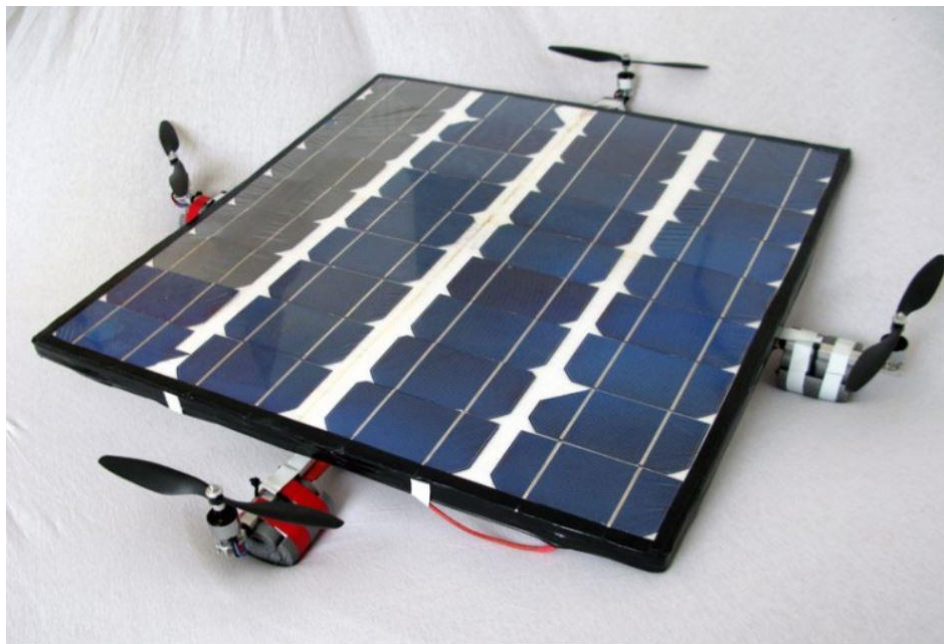


# Multi-Application Solar Powered Autonomous Quadcopter



## Abstract

The idea is to build a generic Quadcopter that is at least 40% solar powered and capable of long range communication up to 10 Km , the quadcopter will be able to preform autonomous and scheduled tasks , like search & tracking , spraying pesticides , and other applications , the flight controller will be built from scratch to deliver best flying mechanisms and maneuvers

(concept Image)

## Introduction:

Current Quadcopters suffers from a range of disabilities that narrows it's range of applications one of the most important ones is the FLIGHT TIME, which is very limited in all current quadcopters and in best cases never exceeds one hour therefor it's travel distance is also limited to half of this time so it can make it back , there is also another limitation that effects the flight distance and height which is the communication range in most cases never exceeds 600 Meters this of course in addition to a range of other problems and disabilities that is found in common quadcopters sold for industry or entertainment like equilibrium , motion precision and Autonomism , we address all of this problems in our graduation project.

## Our Project - Multi-Application Solar Powered Autonomous Quadcopter

Our main frame of work is to address all of these mentioned disabilities by adding solar panel to the quadcopter in addition to the batteries the copter wouldn't rely solely on the panels , rather the solar power will act as a battery extending the flight time, and when the power is exceeded the copter will stop and recharge then continue in it's mission , hence the quadcopter doesn't need to return to station to recharge.

Of Course distant flying mission need a higher communication range this why the quadcopter is equipped with a high power wifi ( *30db transmission power ( the legal limit) nearly 1 watt*) this wifi device is capable in theory to reach range of 50 Km of course it differs in practice also using the WDS capability the range can be extended to cover very wide areas.

The quadcopter will be easily programmable and schedulable for any needed autonomous missions also it will also have very accurate positioning and movement made only possible by autonomous navigation and complicated flying algorithms.

## Main Features:

- Solar energy generation estimated to 30-80 watts.
- Communication Range up to 10Km.
- Autonomous & Manual Navigation.

- Support for other Autonomous Tasks (scheduled).
- High Definition camera.
- Indoor Positioning and GPS enhancement.
- Object detection.
- Minesweeping (metal detection).
- Possibilities for Li-dar & thermal imaging & 3-D mapping.

### Main Applications:

- Search & Identifying objects (all search and object detection applications)
- Real Time Tracking (identifying an object and keep videoing it )
- Extending and providing network coverage & Internet access to remote and deserted areas
- Mapping for indoor and uncharted places
- Localized positioning system with reference to other quadcopters (indoor gps)
- Agriculture applications like spraying pesticides
- Autonomous and scheduled Minesweeping ( it can sweep a large area in day light time and complete the next day autonomously )
- Other Applications made only possible by the capability of traveling very large distances like delivering meds or surviving kit to a sinking boat.

