DEVELOPMENT OF UAV MULTICOPTER AS A VEHICLE FOR TRANSPORTING DISASTER LOGISTICS

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Abstrac

- The Aceh region, which is located on a fire route that contains volcanoes, was destroyed in 2004 by the shaking of the earthquake and tsunami. Until now, large and small earthquake vibrations still occur frequently. Some time ago Aceh was hit by a tectonic earthquake which destroyed buildings in Pidie Jaya area. Because the area affected by the earthquake was so extensive, so many places and locations that were badly affected by the earthquake were late to be known. The use of the Drone in monitoring the area and delivering logistics in the affected area should be given attention. The Aceh region has a mountainous area and a transformation path that is still limited in the deep areas causing delays to reinforcements. Unmanned aircraft systems (UAVs) which are usually widely used by the military, government, and commercial companies, are now widely used by the general public. But most drones only have a small carrying capacity and limited range.In this paper will be presented the design of a Drone with an integrated monitoring and assistance system using a moving (Ground Station) control center. The Quadcopter Drone will be used to monitor and record disaster-affected areas and send light equipment, medicines and food logistics. The drone will use a large capacity Brushless DC Motor Outrunner and be equipped with an ArduCopter control system from the APM 2.8 or PixHawk type, FPV camera and infrared camera. Thus the aircraft can fly far day and night and guided by GPS from satellites.

Aceh Earthquake and Tsunami

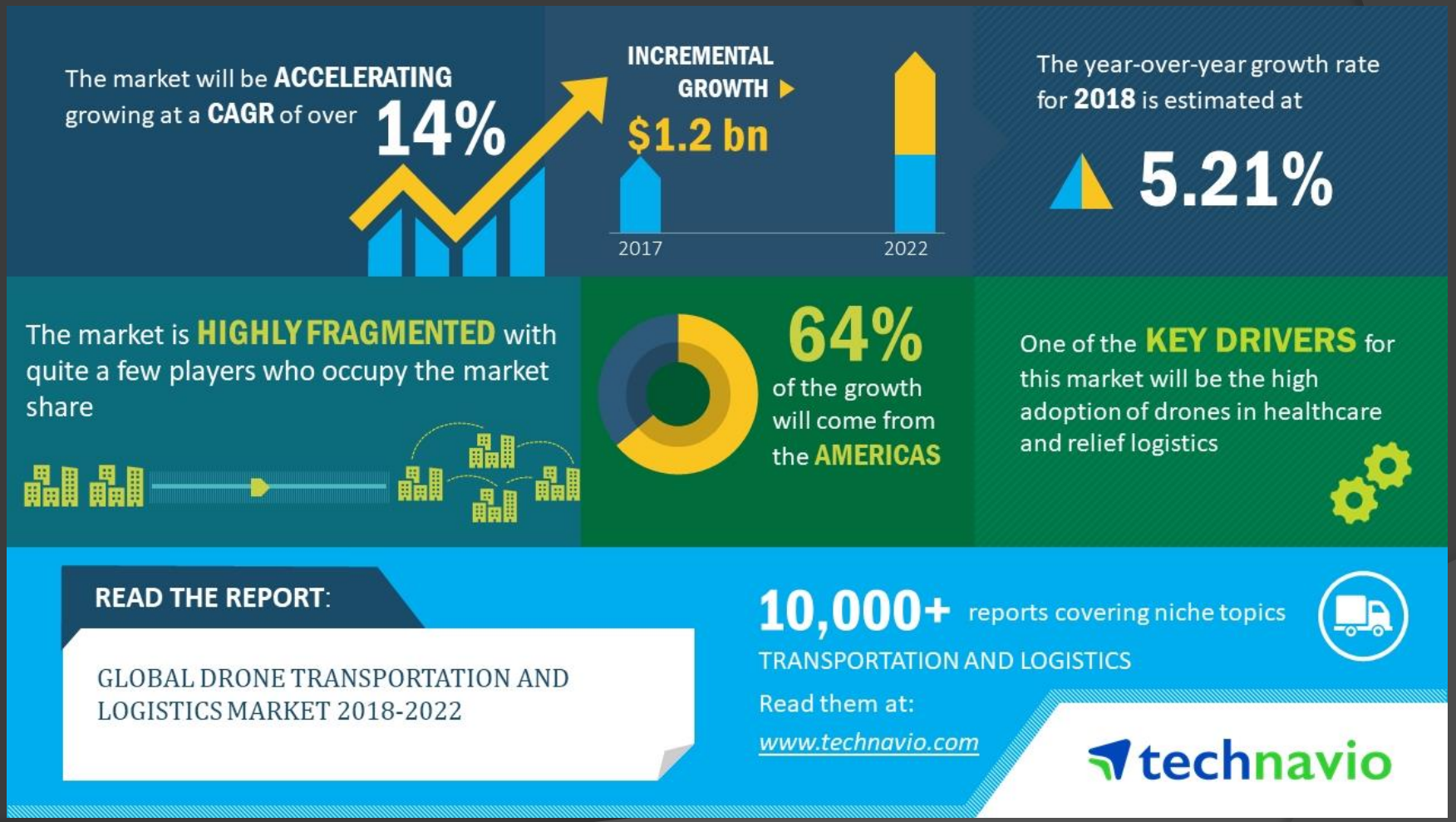
Palu Earthquake

Objective

The objective of this research is to Develop Multicopter UAV for Disaster Logistic Transportation

The drone will pick up and drop logistic from one start point to target point.

