Fooling around with *Toys

12/12/2013

K. Yang
DJI Phantom Quadcopter for GoPro

by DJI

4.8 stars · 206 customer reviews

135 answered questions

List Price: $679.00
Price: $469.00 & FREE Shipping. Details
You Save: $210.00 (31%)

In Stock.
Sold by Hobby Toy Store and ships from Amazon Fulfillment.

• Complete quadcopter is ready to fly. Simply plug in the battery, attach the propellers, and plug in the battery to the remote controller.

• Fun flying by itself or as a partner to your GoPro. Tested with Hero2, Hero3 and Hero3+ models, sold separately. Produce dramatic cinema-quality results from the air! Note: Wi-Fi streaming from a camera is not possible because it may interfere with the Phantom's remote control.

• Outdoor flight is made possible by advanced GPS positioning that compensates for light wind. The Phantom has a fail-safe feature that will cause it to land if it detects a low battery or an incorrect altitude.

• The Phantom is extremely versatile and can be used for a variety of applications.
Background

- KAP
- Embedded System
- Constructive Time Passing
- Drip Irrigation
An Episode
스마트폰이용 원예시설
생육환경조성기술시범

목 적
○ 스마트기기를 통해 장소 및 시간에 구애 받지 않고 원예시설을 모니터링하고 제어하는 기술 도입

추진방향
○ 스마트기기를 활용하고, 환경제어가 가능한 시설을 갖추고 인근지역에 파급효과가 높은 농업인 시행

추진계획
○ 사업대상 : 이천 관내 채배기술이 높고 사업의욕이 강한 원예 농업인 등
○ 규 모 : 개소당 0.1ha이상
○ 시범요인
  - u-IT이용 원예시설 원격 감시 환경제어시스템 기술보급
  - 스마트폰으로 원격조작하고 각종상황은 카메라 추적 영상으로 바로 확인
  - 원실 환경 및 기기 이상발생시 관리자에게 통보
○ 지원내역
  - 제어부(수집서버, 원격단말장치, 환경제어프로그램, 제어PC 등), 센서부(온도, 습도, CO2 통합센서 등), 제어패널 및 관제용 네트워크 카메라 등

(단위 : 개소, 천원)

<table>
<thead>
<tr>
<th>세 부 사업 명</th>
<th>사업량</th>
<th>사업비 구성</th>
</tr>
</thead>
<tbody>
<tr>
<td>스마트폰이용 원예시설 생육환경조성기술 시범</td>
<td>3</td>
<td>계 35,000, 국비 17,500, 도비 -, 시비 17,500, 기타 -</td>
</tr>
</tbody>
</table>

기대효과
○ 컴퓨터와 스마트폰을 이용하여 원실환경 및 각종기 원격 모니터링으로 안정생산하여 농가소득 향상
스마트폰이용 원예시설생육환경조성기술시범

목적
○ 스마트기를 통해 장소 및 시간에 구애 받지 않고 원예시설을 모니터링하고 제어하는 기술 도입

추진방향
○ 스마트기를 활용하고, 원예제어가 가능한 시설을 갖추고 인근지역에 파급효과가 높은 농업인 시행

추진계획
○ 사업대상: 이천 관내 재배기계이 높고 사업비용이 강한 원예 농업인 등
○ 규모: 개소당 0.3ha이상(자동차하우스 또는 유리온실)
○ 시행요인
  - u-IT이용 원예시설 원적 감시 관경제어시스템 기술보급
  - 스마트폰으로 원적조정하고 작동상황은 카메라 추적 영상으로 바로 확인
  - 원실 관경 및 기기 이상발생시 관리자에게 통보
  - 기상청에서 제공하는 기상현상 통합전송에 보다 외부기상 상황 모니터링
○ 자원내역
  - 제어부(수집서버, 원적단말장치, 원경제어프로그램, 제어PC 등), 센서부(온도, 습도, CO2 통합센서, EC, 수분 등), 제어패널 및 관제용 네트워크 카메라 등
  (단위: 계, 귀가, 도비, 시비, 기타)

<table>
<thead>
<tr>
<th>세부사업명</th>
<th>사업량</th>
<th>사업비구성</th>
</tr>
</thead>
<tbody>
<tr>
<td>스마트폰이용 원예시설생육환경조성기술시범</td>
<td>1</td>
<td>계 35,000, 귀가 17,500, - -</td>
</tr>
</tbody>
</table>

기대효과
○ 컴퓨터와 스마트폰을 이용하여 원실환경 및 작동기 원적 모니터링으로 안정생산하여 농가소득 향상
Requirements

- Cost-wise viable
- Off-the-shelf parts
- Potentially extensible
- Educational
- Fun
xToys/Gadgets

- SBC/sensors/relays
- Connecting/Integrable
- Safe / Riskless
- Tangible/Visible
- *Experientia*-oriented: Robots/sUAS
- Fun/Creative/Educational
Why

- Viable - technically, economically
- Visible/concrete
- Output-oriented
- No set rules
- Goal-aligned
- Self-motivating
- Learn by doing
<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
<th>Interfaces</th>
<th>CPU</th>
<th>Power</th>
<th>Graphics</th>
<th>RAM</th>
<th>Storage</th>
<th>USB 2.0</th>
<th>Storage Slots</th>
<th>Ethernet</th>
<th>Analog In</th>
<th>Analog Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arduino Uno</td>
<td>30</td>
<td>Digital GPIO 14</td>
<td>ATMega 328 @16 MHz</td>
<td>0.3W</td>
<td>No</td>
<td>2KB</td>
<td>32KB flash</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Raspberry Pi</td>
<td>35</td>
<td>GPIO, UART, I²C, SPI</td>
<td>ARM11 @700 MHz</td>
<td>3.5W</td>
<td>Broadcom VideoCore IV</td>
<td>512MB</td>
<td>SD Card</td>
<td>1–2</td>
<td>SD</td>
<td>Model B: 10/100 (usb preattached)</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
1. Insert SD card
   - See page 3 for how to prepare the SD card

