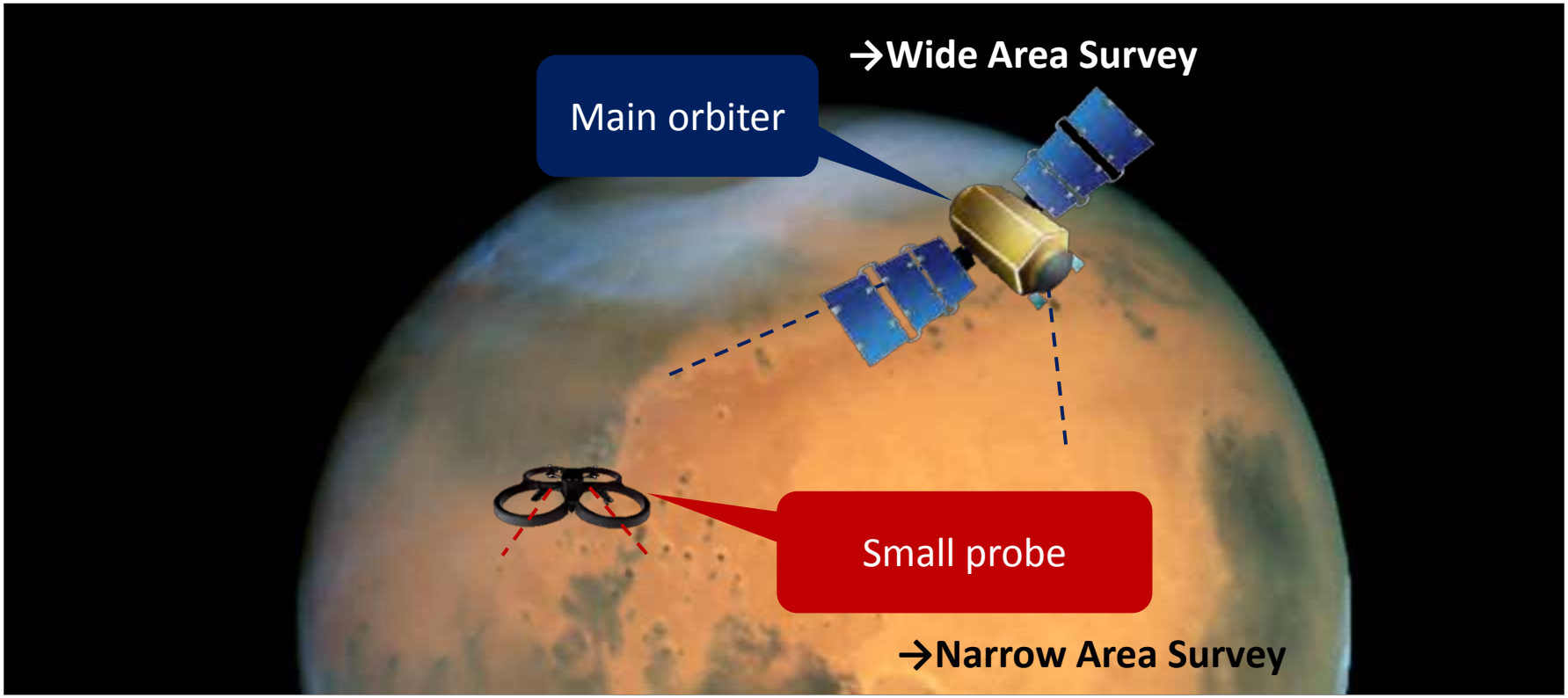
NMOS's ARE GO!!

STORY

- Our can-sat demonstrated a small and low-cost planetary exploration.
- Main orbiter and small probe reconnaissance a planet which has atmosphere (Mars, Titan, etc).



COTS Usage

SMART PHONE in bus system

- App
- Many Devices (Display, Camera, GPSR, Accelerometer, Bluetooth, Wi-Fi)
- Battery and Power supply
- Voice announce (SIRI, Jeannie)
- High extensibility (Update is very easy only to develop each App)

- Very light
- H/W extensibility (Camera, Beacon)
- Many open source S/Ws or APPs
- Communication with Smart Phone