Drone Logistics Market



Current Research

https://www.freightwaves.com/news/boeing-unveils-cargo-drone

Boeing unveils drone capable of carrying 500-pound cargo

January 12, 2018 Brian Straight

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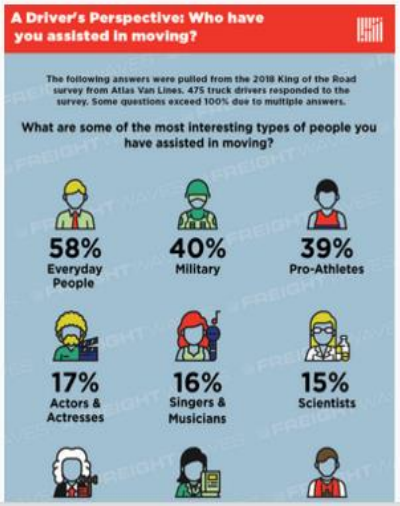


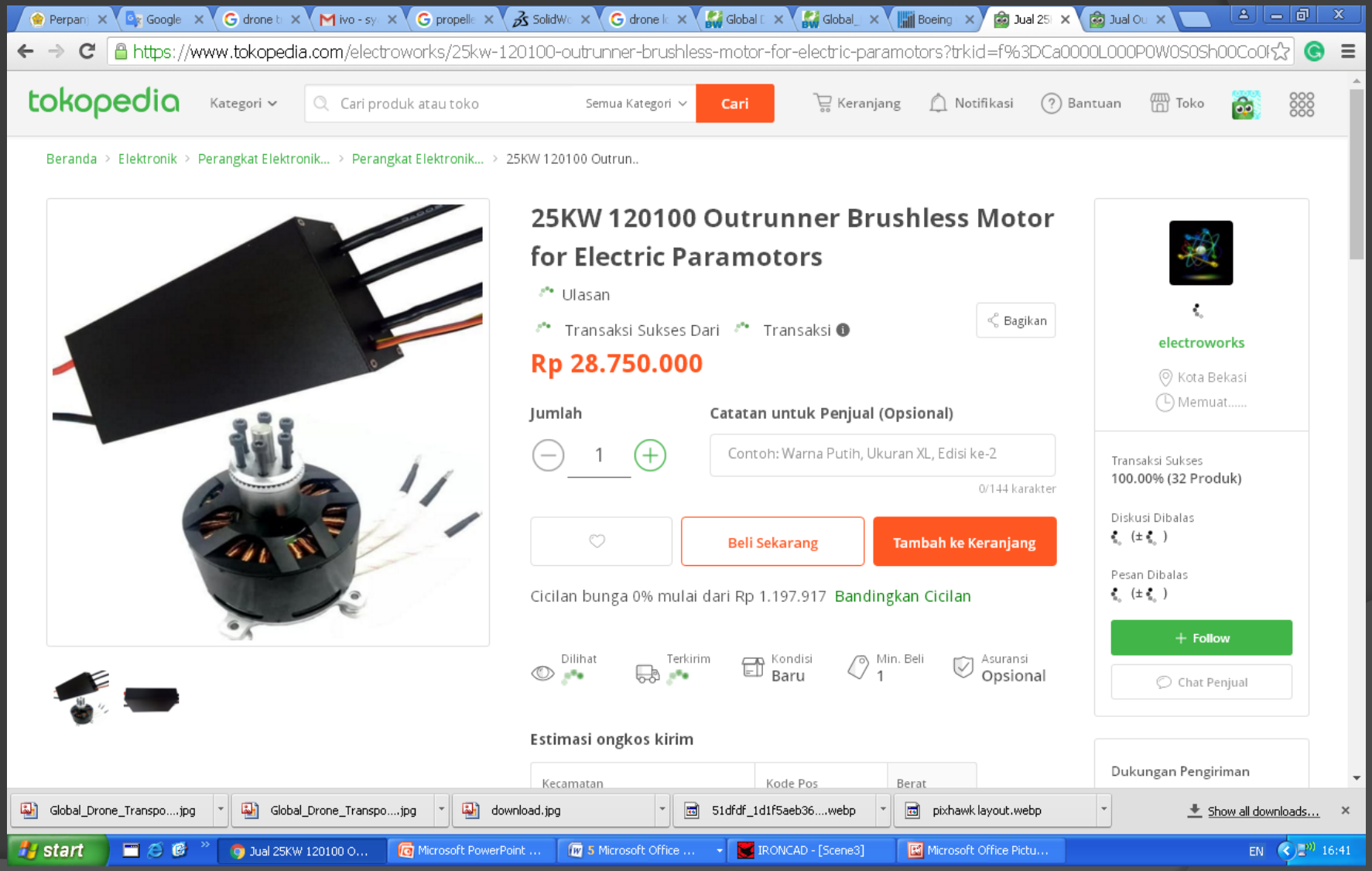
Aerial Robotic

Syiah Kuala University

Controller


px4 autopilot
3DRobotics
UAV TECHNOLOGY
Illustrated by
Jethro Hazelhurst
Make sure that the motors and propellers are properly balanced
Motor 1
Motor 2
Motor 3
Motor 4
CW
CCW
Lithium Ion Polymer Battery
Powers the UAV. This type of battery typically come in 3S or 4S packs depending on your ESC and Motor combination
LIPO
4 in 1 ESC
The electronic speed controller (ESC) allows the Pixhawk to control the speed of each individual motor
Bullet Connectors
If a motor is spinning in the wrong direction simply swap any two bullet connectors
- Motor 1
- Motor 2
- Motor 3
- Motor 4
Servo Connections
Pixhawk has a back up power supply provided by the BEC onboard the 4 in 1 ESC
XT60 Connectors
Power Module
Powers the Pixhawk
Servo Connectors
Battery Warning
Provides an audio alarm when the battery power goes below a pre defined level
This cable provides power to the Pixhawk
Switch
Allows the operator to safely power down the UAV
AUX OUT
MAIN OUT
pixhawk
Buzzer
Provides audio signals that indicate what the UAV is doing
DF13 to Servo cable
SPKT/DSM
BUZZER
TELEM 2
SWITCH
SERIAL 4/5
GPS Port
Telemetry Port
USB
ADC 3.3V
CAN
SPI
Compass Port
ADC 6.6V
Power Port
Telemetry
Telemetry provides a secondary means of controlling the UAV. It can allow you to work with powerful ground station software (on a tablet or laptp PC) in real time.
The telemetry modules transmit 915MHz (USA) or 433MHz (Europe)
PPM Sum Receiver
Translates PWM signals that the pixhawk can not read into PPM signals
An alternative is to purchase a PPM receiver which outputs a PPM signal by default
Note
It is alway best practice to twist wires together! This reduces intereference
Directional arrows must always face forwards
Tablet
