

WenQuanYi Micro Hei [Scale=0.9]WenQuanYi Micro Hei Mono song-  
WenQuanYi Micro Hei sfWenQuanYi Micro Hei "zh" = 0pt plus 1pt

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# **AMazeFlyDocs Documentation**

***Release 1.0.0***

**AMaze**

**Dec 04, 2018**

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## çžĎěĎĚäÿÄæđúæžæúşçijŮéŸşéIJĀæśĆçŽĎěĎĎæIJž

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### 1.1 çşžçžşéIJĀæśĆ

#### 1.1.1 æŮäăžžæIJž

1iijŮä;ŁçŤÍPixhawkä;IJäÿžăĚűéĎĎëąŃæŮğăĹűăŽÍçŽĎæŮäăžžæIJžăĀĆ  
2iijŮäÿÄäÿłăŮăđŇë;ĕè;ĭLinuxèőăçőŮæIJžăĀĆ(ă;ŇăĕĆ:æăŞèŮŞæt'ĭ)  
3iijŮäÿææIJĹUSBéĀĆéĚăŽÍçŽĎXBeeăĹăĹŮăĀĆ(ă;ŇăĕĆ:XBee S1, XBee  
S2CĭijŇç■Ĺç■Ĺ)  
4iijŮ(ăŔŕéĀĹ)çŤĹăžŮërĈërŤçŽĎUSB-ttléĀĆéĚăŽÍ(ă;ŇăĕĆFT232,  
CP2102/CP2104iijŇăÿ■ă;ŁçŤÍPL2303) çđ'žă;Ň:XBeeăĹăĹŮăĀĆĂŽèŁĜUSBèĎĎăŮăĹŔPi,  
ŔPiéĂŽèŁĜUARTèĎĎăŮăĹŔPixhawkăĀĆăĹŔPiäÿŁéĚ■ç;őçăñăžűUARTiijŇă;ŁăĚűèŁŔëăŇăĹĹ921600bps  
æşćçĹ'žçŮŮiijŇăÿŮŮPixhawkçşžăĹŮçŽĎèő;ç;őäÿÄèĜŕăĀĆ([http://ardupilot.org/dev/docs/  
partner-computers.html](http://ardupilot.org/dev/docs/partner-computers.html))

#### 1.1.2 âĹŕéĹæŮğăĹűçñŽ

1iijŮäÿÄäÿłLinuxèőăçőŮæIJžăĀĆ(èŽŽæŇşæIJžăžşăŔŕăžě)  
2iijŮäÿææIJĹUSBéĀĆéĚăŽÍçŽĎXBeeăĹăĹŮăĀĆ(ăçXBee S1, XBee S2Cç■Ĺ)  
éĂŽäÿÿäÿÄäÿłăđŽæŮŇçĭijçžĎæĹŔăŇĚæŇăžèäÿŇçăñăžűiijĹăŽŽè;ŕiijĹiijŽ

#### 1.1.3 äÿÄäÿłăŽŽè;ŕéĎĎëąŇăŽÍçŽĎæĎĎæĹŔiijŽ

1. âŽŽè;ŕæIJžæđú X1iijĹăĹĚéăžiijĹ

## 四轴飞行器构成：



四轴机架\*1架(必须)



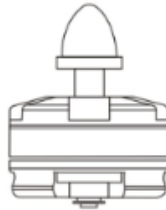
PIXHACK-V3飞控\*1个(必须)



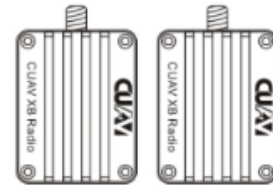
CUAV GPS\*1个(必须)



无刷电子调速器\*4个(必须)



动力马达\*4个(必须)



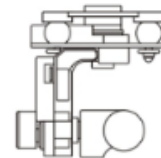
无线数传\*1对(可选)



动力电池\*1个(必须)



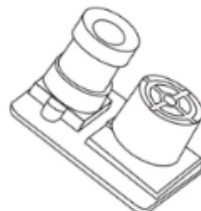
RC遥控器和RC接收机(必须)



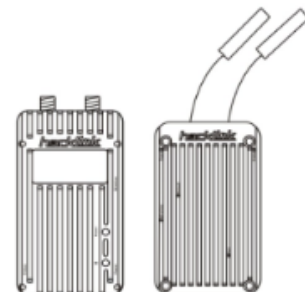
无刷云台/相机(可选)



超声波或激光传感器(可选)