Crazyflie Nano Quadcopter as Probe

Weight: ~19 g

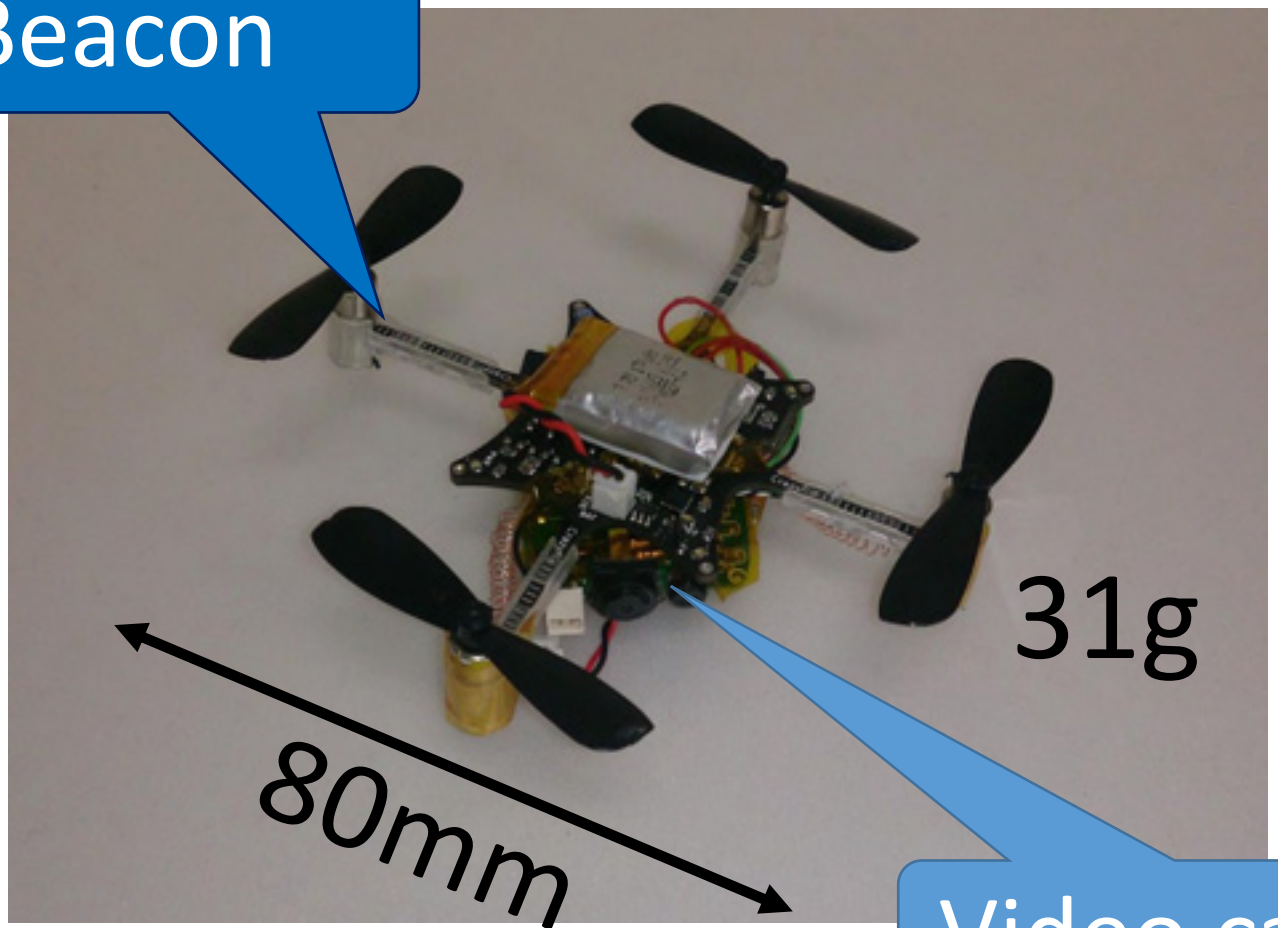
Size: 9 cm x 9 cm

Flight time: 7 min

Charge time: 20 min

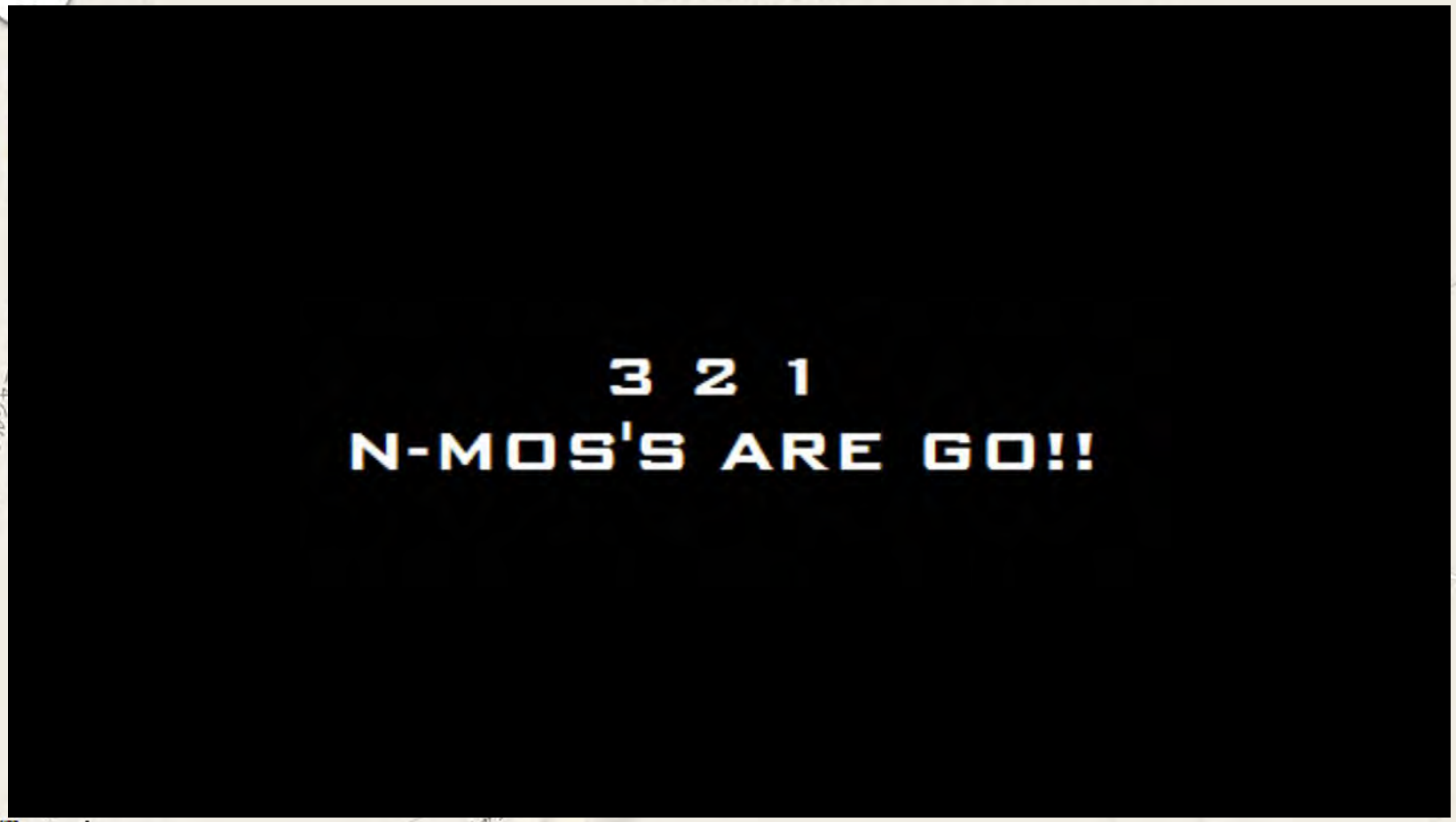
Main Orbiter: MICHIZANE

Probe : QRQR



Lift off and Flying