2a. Connect display
   - Plug in your digital TV or monitor

2b. Connect display
   - If not using HDMI, plug in your analogue TV or display

3. Connect input
   - Plug in a USB keyboard and mouse

4. Connect network
   - Connect to your wired network [optional]

5. Power up
   - Plug in the micro USB power supply
Examples

- Data Gathering
- Personal Web Server
- Device Embedding
- Controlled Precision
- Precision Farming: Viticulture; Beekeeping
- Fishing
- Gadgets: Feeders; Picture Frame
- Educational Use
COMMERCIAL (LEGAL) UA OPERATOR SCOREBOARD

<table>
<thead>
<tr>
<th>Country</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>65</td>
</tr>
<tr>
<td>EU</td>
<td>1114</td>
</tr>
<tr>
<td>Japan</td>
<td>14,000+</td>
</tr>
<tr>
<td>S. Korea</td>
<td>130</td>
</tr>
<tr>
<td>USA</td>
<td>3</td>
</tr>
</tbody>
</table>
Pet Projects

• Small Sonar Fish Finder/PIR Bird Control
• Sophisticated Drip Irrigation
• Spot Sprayers [Grain Color Sorters]
• Crop-specific Ag-cartogram
Implications

• Extracting Capacity - Ballpark-catching; Tech visionary
• Agility - Disruptive Technology
• Paretoing Value Chains
• Instruments: Analytics; Maneuverability
• BM – Open Source; Entry Barriers? On-going Plan B; Tesla

• Negative Side? deRisking; Coping w/ Externality
- Small Unmanned Aerial System for Agriculture and Mapping applications.
- Brushless Electric Motor
- Up to 300 Ha (740 Acres) per flight.
- Max. Endurance: 30 min
- Payload options:
  - Panasonic Lumix TS5 - For Orthomosaic and Digital Surface Model.
  - Tetracam ADC Micro - For Multispectral Near Infra-Red mosaic and NDVI- SAVI maps.
- No RC Skills required. Easy to Use.
- Open access to IMU and GPS data.
- Same GCS, Payload options and Batteries used in sUAS Stardust.
- Developed by IDETEC Unmanned Systems, one of the world leaders in sUAS for Agriculture.
Tetracam ADC Micro – $3795.00 USD

For purchase inquiries please email sales@fieldofviewllc.com

At 90 grams, the ADC Micro extends the power of advanced multispectral imaging to small Unmanned Aircraft Systems all over the planet. In so doing, Tetracam’s smallest multispectral imaging marvel delivers this powerful technology — once only accessible via satellites — to agricultural, industrial and environmental users previously priced out of its use.

Featuring 2068 standard storage (extendible to 8 GB), fast parallel processing, ultra-low power consumption, and simple menu-organized configuration and control, the ADC Micro contains a single 3.2 mega-pixel sensor optimized for capture of visible light wavelengths longer than 520 nm and near-infrared wavelengths up to 920 nm. The camera and its accompanying software, PixelWrench2, are ideally suited for capturing and processing multispectral images of crops and forests and studying a variety of eco-systems.

PixelWrench2 provides color processing of Tetracam RAVY and DCM files, complex batch processing tools, the ability to extract a variety of vegetation indices and a comprehensive suite of image editing tools.

Included:
ADC Micro Agricultural Digital Camera
CDROM with Installation Software and Documentation
Product and Accessory Documentation
USB Interconnection Cable
Micro SD memory card
DC Power Supply with International Adapters
White Teflon Calibration Plate
Test and control box assembly and Cable
Un-terminated System Integration Cable
Hardened Plastic Storage and Transport Case

Product Photos
It’s about time!

- Population Ageing/Labor
- Technically feasible - Disruptive; Precision Ag
- Economically viable [system, labor, materials]
- Environmentally friendly – herbicide
- Socially acceptable – social mix
- Vicious Cycle – myopic
  - Chemicals [fertilizers; herbicide]
  - A Perspective Finder
  - Heavy tractors [No-till Farming]
- Other Issues
Automated Weed Control
Keywords

• Time
  – Agility, Shift, Disruptive
• Cartograms; Dashboard
  – Derisking, Newbies
• Training
  – See the unseen, Experientia
• Technology
  – Inventive Systems, Design
Elon Musk  (born 28 June 1971)

[Early life]
Musk was born in Pretoria, South Africa to a Canadian mother and a South African father. Elon taught himself computer programming and at age 12 sold the computer code for a video game called Blastar for $500. Musk graduated from Pretoria Boys High School and moved to Canada in 1988 at the age of 17, after obtaining Canadian citizenship through his mother. He did so to avoid service in the South African military, and also because he concluded it would be easier to immigrate to the United States from Canada than from South Africa. In 1992, after spending two years at Queen's University, Kingston, Ontario, Musk transferred to the Wharton School at the University of Pennsylvania and received an undergraduate degree in business and a second degree in physics. He moved to California to pursue a Ph.D. in applied physics at Stanford but left the program after two days to pursue his entrepreneurial aspirations in the areas of the Internet, renewable energy and outer space. In 2002, he was naturalized an American citizen.
Make fun with xGadgets, and this will make society better place!