### Benefits of Being Our Sponsor:

- A full soft copy of the project will be provided to you (including the code , mechanical design simulation ..etc.) a Hard copy can be delivered also ( paid to separately )
- You will be represented as our main sponsor in all events and ceremonies
- Your logo will be printed on the project and the T-shirts
- We are targeting to participate in variety of competitions will you be also announced as our main sponsor
- You will be invited as a special guest in all related activities

### In Return:

1. All project fees (components , customs ..etc) will provided by you
2. In case of participating in a competition, all competition fees, travel expenses and accommodation will be provided by you.

## Component list:

Please note that the prices listed below is based on some local stores and can be changed or these components can be sold out, also some components are not determined yet and others can be changed or added if needed

Component name	Qty	Available links	Price	Description	Total
Brushless Motor	4	<a href="https://uge-one.com/index.php?route=product/product&amp;product_id=1148&amp;search=Brushless+Motor">https://uge-one.com/index.php?route=product/product&amp;product_id=1148&amp;search=Brushless+Motor</a>	295	DM2220 1700KV / 1.8Kg Thrust	1180
ESC Driver	4	<a href="https://uge-one.com/index.php?route=product/product&amp;product_id=1257&amp;search=ESC">https://uge-one.com/index.php?route=product/product&amp;product_id=1257&amp;search=ESC</a>	180	50A Brushless ESC Driver	720
Propeller	4	<a href="http://store.fut-electronics.com/collections/propellers/products/propeller-gws-ep-9047-standard-rotating">http://store.fut-electronics.com/collections/propellers/products/propeller-gws-ep-9047-standard-rotating</a>	40	The fan	160
Battery	1	<a href="http://ram-e-shop.com/oscmx/catalog/product_info.php?cPath=72_74&amp;products_id=2775">http://ram-e-shop.com/oscmx/catalog/product_info.php?cPath=72_74&amp;products_id=2775</a>	450	Lipo low weight rechargeable, high discharge 35C	450
ARDUIMU	1	<a href="http://store.fut-electronics.com/collections/sensors-controls/products/arduimu-v3-9dof-3axis-gyro-3axis-accel-3axis-compass">http://store.fut-electronics.com/collections/sensors-controls/products/arduimu-v3-9dof-3axis-gyro-3axis-accel-3axis-compass</a>	520	Accelerometer + Gyroscope + Compass	520
GPS Module	1	<a href="https://uge-one.com/index.php?route=product/product&amp;product_id=187&amp;search=GPS&amp;sort=p.price&amp;order=ASC">https://uge-one.com/index.php?route=product/product&amp;product_id=187&amp;search=GPS&amp;sort=p.price&amp;order=ASC</a>	275	GPS	275
Solar Panels + solar Charger	1		1000-2500	The size and matrial will determined later	1000-2500
High Power wifi	2	<a href="http://egypt.souq.com/eg-ar/bullet2hp-access-point-18dbi-hyperlink-omni-antenna-5434144/i/">http://egypt.souq.com/eg-ar/bullet2hp-access-point-18dbi-hyperlink-omni-antenna-5434144/i/</a>	3333	30db transmission power ( the federal limit)	6666
Camera				To be determined later	500-3000
Lidar		<a href="http://www.robotshop.com/en/lidar-lite-3-laser-rangefinder.html">http://www.robotshop.com/en/lidar-lite-3-laser-rangefinder.html</a>		Likely to be canceled based on the sponsor budget	
Metal Detector Sensor	2	<a href="http://store.fut-electronics.com/products/metal-detector-sensor">http://store.fut-electronics.com/products/metal-detector-sensor</a>	300	Likely to be changed	600
Microcontroller and kit					700-1000
Grand Estimated Total					12771-17071

for any other information please contact the contact person, the contact information is mentioned below

## Can we do it? (learn more about team members):

- Shawkat El.Shahed : Embedded Certified Engineer  
Projects: Automatic cooling system ( Fan & Temperature sensor ) , Safe security look with alarm  
Overall grade: Excellent with honors  
Contact info: Email: *Shwakate@gmail.com* mobile: 00201090534007
- Amr Matouk : Control and measurement Intern at Global Technical Services  
Projects: Smart Security Passcode look, Bluetooth enabler for speakers ( make any speaker work with Bluetooth )  
Contact info: Email: *Amr.alexander@yahoo.com* mobile : 00201065615256
- Yousra Eid : Embedded Certified Engineer (more info will be provided later).
- Ahmed Galal : Embedded Certified Engineer (more info will be provided later).
- Amr M. Kamal (Contact Person): Embedded Certified Engineer ... Embedded Systems Instructor at ATC  
Projects: -Cell phone jammer & detector, - IR remote controlled motor driver, -GSM controlled traffic light , - Maze solving robot ( Embedded fab graduation project ) , UGV (unmanned ground vehicle) it was solar powered (120 watt) with communication range up to 600 meters and the ability to move on hard terrain it won **5'th place in UGVC competition**  
Overall grade: very good with honors.  
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