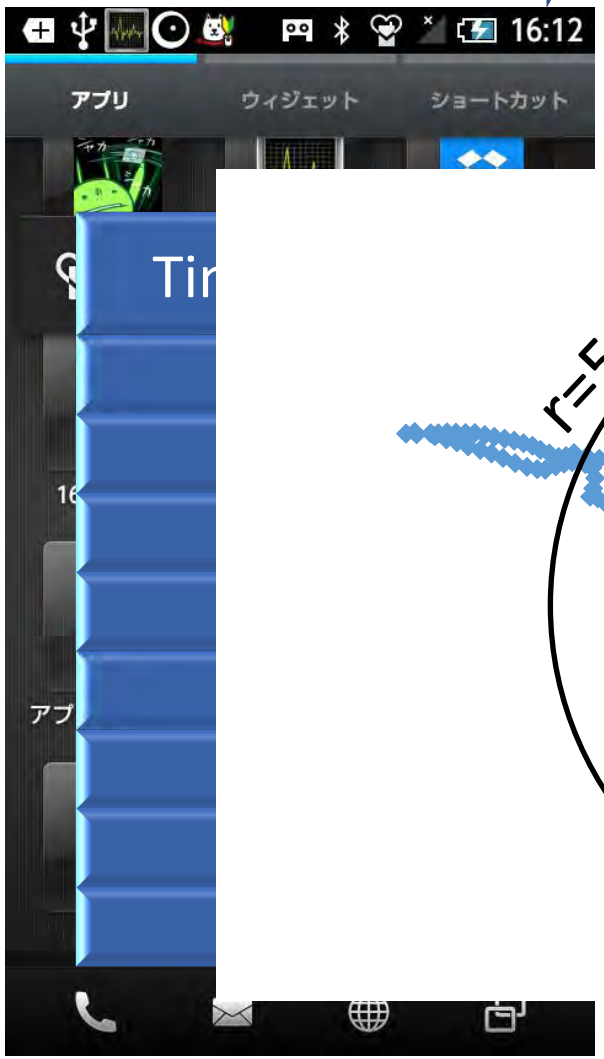
Launch

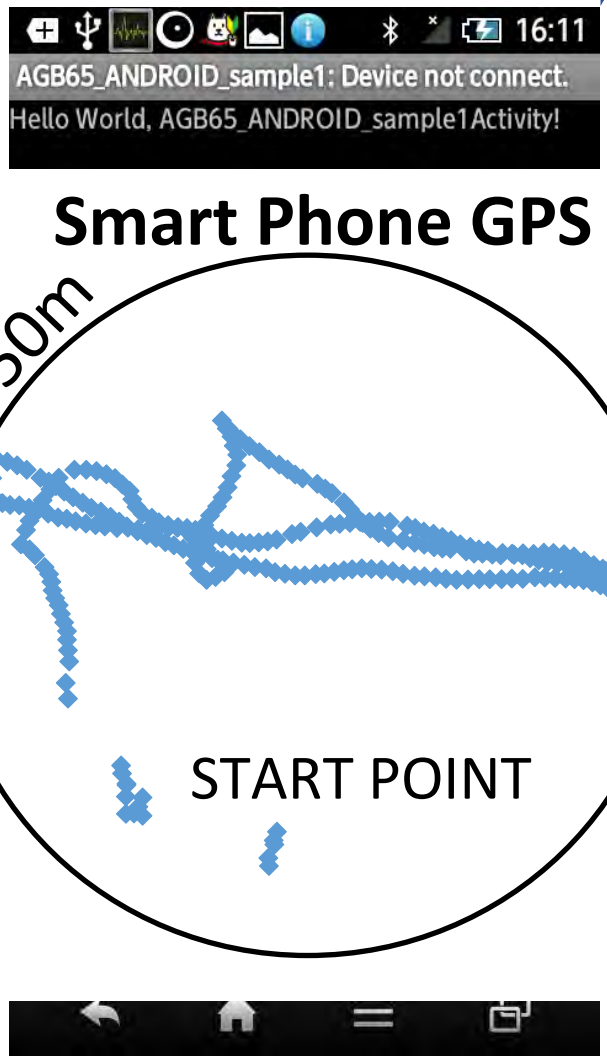


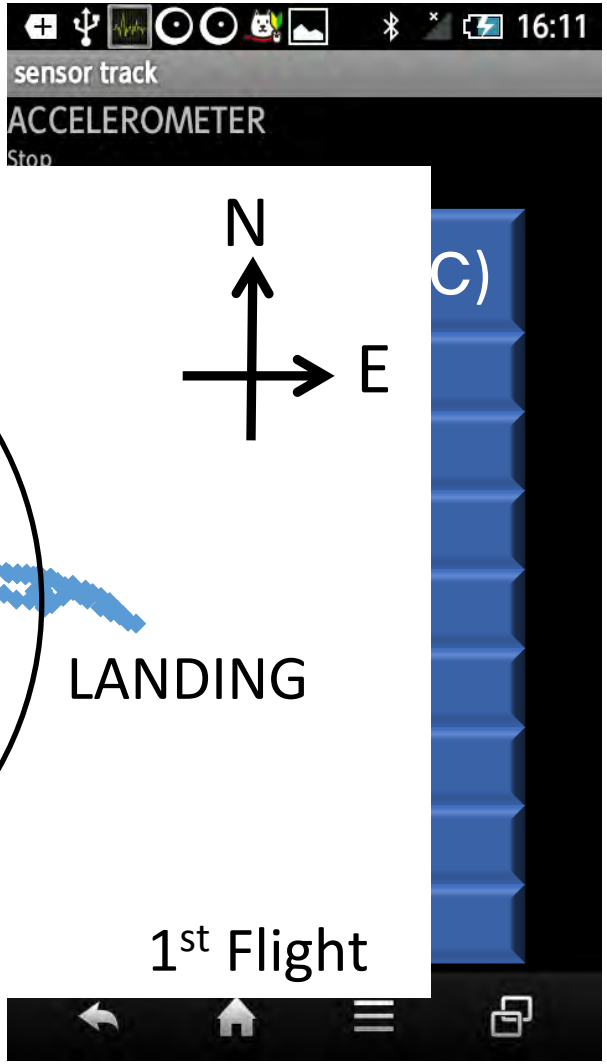
2nd Flight

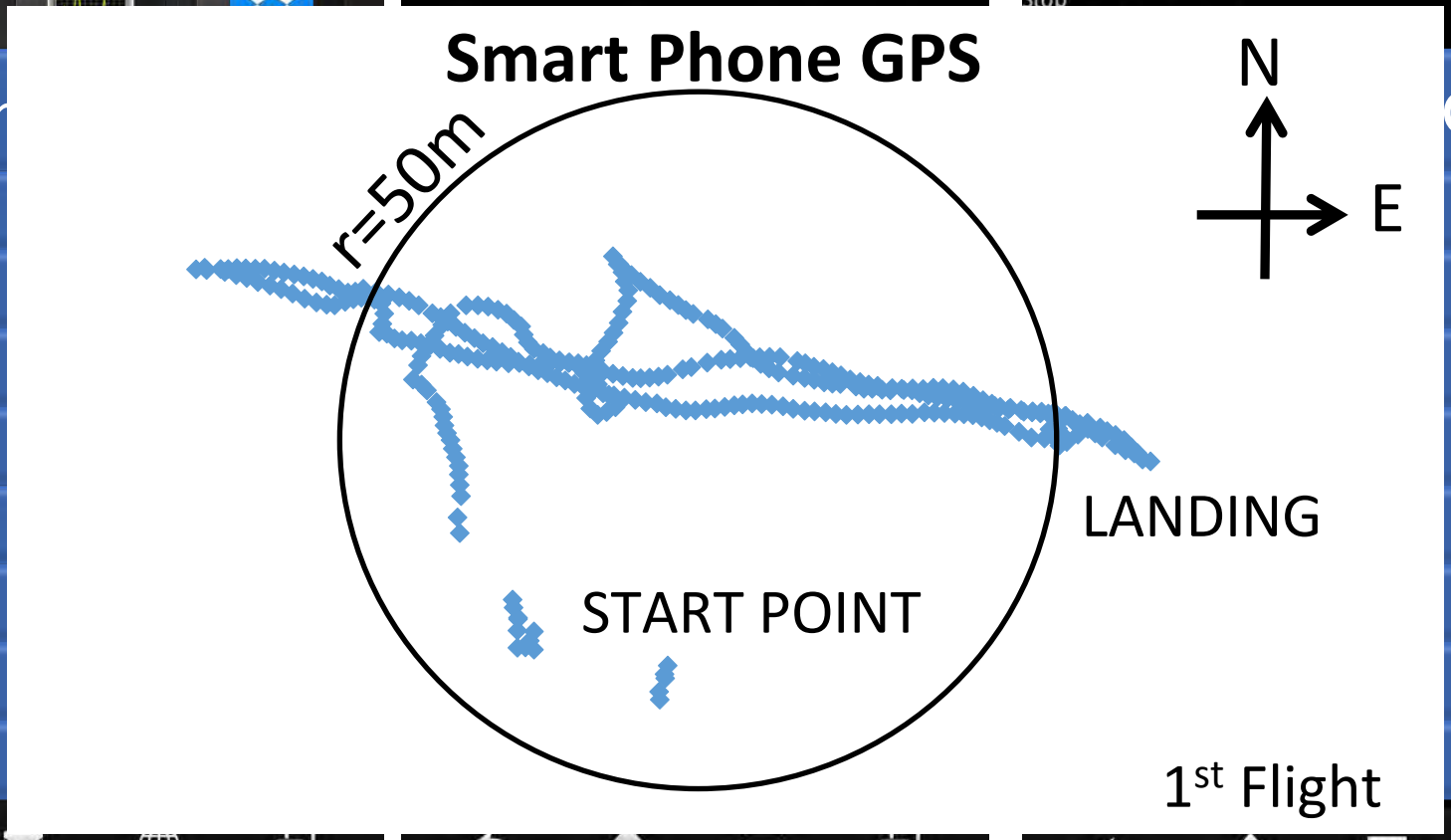
APPs 1

Mission start Menu → Communication with FPGA Preservation of HK Data → Sensor Tracking →