A tablet or laptop PC connects to the pixhawk via telemetry radio allowing the operator to use powerful groundstation software to control the UAV
USB Cable
GPS & Compass
The GPS and Compass are housed externally which means that the directional arrow must face pointing to the nose of the UAV
Back
Right
Left
Forward
Receiver
The receiver talies the 2.4GHz signals from the transmitter allowing the operator low latency control over the UAV
Gimbal
A gimbal stabilizes the camera in real time and usually hangs underneath the UAV frame
Brushless gimbal controller
Camera
A small camera such as the GoPro is ideal for use with a brushless gimbal
Transmitter
The transmitter is the primary link between the operator and the UAV. It typically transmits at 2.4GHz
A transmitter with 8 or more channels is sufficient to allow the operator to use most of the features on pixhawk and control a gimbal
open source
open hardware
DIY DRONES
ARDUPILOT MEGA
05/02/2014

High Torque Outrunner Motor



25KW 120100 Outrunner Brushless Motor for Electric Paramotors and Electric Go-karts with 22S 500A boat ESC

1) The firmware is upgraded recently
2) Two way communication while connection it with computer
3) Firmware can be upgraded by user
4) Motor cable can be inspected while connecting the power battery
5) Simply set function value by programming box or by PC via USB cable
6) Li-MH/Li-PO,Ne-Cd/Ne-Mh,LiFe battery can be used
7) Enable setting the voltage per cell for the point at which the controller's cut off circuitry engages.Li-MH/Li-Po from 2.0V-3.6V,Ne-Cd/Ne4-1.0V,LiFe from 2.2-2.8V
8) Reverse function,the delay time of reverse is adjustable.
9) The power of the motor forward/reverse can be set
10) Automatically detection the throttle route or can be set a fixed number by manual operation.
11) Auto cut off the power within 3 seconds if no radio signal
12) Timing setting may be adjusted(0-30)to suit the motor type.

Specifications :
MOTOR: MP120100
MAX POWER: 25KW
KV: 35KV,55KV,80KV,130KV,
TORQUE: 46Nm
MAX RPM: 8000
ESC: 22S 380-500A
MAX VOLT: 100 V
MAX CURRENT : 350A
CONTINIOUS CURRENT: 230A
SIZE: 120 mmx 120mm (without shaft)
STATOR: 60mm
WEIGHT (KG): 4
SHAFT: 12mm
ACCESSORY PACK: Yes

Design Logistic UAV