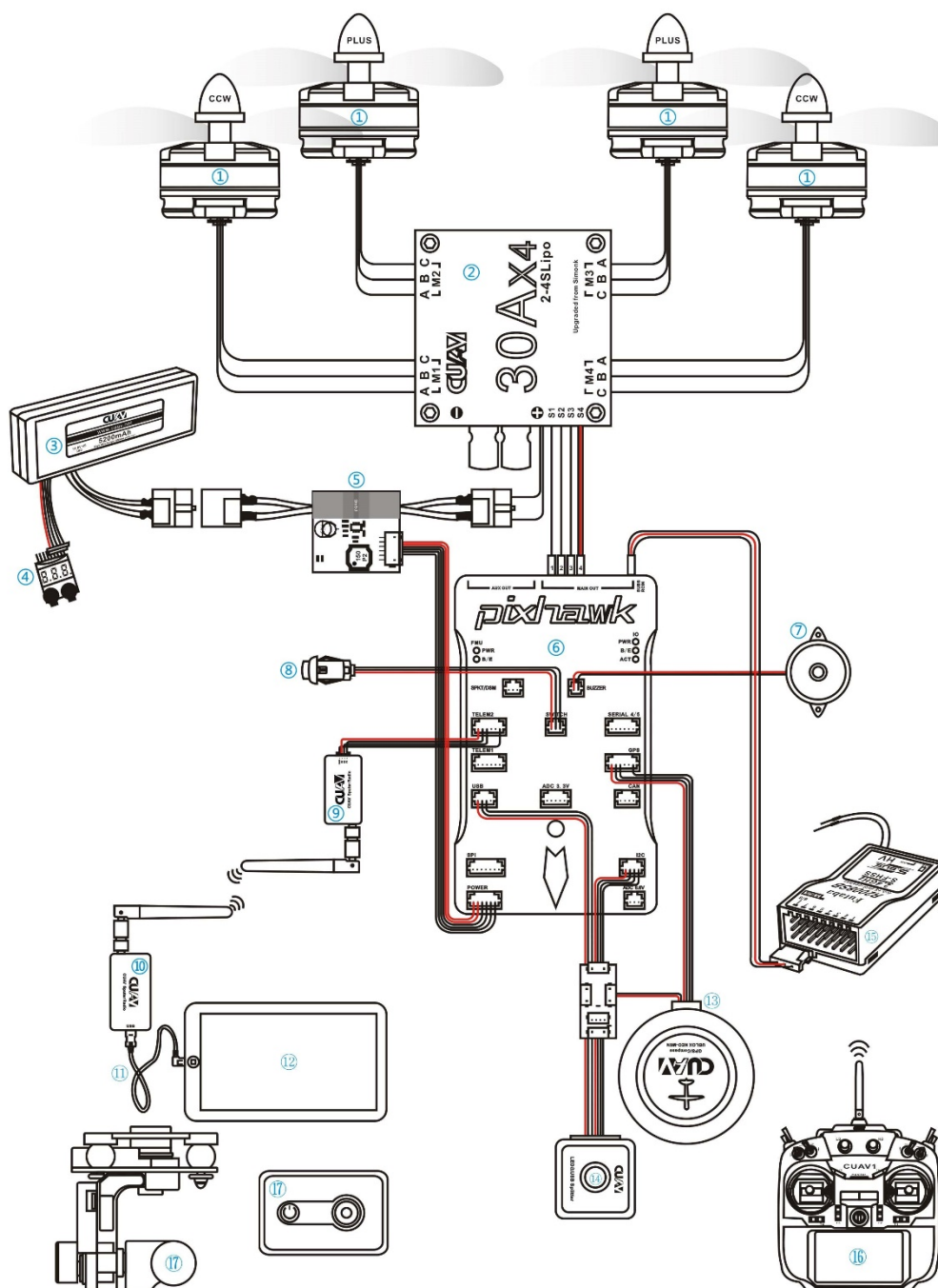
光流定点传感器(可选)