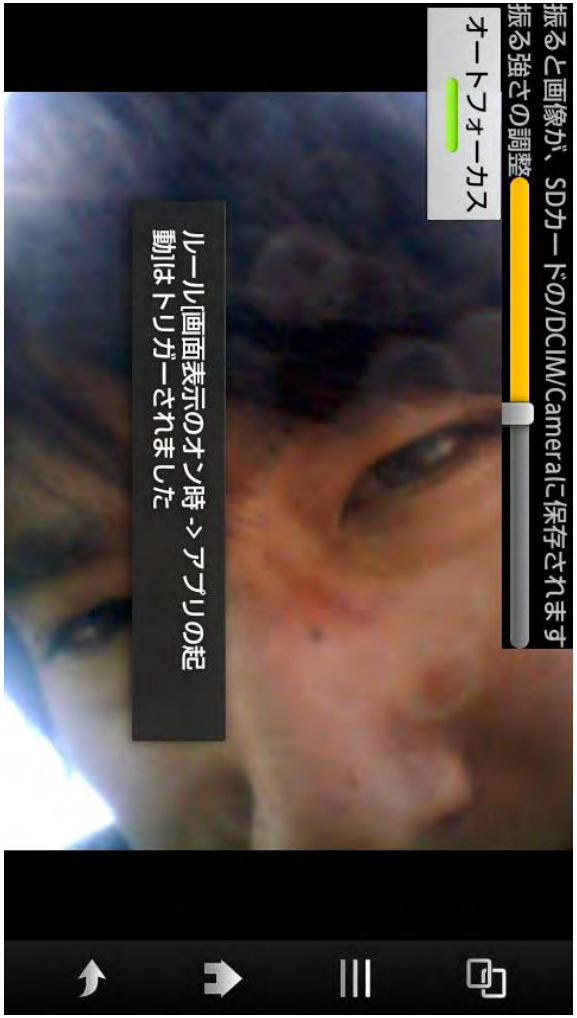




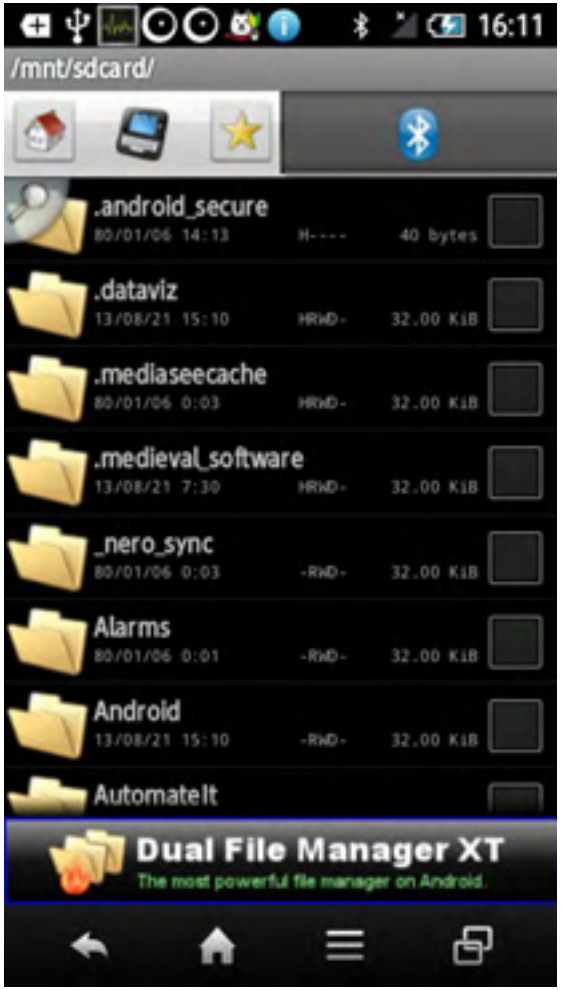


APPs 2

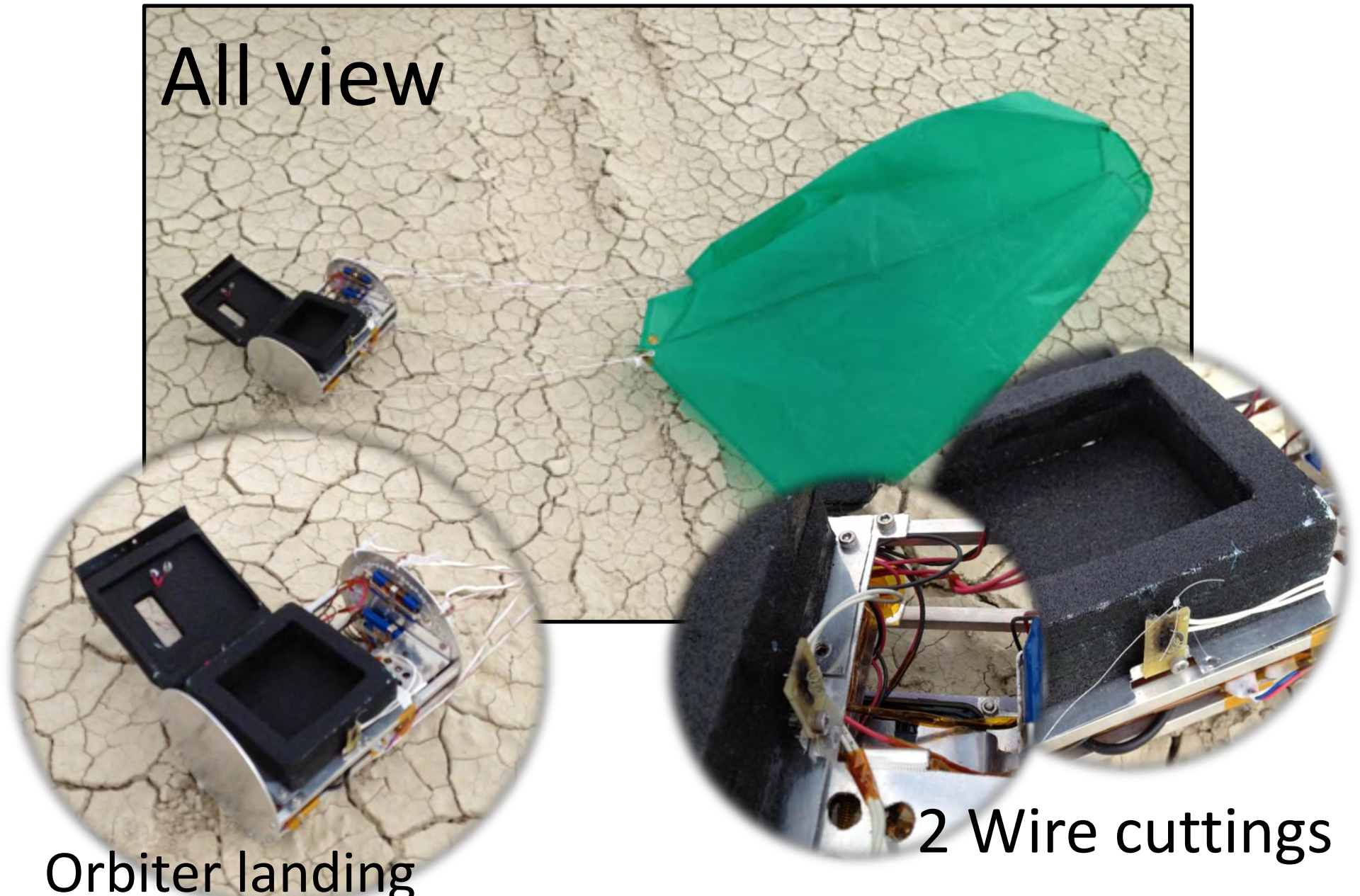
Camera



Start Bluetooth communication
Satellite smart phone

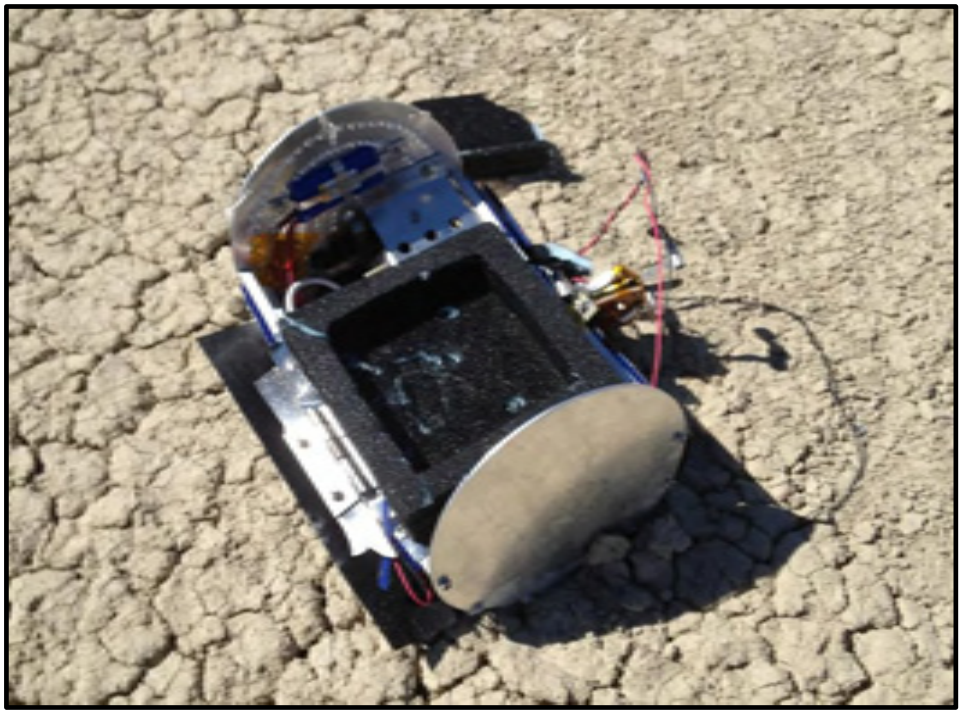


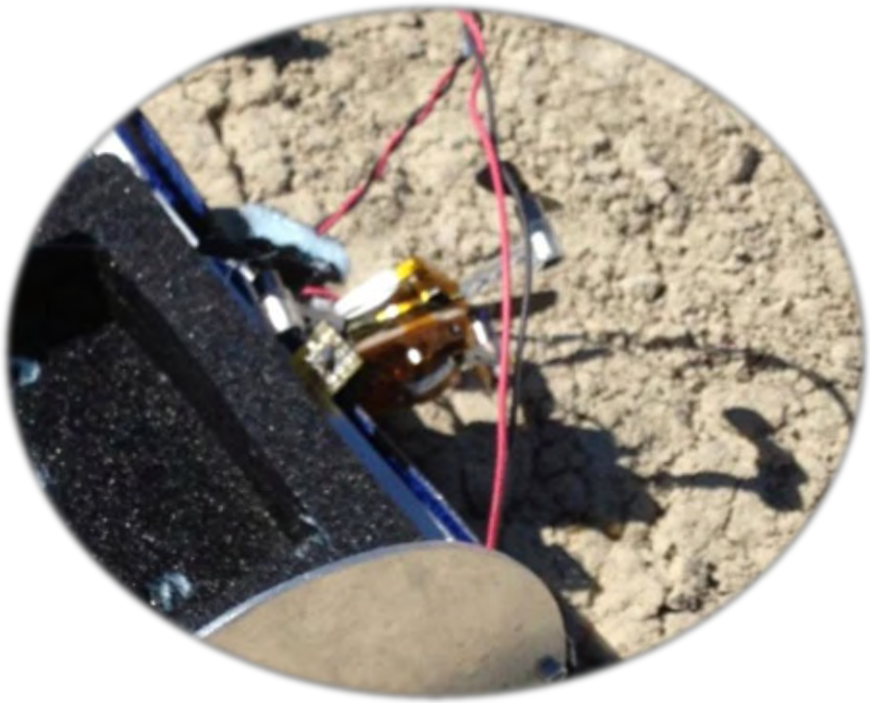
Landing / Ready to QR flying



Probe Results

- 1st probe was lost for its flying. (2nd flight)
- 2nd probe was unbroken and shot a movie. (1st flight)





