

Study on the current direction of our country in accordance with the basic conditions for the commercialization of the UAV

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Abstract

Shipping related services is attracting attention as a UAV (Unmanned Aerial Vehicle) application with the recent economy has been generally accepted drones. UAV of the existing military-driven logistics delivery, aerial photography, wireless Internet connection, broadcasting, disaster research, digital maps, transportation, advertising, meteorological, border surveillance, agricultural use, such as hobbies range of uses from up military are diverse and growing. The advantage of delivery drones seems to be an important feature of delivery of the goods, including labor-saving, long-distance transportation in cold weather. UAV is demanded by competitive performance development for commercialization. Privacy issues that may arise during the drone operation, ensuring marketability issues, control system, regulations, operational standards and specifications, etc. should be addressed. Development direction of Korea UAV based in current technology, regulation, and growth potential presented by deriving from the idea of 'GIF 2016 Gang-won Hackathon.

Keywords: UAV(Unmanned Aerial Vehicle), delivery drones, , control system , aerial photography, Hackathon.

1. Introduction

The unmanned aerial vehicle (UAV) flying autonomously to boost the power of the air without a pilot means a powered vehicle equipped with such weapons and cargo. Unmanned aircraft are typically being a drone.

UAV of the existing military-driven logistics delivery, aerial photography, wireless Internet connection, broadcasting, disaster research, digital maps, transportation, advertising, meteorological, border surveillance, agricultural use, such as hobbies range of uses from up military are diverse and growing.[1] Shipping related business applications with the recent economy has been noted. The advantage of delivery drones seems to be an important feature of delivery of the goods, including labor-saving, long-distance transportation in cold weather. UAV is demanded by competitive performance development for commercialization. Privacy issues that may arise during the drone operation, ensuring marketability issues, control system, regulations,

operational standards and specifications, etc. should be addressed. The derivation proposed development direction of the country of the ideas discussed in the drone 'GIF 2016 Gang-won Hackathon'.

2. Rule

The world UAV market occupying 66% of the US market, and Israel is 23%, and Europe accounted for 8%. Our country holds technology is being developed technology compared with US technology, "the development of digital flight control computer in the multiplexing function, development Ku-band transceiver and an image processing device" is 70% or "flight control, mission planning, image manipulators" is advanced It is on par with the technology. Korea has developed the world's second by a vertical takeoff and landing UAV tilt-rotor SMART possible in the field of unmanned aircraft could successfully become a country with the world's seven drone technology. Unmanned aircraft will be used by a commercial flight range to be a civilian residential area. UAV GPS position is available, but must be estimated in order to a large number of unmanned aircraft flight control system in a confined space is essential. [2]

Table 1 shows the data of research company Forecast International, Teal Group prediction the global aviation market.[3]

Table 1. Civil aircraft demand forecasts

Aerospace market, UAV Market	Base Year (2014)	Annual 10% (2023)
UAV Market for civilian use	0.6Billion (2014)	8.8 Billion, Annual 35% (2023)
The Federal Aviation Administration flight number	15,000EA (2020)	30,000EA (2030)

Table 2. Drone Regulation

	Weight	Speed	Altitude
ROK (Unmanned flight system)	- 150 kg below	-	-
USA FAA (Small unmanned airship)	- 250g ~ 25kg (register) - More than 2kg (registered document)	160 km/h	152 m

3. Technology

3.1 Quad-copter technology

Quad-copter maintain the high reliability of the machines than existing state of the helicopter, and fast response time, and can be moved horizontally or diagonally and has the advantage of vertical-landing, miniaturization, hovering. Quad-copter is parallel with the front (moving direction) of the machine and the roll, pitch, yaw to control the machine position, by adjusting the relative movement speed of the four rotor forms the heart of the control system.[4] Control systems of a typical unmanned aircraft are classified in automatic mode, manual mode(semi-automatic), the return mode, the emergency mode receiver.[5] The PID control techniques such as linear, back-stepping control techniques, control techniques applied to dynamic surface control theory has been proposed to control the height of the quad rotor. Because it is difficult to

correct the balance maintained by the appearance and body shake consider this point and must be corrected through the sensor. Quad-rotor requires a rather complex system modeling because it immune to external disturbances and nonlinear manipulation of the technology or a skilled manipulator of autonomous flight if you are required to pre-program. [6]

3.2 Communication Method

There is no data for UAV mission frequency. WRC-12 (World Radio-communication Conference-12) is a UAV C2 (Command and Control) Frequency (5030-5091MHz) assignment, and private / research UAV mission data for a widely used frequency band (2.4/5.8GHz) there is. There is a maximum transmission power is limited, the communication limit distance, there is a limit to the wide variety of uses.

When used in this hobby it is low frequency channel, but not a big problem, when the commercial is to gather a large number of models such as the controller increases the possibility of a malfunction occur.

Appearance is important, but the performance of the drones because they need to combine a variety of techniques, including various safety standards and autonomous driving technology, big data, radar, sensor development, commercialization likely to take some time yet. The high-tech drones are mounted on the unmanned autonomous vehicle technology similar to that received recent attention.