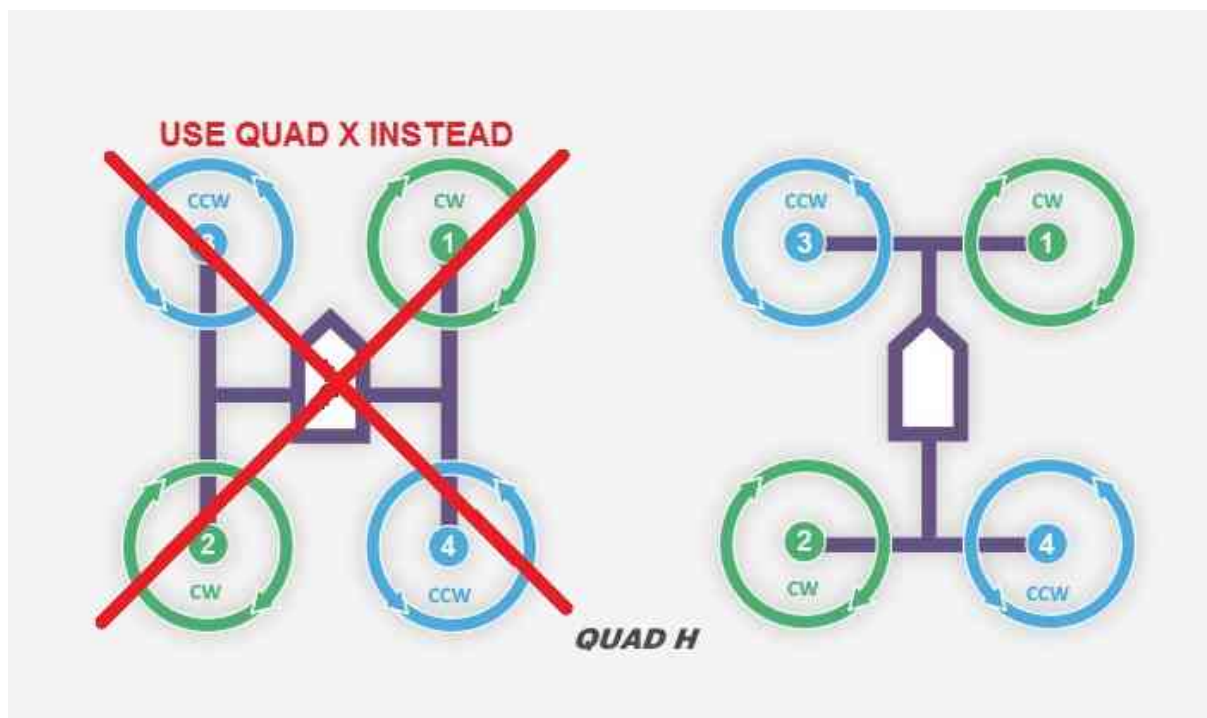
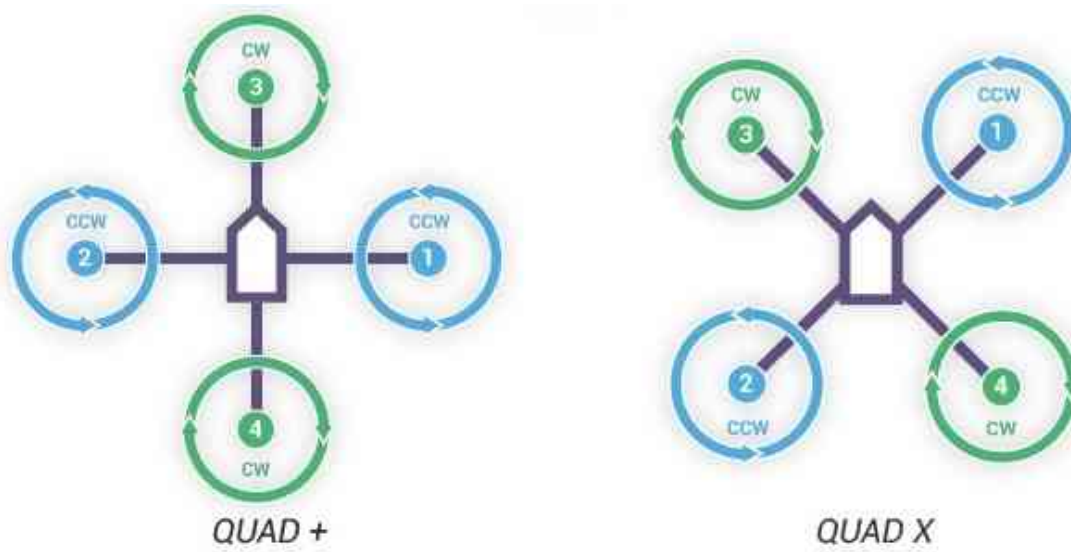
数字链路\*1对(可选)











è|rážűåŘŁąŤŇǺĚěǻijŔçşżçźŝéĚ■ç|ő

éċđæŒğçŽĐTelem2æŒăĤăŸŒRaspberryPIçŽĐUARTéĂŽêĤ3-pin twisted ca-  
bleêĤđæŒŒiijŦRaspberryPIăŸŒXBeē(æIJŋéazçŽŒéĤĤŒTŒXBeē pro s1)éĂŽêĤUSB ca-  
bleçŽŸêĤđăĂĤăŸzăEă;ĤăŸLŒéĂĤĤ;ăđ' \$æŦăŸŸéĂŽăĤiijŦŋéazăŦL'çĖġăzăăŸŦăŦĤēĤđ'êĤŽăăŦĖŦ;ŒăĂĤ

## 2.1 RaspberryPi

2.1.1 1. æǻSèÕ\$æt'Ꞥæ\$■ǻ|Jçşçzç\$ (æşl:æljñéąçŻóéĜĜçTlǻyęæljL'ǻŻꞤǻjçç  
MATE 16.04 for RaspberryPI 3BiiǻŃǻĚüǻžŮçŽĐOSéĚ■çjǻæŮzæşŤǻRrèĈ;

1. SDa■æäijäijRāŃŨè;řāzűSD Formatter 4.0 for SD/SDHC/SDXC
2. çşzçzşéŤIJāČRæŨĜäzűāIJÍUbuntu mateāōŸç;ŚäyLäyNè;;iijŃāEŹāĚēSDā■açŽDè;řāzűWin32 Disk Imager
3. āōL'èçĚæ\$■ä;IJçşzçzşæŮüiijŃāŃĹéĀL'āijĀæIJžèĠtāĹćŽzā;ŤāĀĆ(āōđçŎřauto-login)
4. æ\$■ä;IJçşzçzşāōL'èçĚāōŃæĹŘäzēāŘŎiijŃäyNè;;æŨĜæIJñçijŨèĹŚāŹĬgeditüijŃæŨzäĹ£āŘŎçz■æŽt æŤ  
sudo apt install gedit