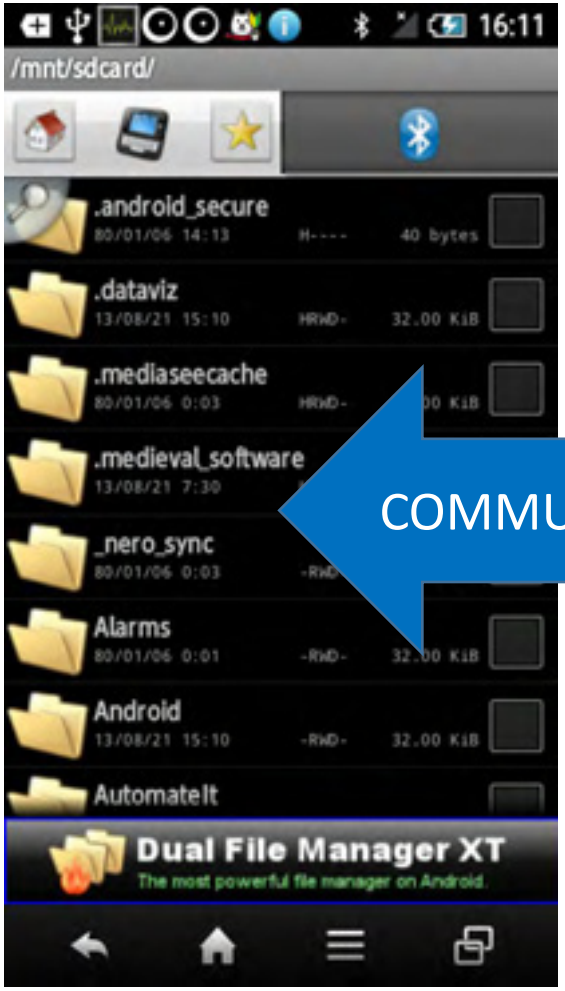
APPs 3

Communication with GS Smart Phone

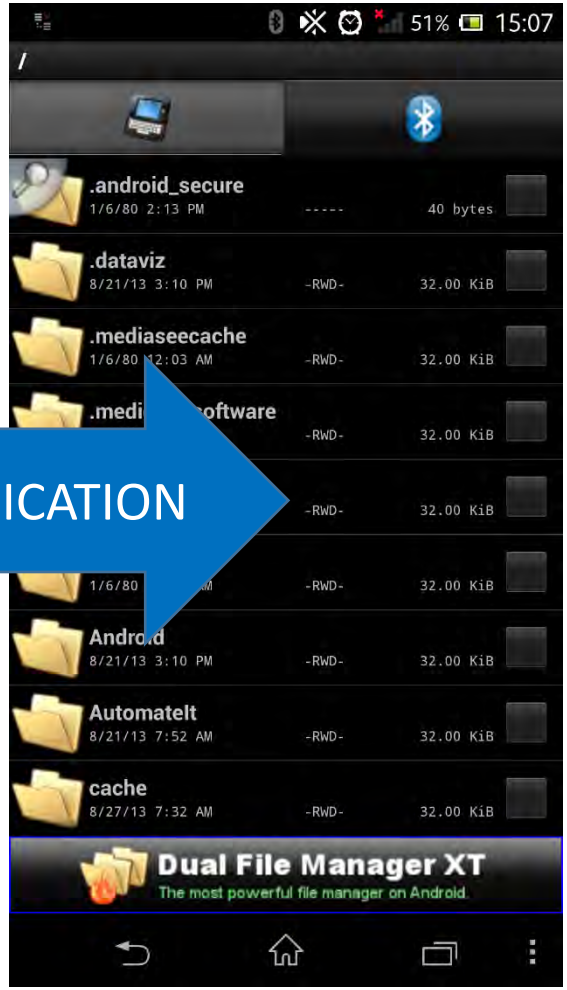
Satellite smart phone

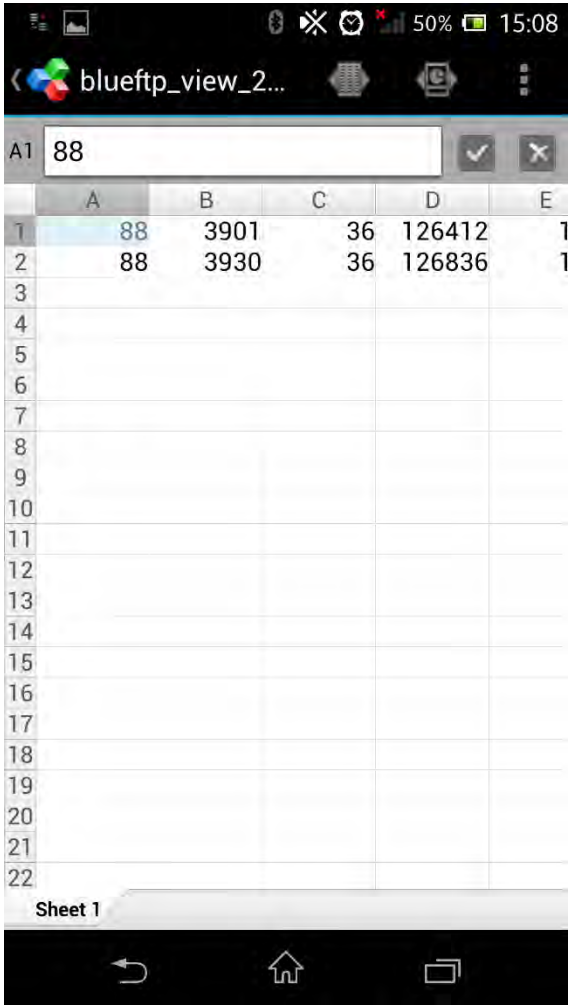
My GS smart phone

Data example

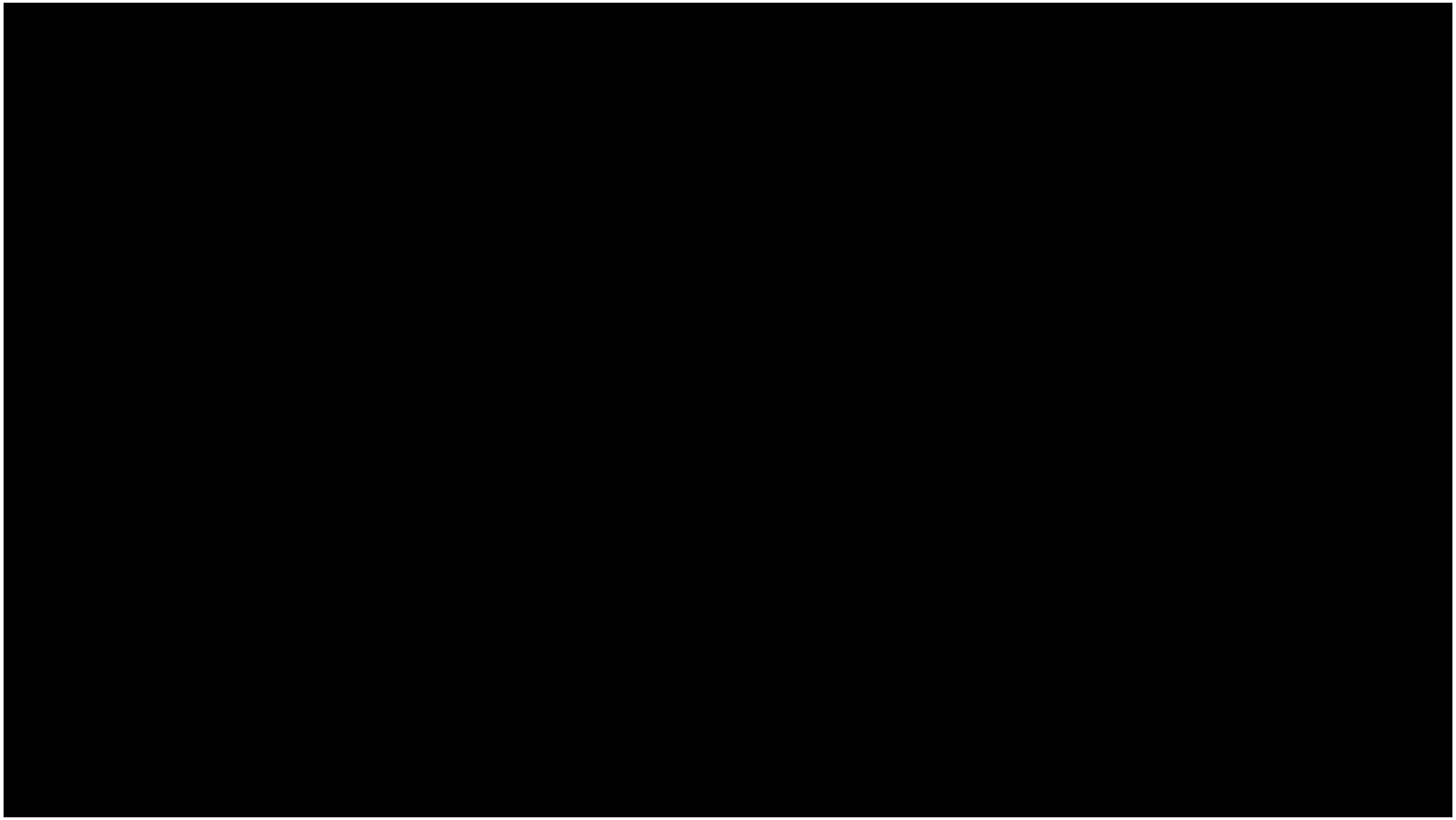


COMMUNICATION





Last Mission



Experimental Results

BUS SYSTEM MISSION
QR SYSTEM MISSION

1. Minimum

Get GPS data (GPSR)	Done
Parachute deployment	Done
App. ON	Done
QR no damage	Done

2. Full

Power supply to each component	Done
BUS system inner communication	Done
Save HK data	Done
Landing	Done
Ready to fly (Cover open, Melting launch-rock, Power ON)	Done
Take off	Maybe done

3. Extra

Take photos	Maybe done
Get GPS data (Smart Phone)	Done
Shot a movie	Done
Communication between QR and Smart phone	Incomplete
Communication between Smart phone and other phone	Done

Your SMART PHONE is Your CAN-SAT

- We'll open a web-site for Can-Sat App!

  -We'll share all Apps used in this can-sat

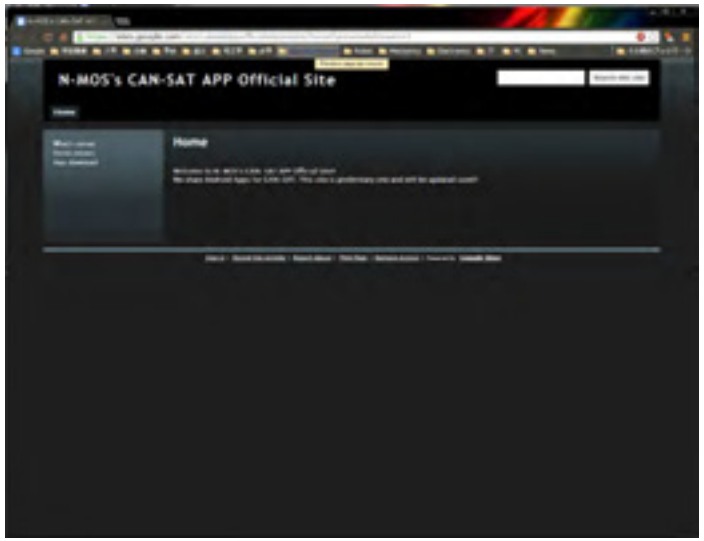
  -You can use all Apps (Free)

  -You can update your Apps (Free)

Preliminary Site URL :

https://sites.google.com/site/cansatappofficialsitepresite/home

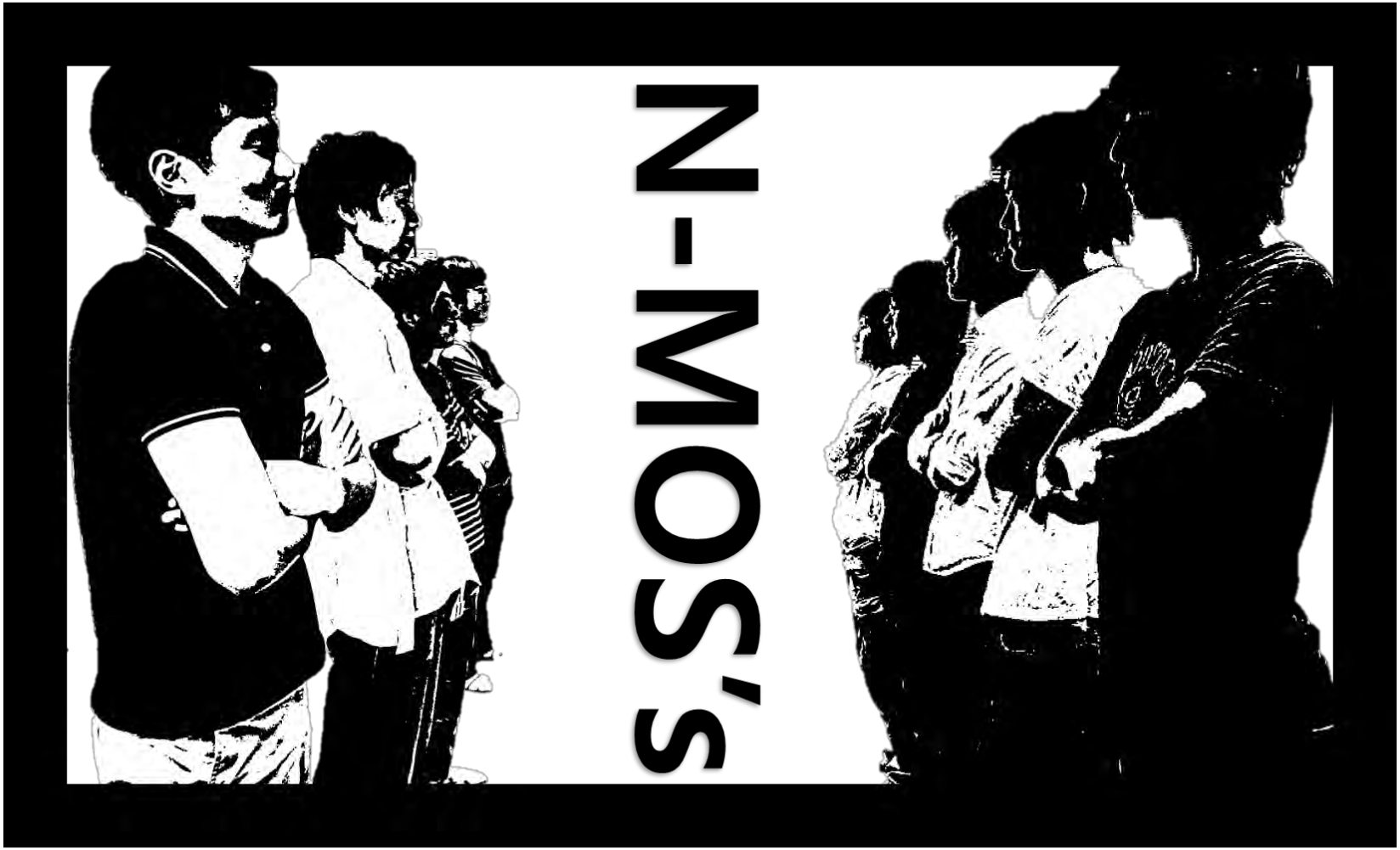
- More Apps coming soon



CHECK IT OUT!!

