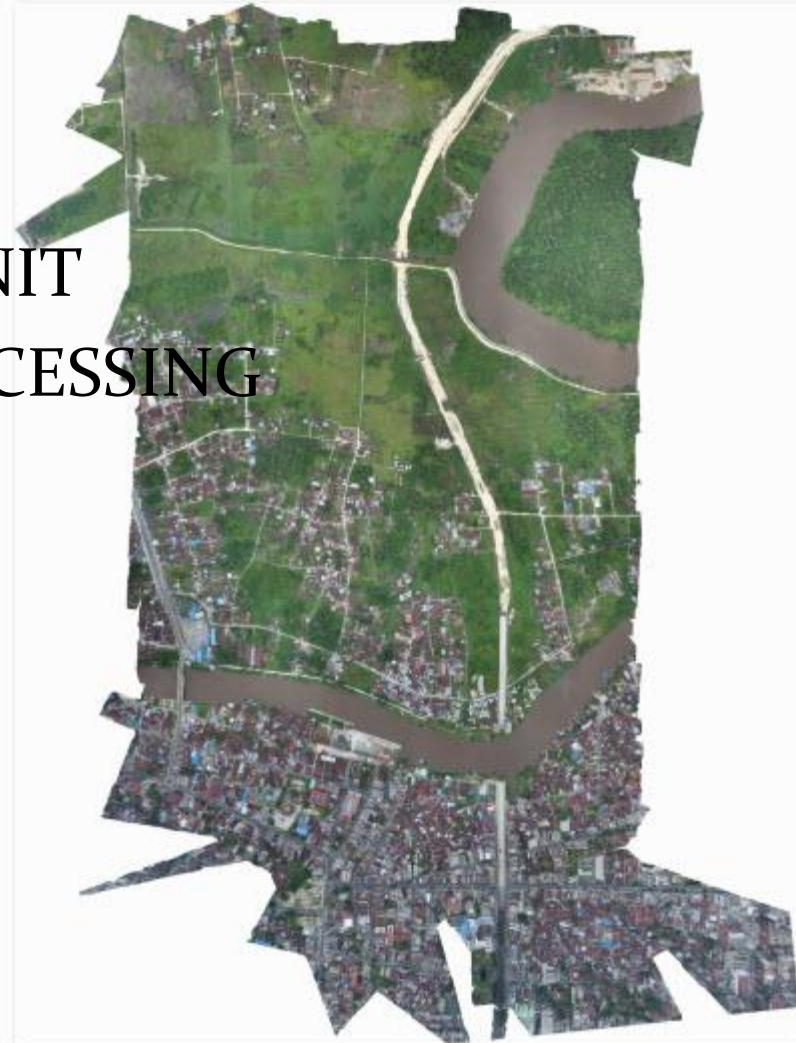
- Agisoft Photoscan
- Pix4D Desktop
- Ensomosaic
- Menci ufly
- Inpho UAS Master
- dll

KOMPUTER PROCESSING

- Spesifikasi PC yang dianjurkan :
 - Processor Intel I-7
 - RAM : 32 GB
 - VGA Quadro 4 GB
 - Hardisk SSD 1 TB

SISTEM KESELURUHAN

- UAV
- GROUND CONTROL SYSTEM
- HARDWARE PROCESSING UNIT
- SOFTWARE FOR IMAGE PROCESSING





TERIMAKASIH