### 2.1.2 2. řEUARTãRřçTlãžcommunication interfaceãČ

1. `sudo gedit /boot/cmdline.text`
2. `åĹăÉZd'èr■ăRěăĂÿconsole=serial0,115200ăŽăŕİă■ŸăźúéĂăăĞžăĂĆ`

### 2.1.3 3. äŒöæŤzUARTéĚ■ç;őiiĴŇăĚşéŮ■èŞİçL'ZiijLæşİ:mateçşzçzşşézYèóđ'èŞİç

1. `sudo gedit /boot/config.txt`
2. `äŒöæŤzinit_uart_clock to 16MHzäzèâŔĹinit_uart_baudrate to 921600âzűăĹăéŹđ'ér■ăŔěăĹ'■éİçŹĐæşİéĜĹçņăŔŮ#ăĂĈiijLæşİ:éčđæŎğTelem2æşççL'zçŎĞăzşèçAç`
3. `ăĴĴăŮĜăĴŇăyŇéİçăűăĹăér■ăŔěăĂŸcore_freq = 250ăĂŹ`
4. `ăĴĴăŮĜăĴŇăyŇéİçăűăĹăér■ăŔěăĂŸdtoverlay=pi3-disable-btăĂŹăĴİă■ŸăzűéĂăĜž`
5. `sudo systemctl disable hciuart sudo reboot`  
`éĜ■ăŔŕăŔŎUARTéĚ■ç;őăŏŇăĹŔ`

### 2.1.4 4. ăŎL'èçĚPythonăŇĚăŞŇLinuxăŇĚăĂĈiijLæşİ:mateçşzçzşşèĜĴăyępython 2.7çŎŔăçĈiijL'

1. `sudo apt install python-pip python-dev sudo pip install pip dronekit xbee numpy gps pyzmq --upgrade`
2. `sudo apt install python-serial`

### 2.1.5 5. ăĴĴăŔŕsshăĂĈ

1. `sudo apt install openssh-server openssh-client`
2. `sudo raspi-config`
3. `ăĜžçŎŔéĚ■ç;őçŤŇéİçiijŇéĂĹ'ăŇĴ'ăĂŸnetworkăĂŹăĂĈ`
4. `éĂĹ'ăŇĴ'ăĂŸssh enabledăĂŹăĂĈ ### 6. èŎçç;őăĴĴăĴĴăŔŕçĴŇăžŔăĂĈ(çăŏăĴİauto-loginăűşăŏđçŎŔ)`
5. `sudo gedit /etc/rc.local`
6. `ăĴĴăŮĜăzűăŸ■ăűăĹă cd /AmazeFly python onboard.py -xbee /dev/ttyUSB -pix /dev/ttyAMA0iijŇăĴİă■ŸéĂăĜž`

## 2.2 XBeeéĚ■ç;őăŔĈèĂĈ

### 2.2.1 1. ăŹžăzűçĈĜăĚŹ

1. `ăŸŇëĴ;ăűčăĚŮXCTU`
2. `çĈĜăĚŹDigiMeshăŹžăzű(æşİ:æŎĴè■Ŕ8073 – Xbee DiGiMesh 2.4)`

## 2.2.2 2. åŒéĚ■çĩőæŰĞäzűáríjåĚĚXBee

## CHAPTER 3

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### çijŮéŸşçlÍŇăžŘèğçæđŘ

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#### 3.1 1. äžŇçž■

AmazeFlyçŽĐæŮääžžæIJžéĜĜçŤlPixhawkăŠŇArduPilotăăEæăĹă;IJăŸžăőČăžŋçŽĐă;ŮçžğéčđæăŇæŮğpythonă;IJăŸžénŸçžğăžŤçŤlçlÍŇăžŘæŮğăĹŭăĂĈăĹçŽăăĹ■ăŸžæ■çèĚŸæşqæIJĹăIJlPixhawkăŠŇArduPilotçPi)ăĂĈ

AMazeFlyçŽĐæŮääžžæIJžă;ĚçŤlXBeeăĹăăĹăIJăŮääžžæIJžăŠŇăIJřéĹæŮğăĹŭçŋŽăžŇéŮt'ăžžçŋŇér

##### 3.1.1 1.1 âijŤçŤl

Quan Yuan,FlydanéąçžŽŮ(<https://github.com/WeskerYuan/flydan>)