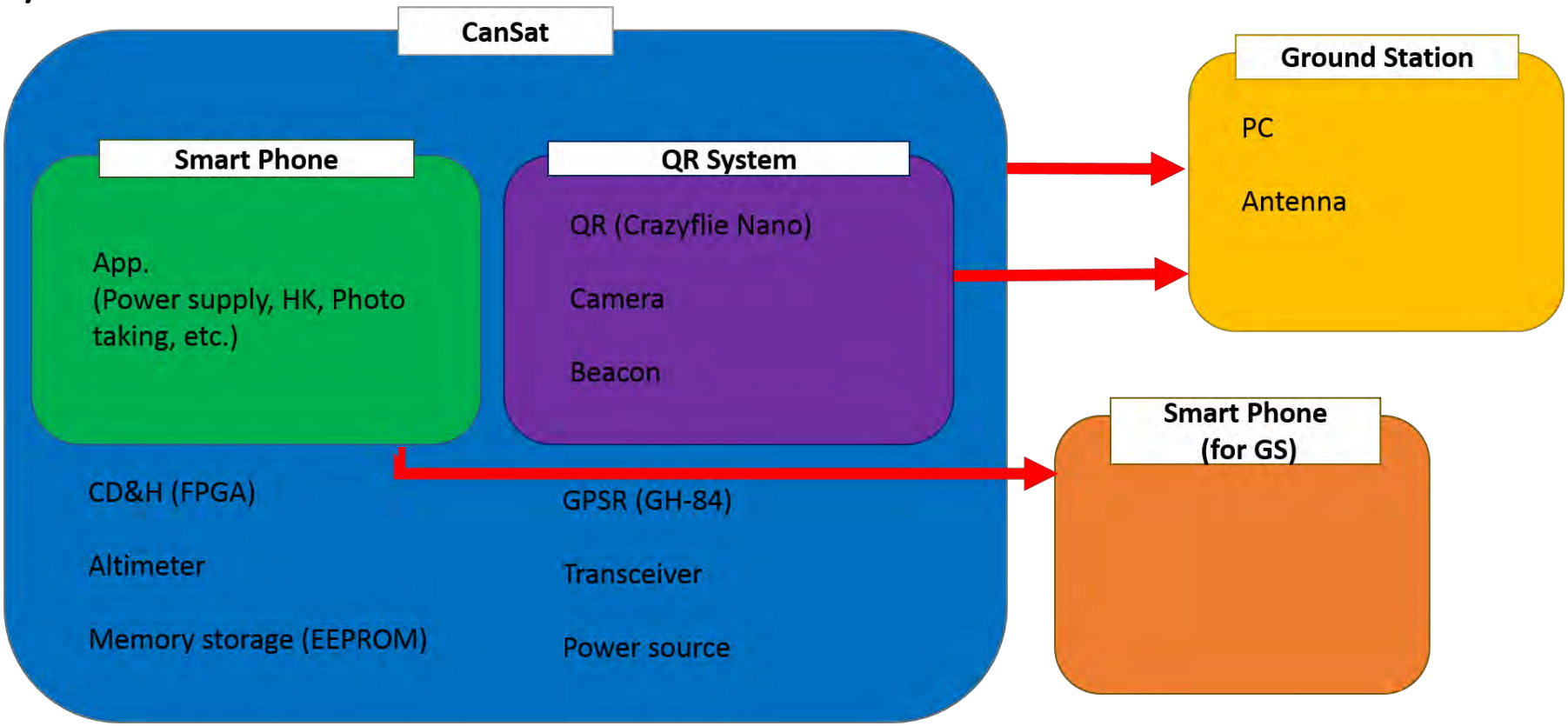
APPENDIX

Hi, we are ***N-MOS'S***

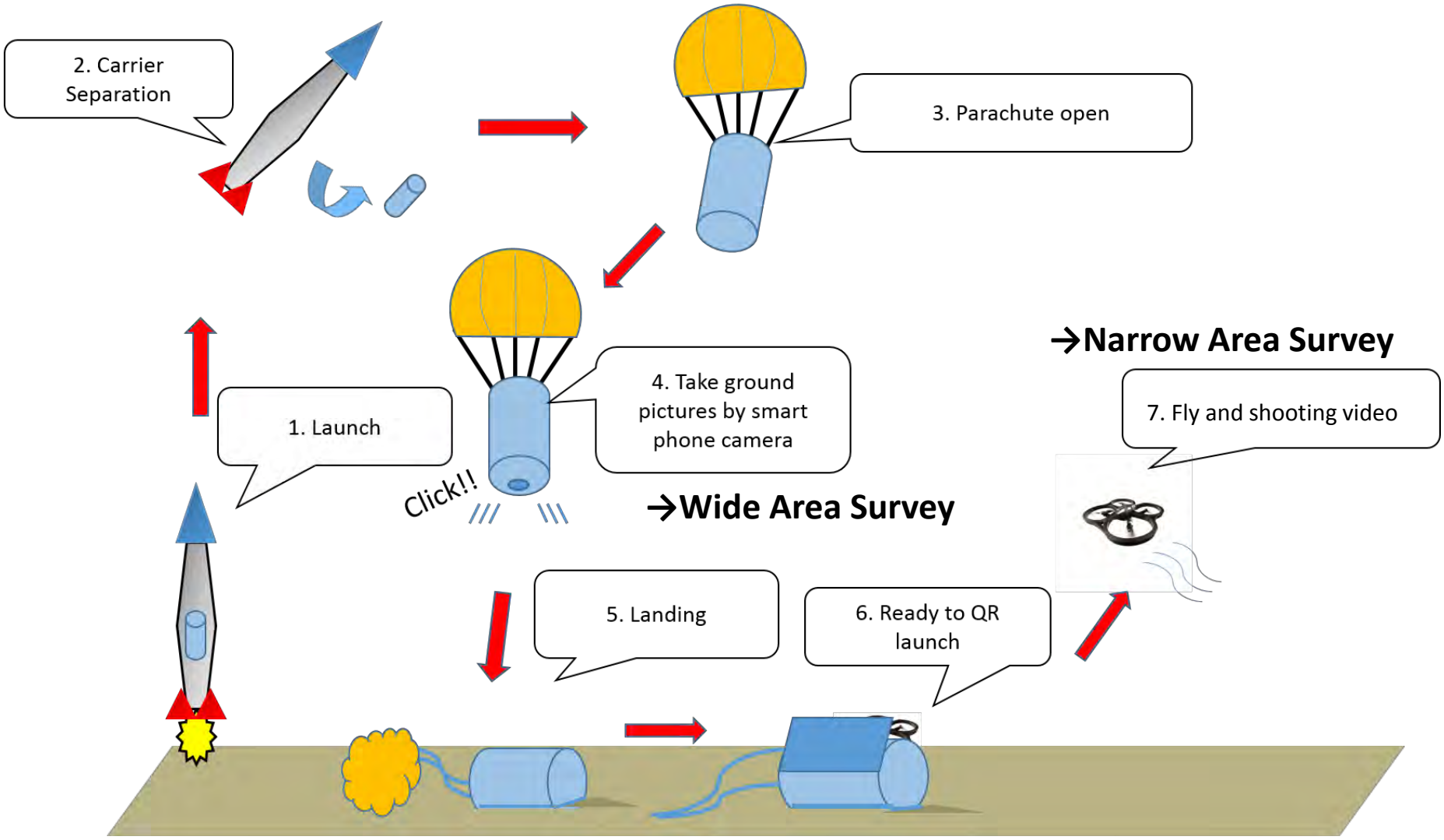


OUR CAN-SAT SYSTEM

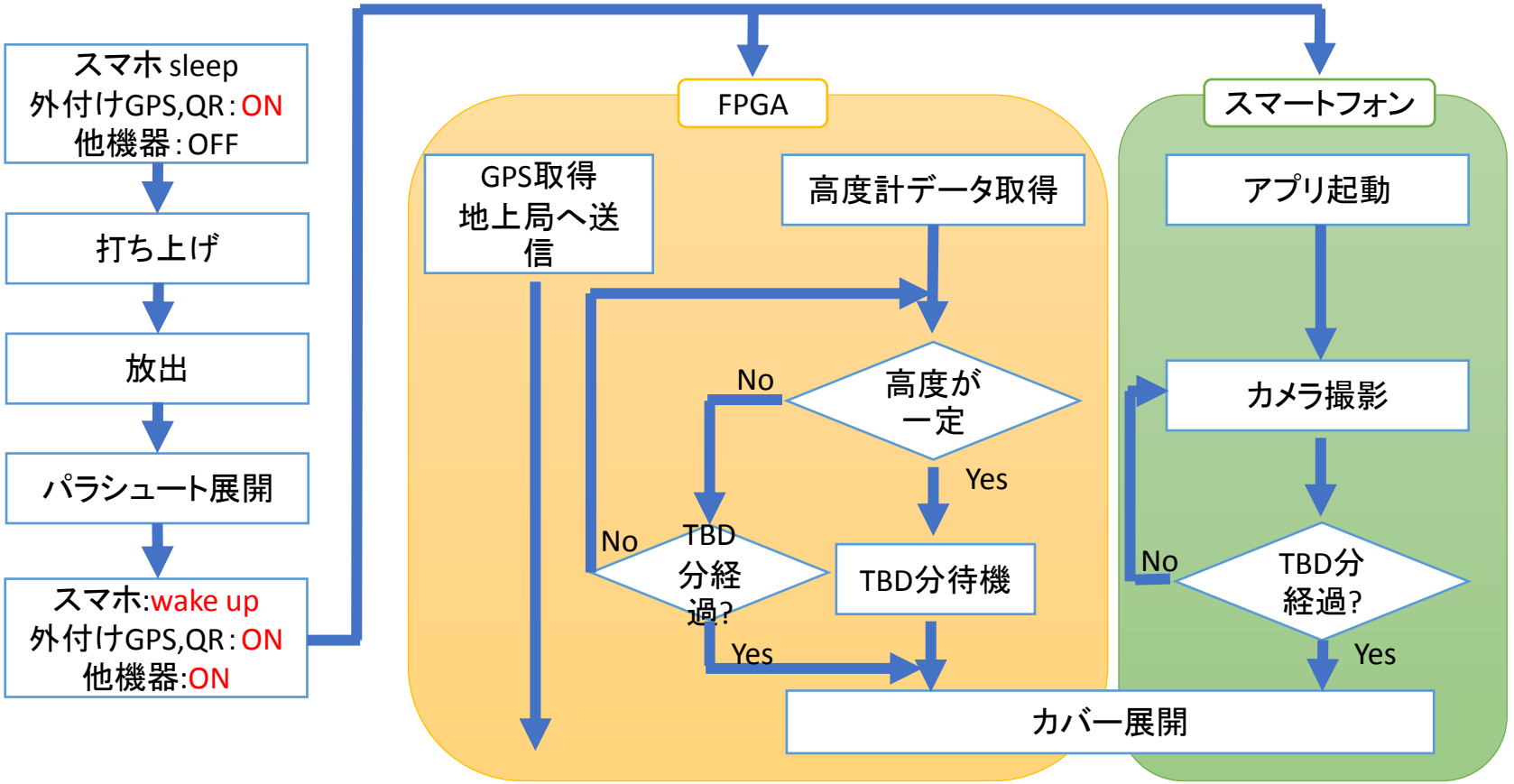
System

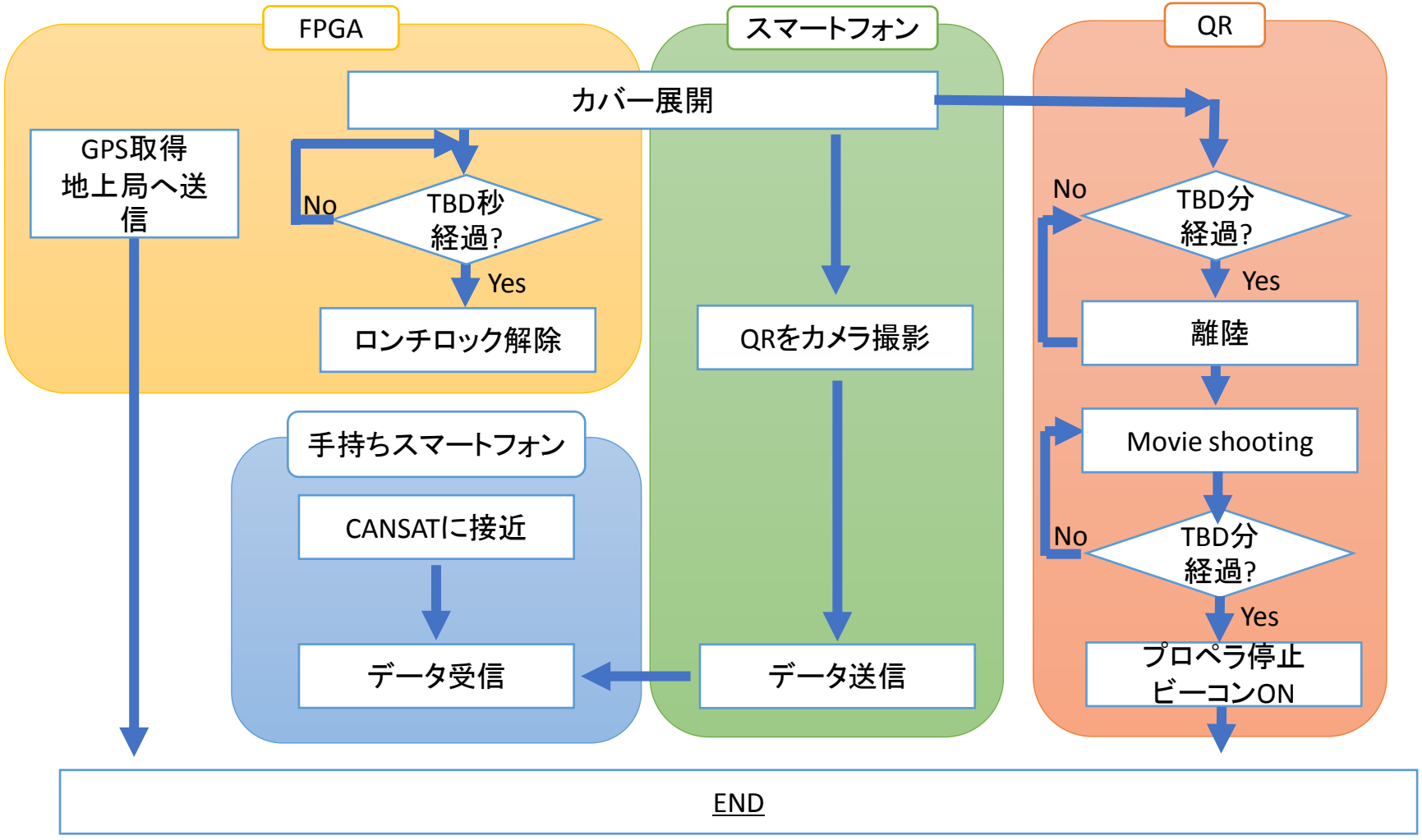


MISSION OUTLINE

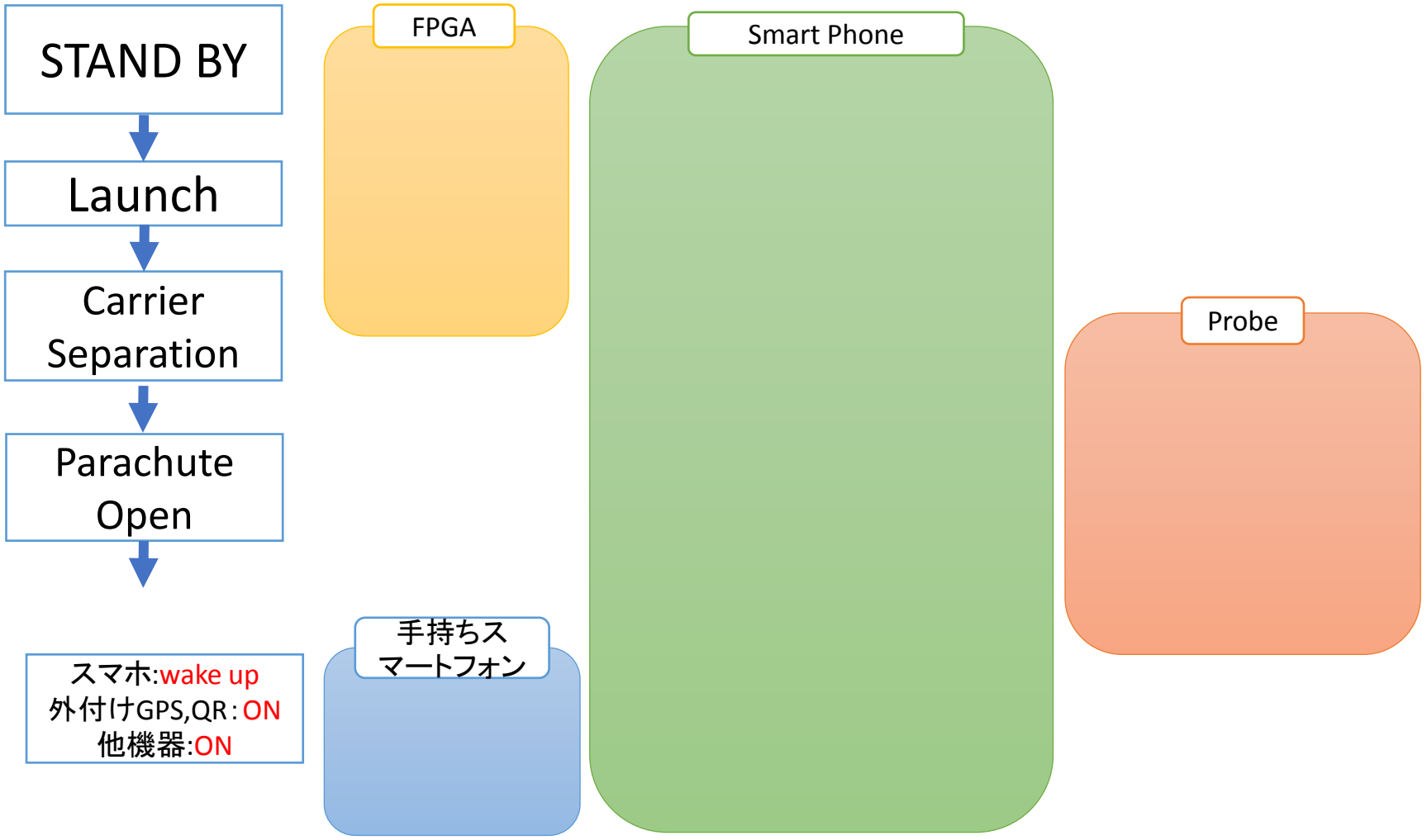


ミッションフローチャート




FPGA
スマートフォン
QR
カバー展開
GPS取得
地上局へ送信
No
TBD秒
経過?
Yes
ロンチロック解除
QRをカメラ撮影
No
TBD分
経過?
Yes
離陸
Movie shooting
No
TBD分
経過?
Yes
プロペラ停止
ビーコンON
手持ちスマートフォン
CANSATに接近
データ受信
データ送信
END

MISSION SEQUENCE



SUCCESS QRITERIA

BUS SYSTEM MISSION
QR SYSTEM MISSION

1. Minimum

Get GPS data (GPSR)	Done
Parachute deployment	Done
App. ON	Done
QR no damage	Done