After the trial, increase the technological maturity through projects in various fields just as difficult to enter the commercialization stage in the development of proprietary technology nature of the aviation industry it is preferable to enter the commercialization stage. [7]

4. GIF 2016 Gang-won Hackathon participate ideas

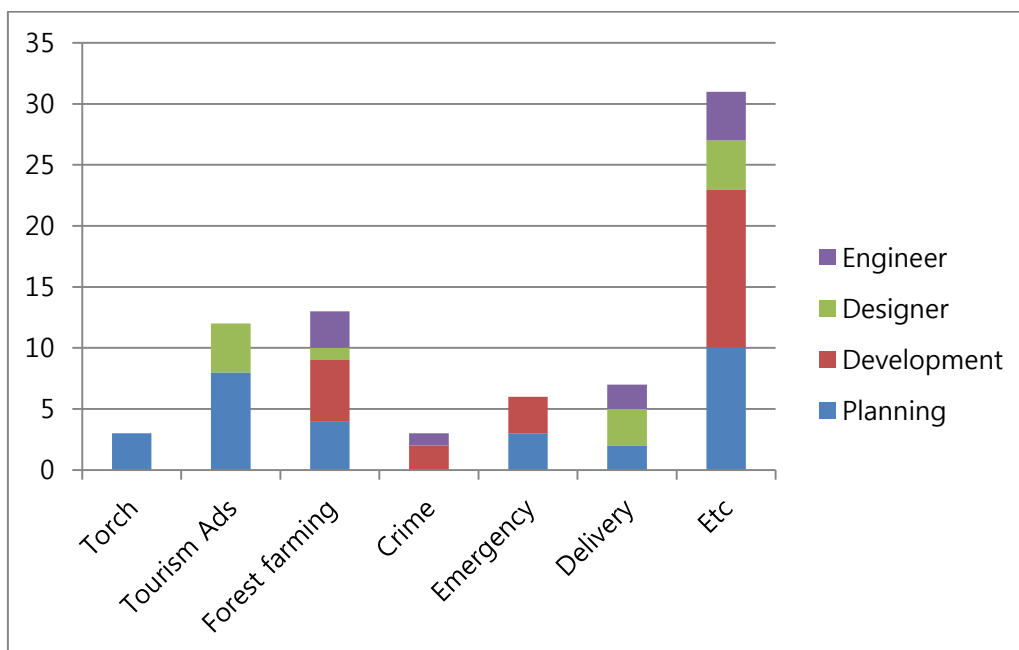


Figure 1. The idea suggested by sector.

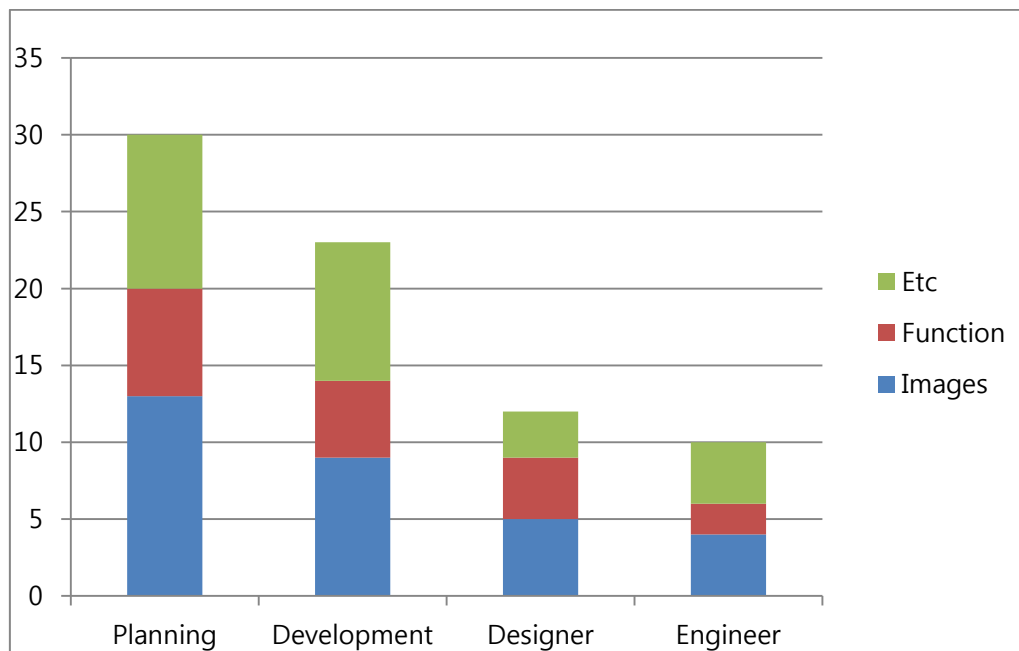


Figure 2. Sector proposed ideas.

Proposal attended a total of 75 cases, and "Torch, Tourism Ads, Forest farming, Crime, Emergency, Application delivery," was the majority. Other items are pine nut harvesting, meteorological, disaster relief airbag device etc. Weather-related idea was this expert opinion did not fit was envisioned a decade ago. Now proponent technology was explained that the situation has changed. Drone is one of a small size unmanned aircraft types that exist previously. In addition to existing functions that were on the flight functions of many ideas Drones changed to the new equipment. Most video-related ideas and functions, as shown in Figure 1, 2. The problem with commercialization drones are autonomous capabilities and software. Teams have created a prototype of achievements in a short schedule of three days. In this example, the device design and image processing, utilizing Internet technology has reached the top of the art. Communication channels used drones had difficulty in demonstrating the flight be limited to four.

Therefore, we recognize that regulation, the choice of communication methods using multiple lines, a prerequisite for achieving the commercialization process, including the future of the regulatory regions of the drones. Aviation Department at the National University among the 496 has 62 universities. Automotive Department has 140 universities. The number of Academic and industry is also proportional share. For commercial UAV autonomous flight is expected to take a lot of portion, there is a need for technologies related to education. [8]

View of the drones is bright. It is evident also take advantage of value-wise. The new industrial powered by our technology and ideas that will be an opportunity to sum the skills of each area.

Acknowledgement

The present research has been conducted by the Research Grant of Seoil University in 2016

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