##### 3.1.2 1.2 èőÿăŘr

AmazeFlyéąçžŽŮăŸřApache 2.0ăŸŇæŘŤă;ŽçŽĐăijĂæžŘèőÿăŘŤăĂĈ

##### 3.1.3 1.3 çijŮçăAèğĐèŇĈ

éąçžŽŮăőŇăĹăŸŤæŇĹçĚğèřŭæ■ŇPythonéĈŌăăijæŇĜă■ŮçŽĐçžăăŮžçŤlPython2.7çijŮăĚŽçŽĐăĂĈ

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## 3.2 2. éążçŻóçŻDäyžèèAçzDæŁŘéČlăĹĚ

AmazeFly	README.md	
	gcs.py	
	onboard.py	
	main.py	
	src	comm.py
		handlers.py
		mas.py
		nav.py
		missionparser.py
		PWMController.py
		shared.py
		util.py
	mission_txt	
	log	

1.gcs.py:

çŦlăžŎăZZè;t' ècđèąŇăZlėZEç;d' æŎğăĹŭăôđétŇçŻDăIJřéİcæŎğăĹŭçnŻèDŽæIJňăĂĆ

èřèèDŽæIJňăIJlēcĚæIJĹLinux çŻDçñŦèõřæIJñçŦŦeDŠăyĹèŁŦRèąŇăĂĆèřèèŁŦçĹŇăžŦèŁđæŎëăyĂăyĹén  
Pro S1æĹăĹŮřijĹă;ŁçŦĹDIJI MeshăŻžăžŭřijĹăĂĆæIJĹăĚşæŽŦăđ' ŽèřççZEăŁąæAřijŇèřŭăŦŦéYĚDIJIăŦŸæŁ  
APIăŇĚæŦřæŇAPython 2.7ăĂĆçĐŭèĂŇijŇUbuntuæŸřæŽŦăăç;çŻĐéĂĹæŇŦ'ijŇăŽăăyžăŦŦă;ŁçŦĹăĂŸaptă

2.onboard.py:

èŁŽæŸřăZZè;t' ècđèąŇăZlėZEç;d' æŎğăĹŭăôđétŇçŻDăyžèèAèDŽæIJňăĂĆ

èřèèDŽæIJňăIJlėŁè;ĹéĚăăŮèŦăçŦŮæIJžijĹă;ŇăĚŦRasperry  
PijijĹăyĹèŁŦRèąŇăĂĆăyŎăđ'ăŦŇæŮřijŇæŎğăĹŭăĂŽèŁŦGUSBăĹŮăyşèąŇèŁđæŎëijŇæŇĹçĚġMAVĹin  
Pro S1æĹăĹŮřijĹă;ŁçŦĹDIJI MeshăŻžăžŭřijĹăĂĆæIJĹăĚşæŽŦăđ' ŽèřççZEăŁąæAřijŇèřŭăŦŦéYĚDIJIăŦŸæŁ  
APIăŇĚæŦřæŇAPython 2.7ăĂĆçĐŭèĂŇijŇUbuntuæŸřæŽŦăăç;çŻĐéĂĹæŇŦ'ijŇăŽăăyžăŦŦă;ŁçŦĹăĂŸaptă

3.comm.pyijŽ

éĂŽăŁăçŻDçşăăŇăĢ;æŦřăĂĆ

èřèăĹăĹŮăŇĚăŦŦçŦĹăžŎè;èè;ĹăĹŮè;èè;ĹăŇŦGCSăžŇéŮŦăĂŽăŁăçŻDçşăăŇăĢ;æŦřăĂĆéĂŽăyŷij

4.mas.pyijŽ

ăđ'ŽăžçčŘĚçşççşæŎğăĹŭçŦŮăşŦăĹăĹŮăĂĆ

æ■d' ælāāiUāÑĖāRñénYçžgäzčçŘEçşzçzşæŌğāLúçŽDçşzāŠÑāGjæTřāĀĆèŁæIJL'äyð' çğ■äyžèeAçŽD  
2014āzt' COLLMOTçŽDĖĠāLāĖŌlēŁZçōUæşTāŠÑ2016āzt' çŽDRCSNSçŽDāLEæTčāijRāīāđNécĐætNæČ

5.nav.pyiijŽ

ārījèLlāŁšèČ;āĀĆ

èřæīāāiUāÑĖāRñāşžæIJñçŽDçŽt' ā■GæIJžārījèLlāŁšèČ;īijÑèŁZāžZāŁšèČ;āđ' ġéČlāLEāđ' DžŌGUID

6.shared.pyiijŽ

èulæŪĞäzūāĖšāžñçŽDæīāāiUāĀĆ

èřæīāāiUāÑĖāRñèōyāđ' Žäy■āRŇçŽDāĖlāśĀāĖšāžñæŪĞäzūāŁšèČ;āĀĆāōČāžñæYřāyýéĠRæLŪécĐā

7.util.pyiijŽ

āōđçTlāŁšèČ;āĀĆ

èřæīāāiUāĖūæIJL'āĞäyŁæIJL'çTlçŽDāŁšèČ;īijNāŁŁāžŌçşcéĠRèōaçōUāŠÑæTřæ■ōæŪčāŁŪèōřā;Tā