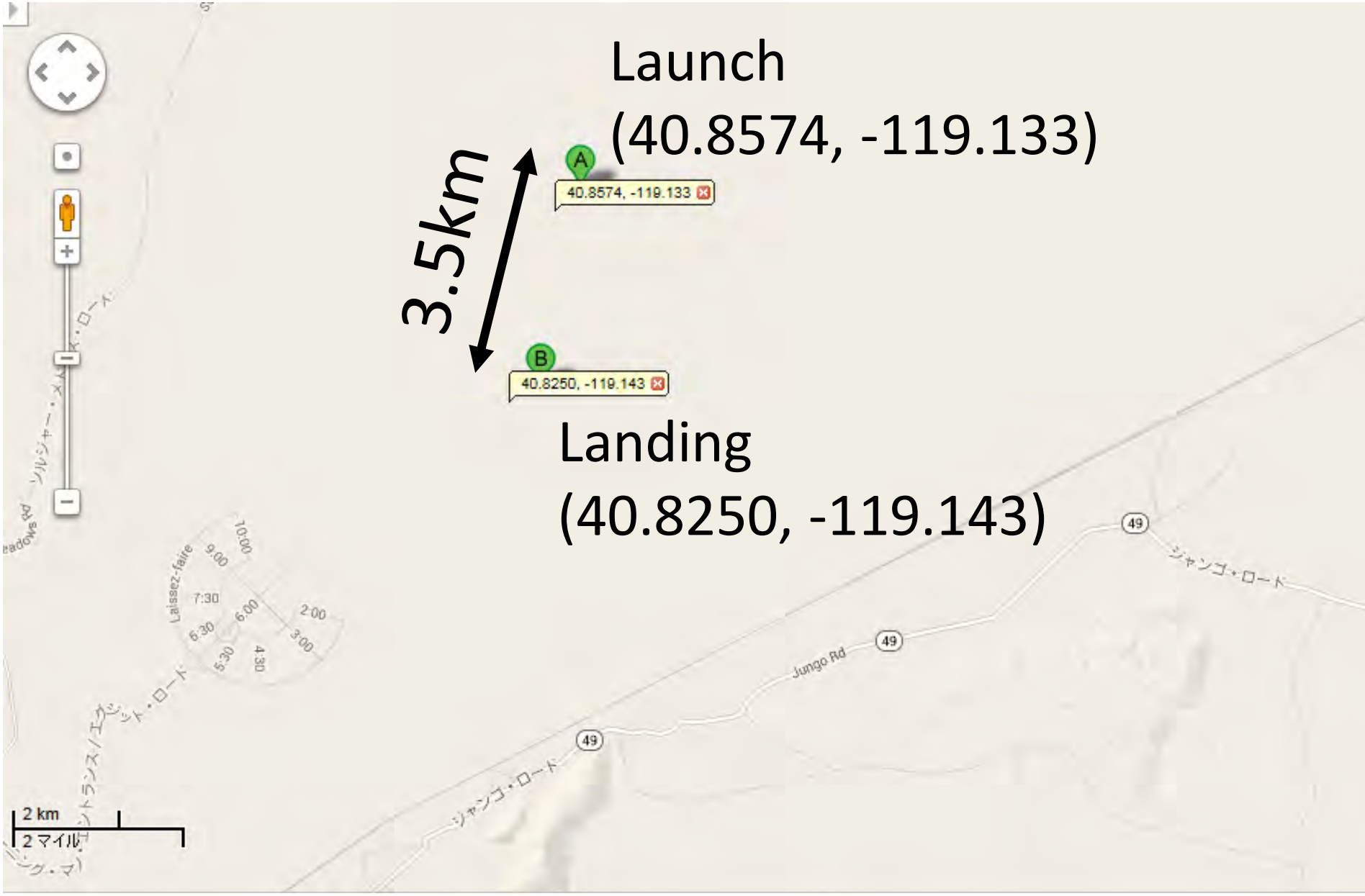
2. Full

Power supply to each component	Done
BUS system inner communication	Done
Save HK data	Done
App. release	COMPLETED
Landing	COMPLETED
Ready to fly (Cover open Melting launch-rock Power ON)	COMPLETED
Take off	COMPLETED

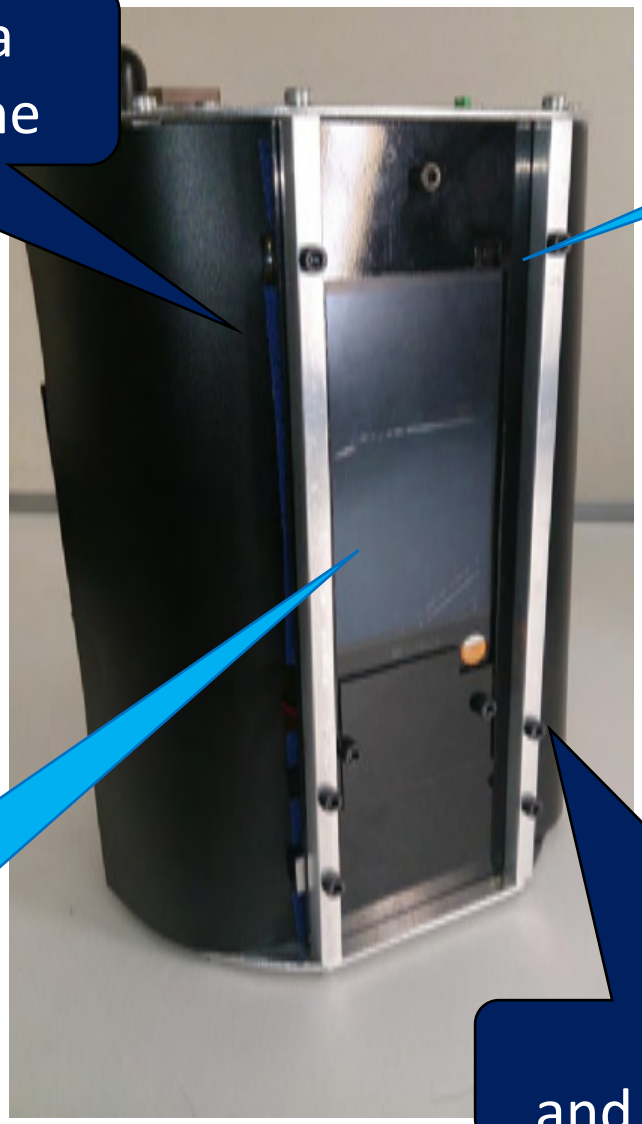
3. Extra

Take photo	COMPLETED
Get GPS data (Smart Phone)	COMPLETED
App. usage response	Not yet
Film movie	COMPLETED
Communication between QR and Smart phone	COMPLETED
Communication between Smart phone and other phone	COMPLETED

MISSION COMPLETE !!


Launch
(40.8574, -119.133)
3.5km
A
40.8574, -119.133
B
40.8250, -119.143
Landing
(40.8250, -119.143)
49
Jungo Rd
2 km
2 マイル

Main Satellite : MICHIZANE (Back)



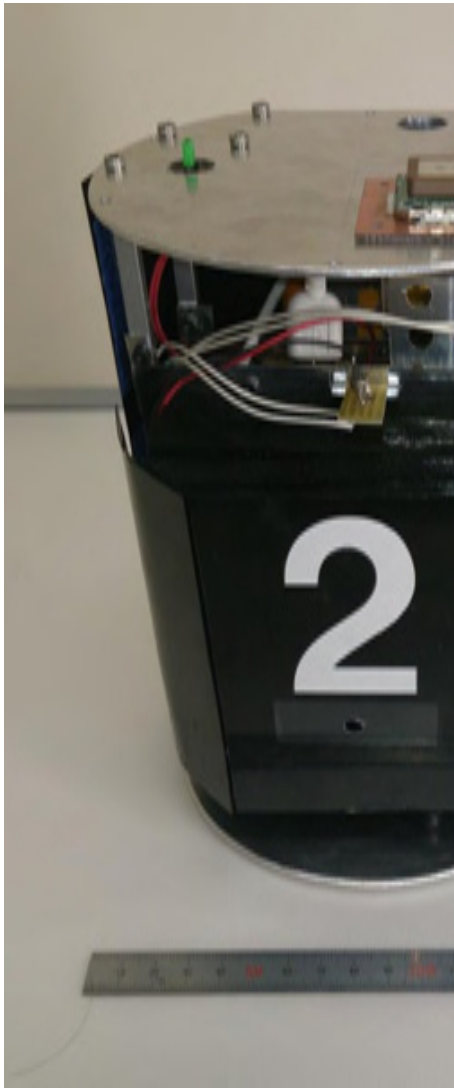
He sends his data
to our Smart Phone

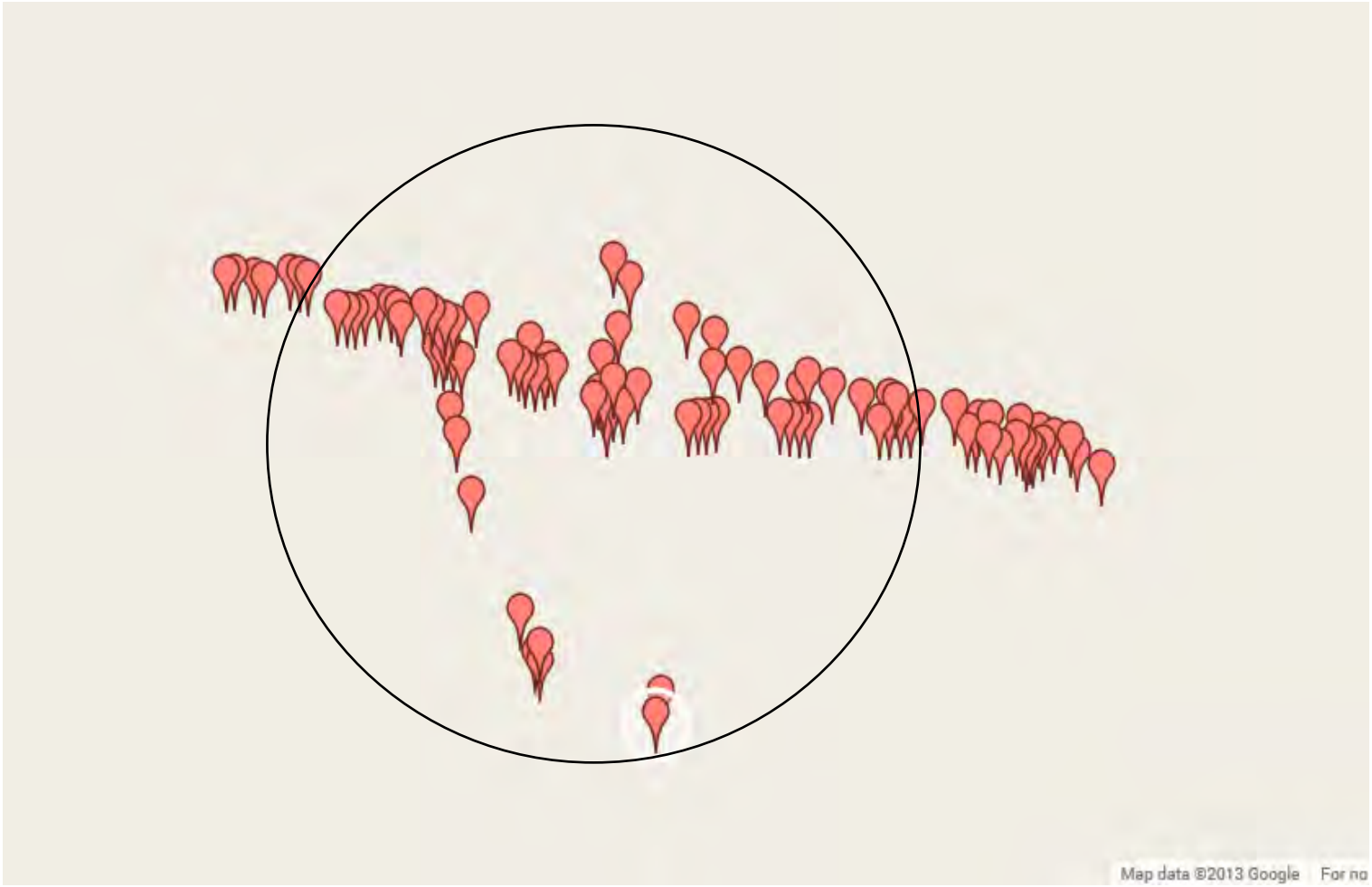
Camera

Smart Phone

He TALKs his status
and SINGs his favorite song

1
N-MOS'S


2


Map data ©2013 Google
For no

THANK YOU

N-MOS'S