8.missionparser.pyiijŽ

äyŁāijāāžzāŁāĀĆ

9.PWMController.pyiijŽ

æL'ŠāijĀæLŪāĖşéŪ■æŪāāžžæIJžäyŁçŽDLEDāĀĆ

Mission\_txtiijŽ ā■YæTŁāžzāŁaçŽDçŽōā;TāĀĆ

### 3.3 3. äyžèeAæ■ééld'

1.āžžčñNäyĀäyŁéčđēāNāžzāŁāqījNāžūāřEçTşæLŘçŽDāžzāŁāTXTæŪĞäzūāđ' ■āLūāLřæŪāāžžæIJžéāçç

2.èŁRēāNōnboard.pyæŪĞäzūāĀĆ

3.āIJlLinuxèōaçōŪæIJžèŁRēāNġcs.pyæŪĞäzūāžūæŌğāLūæŪāāžžæIJžāĀĆ

### 3.4 4. āęČä;Tjā;ŁçTl

#### 3.4.1 1. āžžčñNäyĀäyŁéčđēāNāžzāŁāç:

è;řāžū:APM Planner 2.0

æ■ééld':

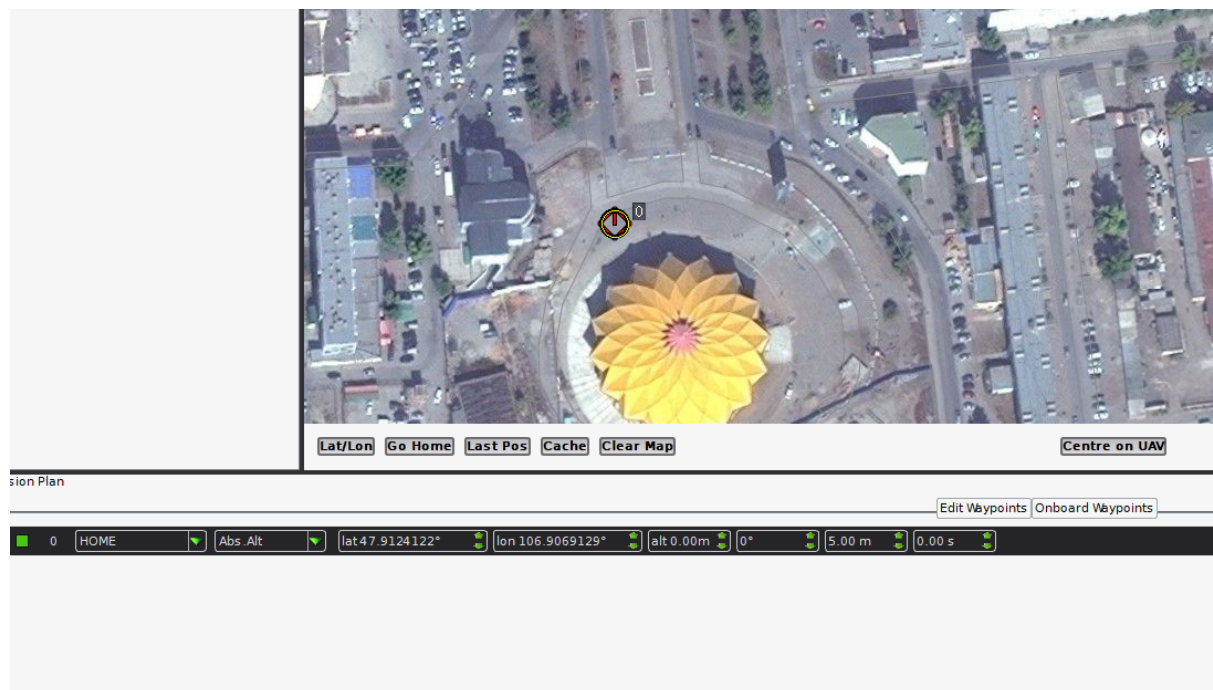
(1)èŁRēāNērēè;řāžūāĀĆ

(2)ā■TjāGzāĀIJFLIGHT PLANāĀīāĀĆ

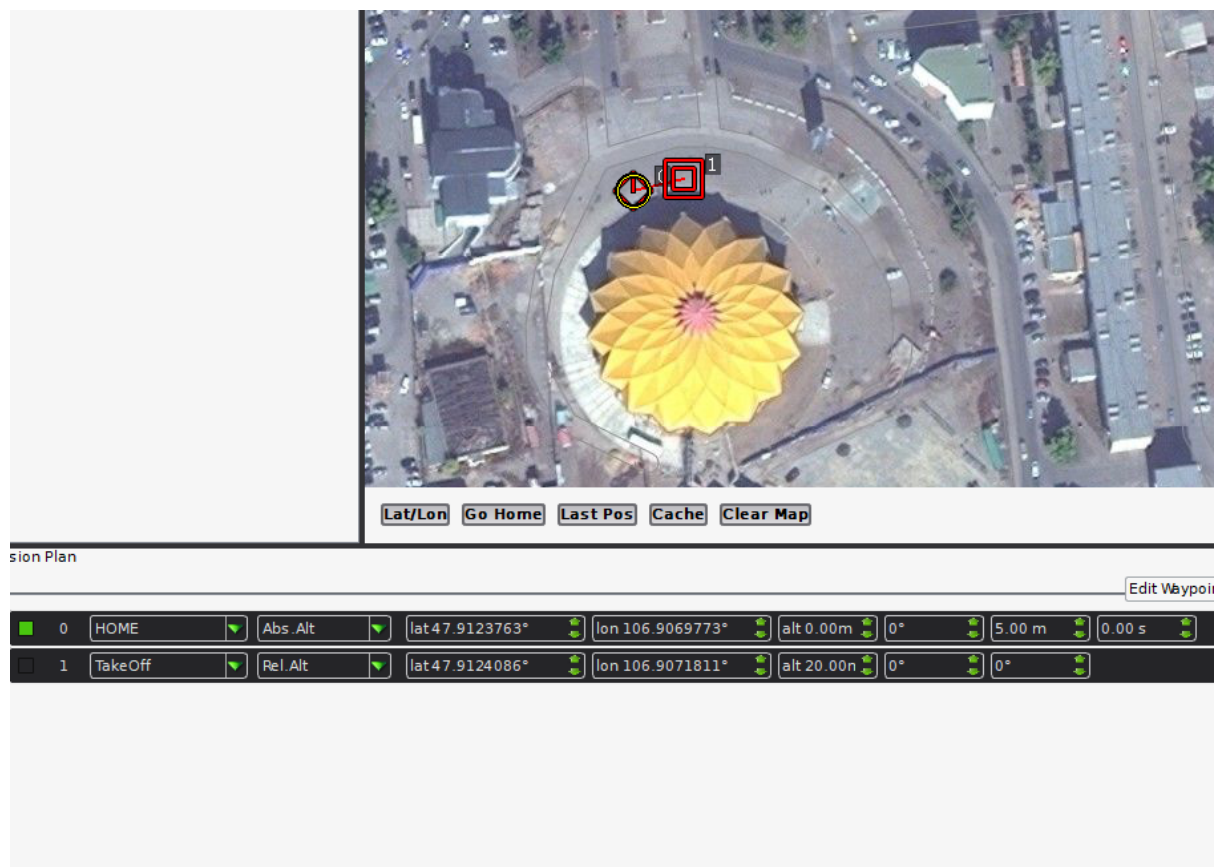
(3)āRŇāGzāIJřāZŁäyŁçŽDäyĀäyŁçČž(çijŪāRūāyž0)ā;IJäyžāĀIJéčđēāNāŌşçČzāĀīāĀĆ

(4)āRŇāGzāIJřāZŁäyŁçŽDçññāžŇçČž(çijŪāRūāyž1)ā;IJäyžāĀIJèŁéčđēāNāŌşçČzāĀīāĀĆ

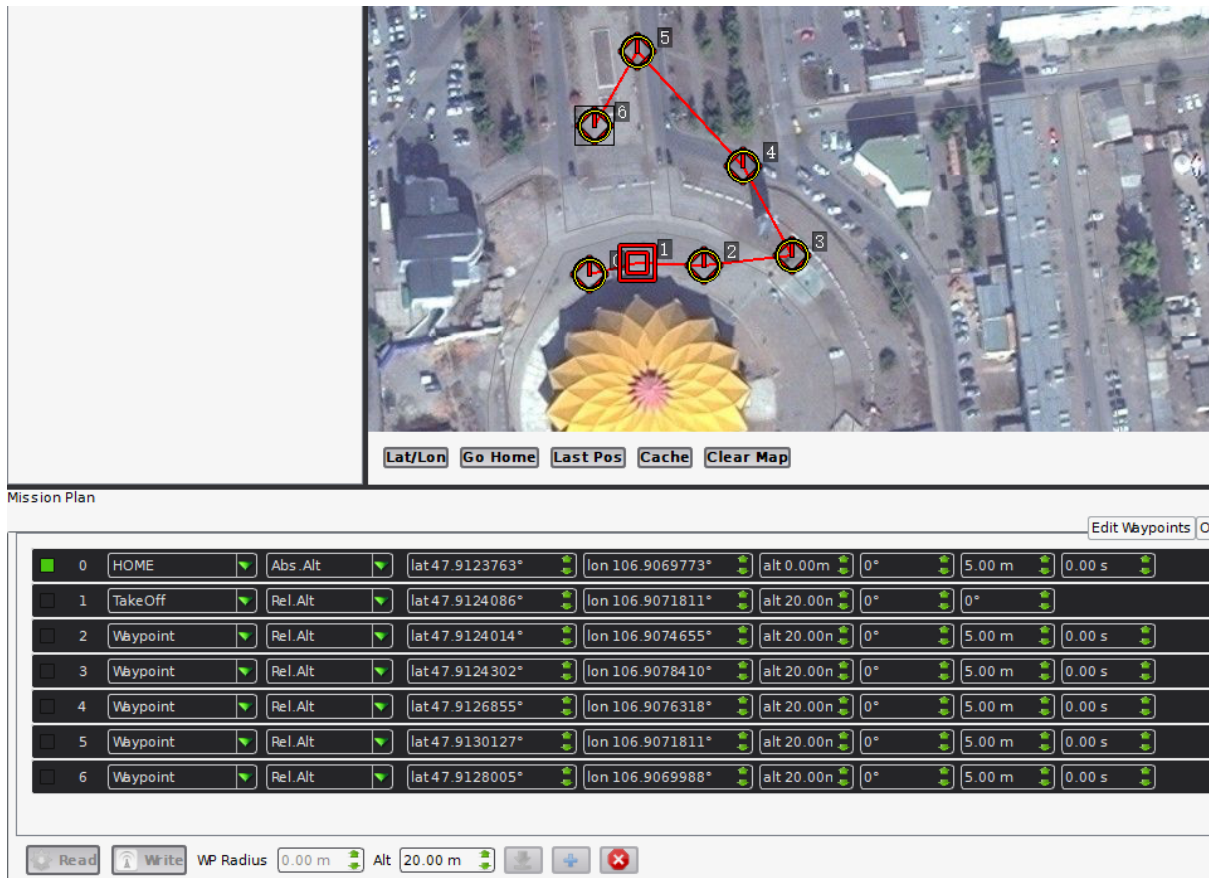








(5)çžğçz■āŖŃāĠzäyÄäžŽçĆzä;IJäyžèùŕā;ĎçĆzāĀĆ



(6)āŖfäzēāIJléaŕéİcäyŃæŰzæŽt' æŦžçĆžçŽĎénŸäžēāĀAçš;çaðāžēāŖŃæāĠécŸāĀĆ

(7)ārEçŦŖæĠŖçŽĎTXTæŰĠgäzŭād'■āĠŭāĠŖmission\_txtçŽōā;Ŧäy■iijŃāžŭæŃĻçĖgæŰäāžžæIJžçŽĎāžŖ.txtāĀŽāĀAâĀŽSECOND.txtāĀŽæĠŰâĀŽTHIRD.txtāĀŽāĀĆ)

āŖĆèĀĆ:<http://ardupilot.org/planner2/>

### 3.4.2 2. èŖŖèaŃāĀŽonboard.pyâĀŽæŰĠgäzŭiijž

âĀŸonboard.pyâĀŽèĎŽæIJnäijžâIJæŰäāžžæIJžâŖŕäĠæŰüèĠäĠéŖŖèaŃāĀĆ

### 3.4.3 3. éĀŽèŖĠâĀŽgcs.pyâĀŽæŰĠgäzŭiijž

(1)æĻŖäijĀLinuxāĀĆ

(2)ārEXbeeäĠäĠŰèŖæŖŖäĠŖLinuxèŖaçŖŰæIJžāĀĆ

(3)èŖŖèaŃçžĠçŕŕāĀĆ

(4)ä;ŖçŦĠäĀŽcdâĀŽāŖ;äzd' āĠĠæ■cāĠŖéažçŽŖçŽŖä;ŦāĀĆ

(5)éĀŽèŖĠâĀŽ `sudo python gcs.py -xbee /dev/ttyUSB0`  
 âĀŸèŖŖèaŃçžĎâĀŽgcs.pyâĀŽāĀĆä;ŖçŦĠäĀŽ–helpâĀŽæĠŰâŖĆèĀĆæžŖäžççāAçžĎæŰĠgäzŭiijžæç■ŰçŖäyŖšä.

Keylist:

```
'x': 0, # switch the mode to auto
'1': 1, # the first mission
'2': 2, # the second mission
'3': 3, # the third mission
'l': 4, # landed
'd': 5, # turn on the LED
'k': 6, # kill thread and restart
```

æ■čăÿyèŧuécđeazăžRăžTèrěæYr:

- 1).æŃĹ'âĂIJ1âĂĪ/âĂIJ2âĂĪ/âĂIJ3âĂĪiijŃéĂĹ'æŃĹ'çŋăÿĂ/çŋăžŃ/çŋăÿĹ'äÿlăzzăĹqăĂĈ
- 2).æŃĹ'âĂIJxâĂĪéŤōiijŃăĹĜæ■căĹrèĜlăĹlăĹqăijŖăžüèțuécđăĂĈ
- 3).æŃĹ'âĂIJdâĂĪéŤōiijŃæĹ'ȘăijĂLEDçAŖăĂĈ
- 4).æŃĹ'âĂIJl âĂĪéŤōiijŃçZt'æŌëéŽ■èŖjæŮăăžžæIJžăĂĈ
- 5).æŃĹ'âĂIJkâĂĪéŤōiijŃăĹĖsêŮ■çžćŃĹăžúéĜ■æŮŖăŖăĹlăĂĈ

## CHAPTER 4

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