

SATELLITE D.I.Y.





"Mom, can you buy me
a satellite as Christmas gift?"

"Yes, darling."

인공위성을 손에 들고
걸어가는 사람들, 2009

Cal Poly, San Luis
Obispo, CA, U.S.

After 3 years' research and one year's satellite engineer experience, I found possibility of launching and operating personal satellite with fairly reasonable price. And having been lived as artist for 5 years, I could also find ways to integrate the satellite project into cultural context-open source and art.

I & Universe

So far, almost all space programs were led by government or military. And very little were initiated by amateurs. Individual fantasies were used and fostered by institutions. It's time to have a private connection between I and universe. By doing this, we can think about our existence more often, I believe.

Unpractical Technology

When space program is personally used, it might not be as useful as institutional ones. But that does not mean private space program is less important than institutional one. Realizing fantasy and dreaming of another fantasy is as valuable as practical and scientific missions and probably even more to some people.

Collaborative Fantasy

I haven't seen fantasies being realized these days. Probably this is because the era we live in. To realize the project, helps from artists and passionate amateurs are needed. We've seen examples of collaborative intelligences and it's time to build fantasies together. Soon we can buy 200\$ satellite at a store and will wait it to be launched.

Very Kind Open Source ™

What is going to happen when secret technologies are open sourced? Are we going to see boomerang effect like Titanic incident that led governmental radio frequency domination? By providing very kind instructions to build a satellite, I want to bring up a series of questions.

Open Source Satellite Initiative | <http://opensat.cc>

Song hojun 2009



Open Source Satellite Initiative Logo
designed by lee jangsub, 2009

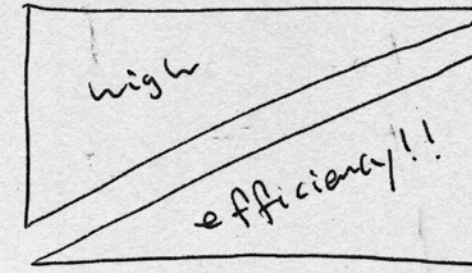
Technology
As
Texture!

D.I.Y.

Launch

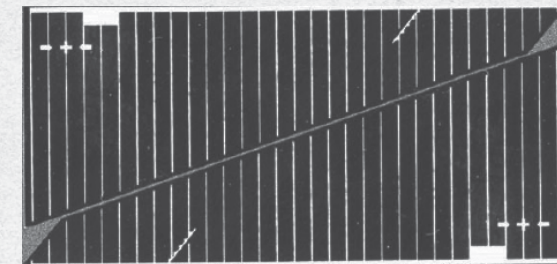
Operate

Solar Cell

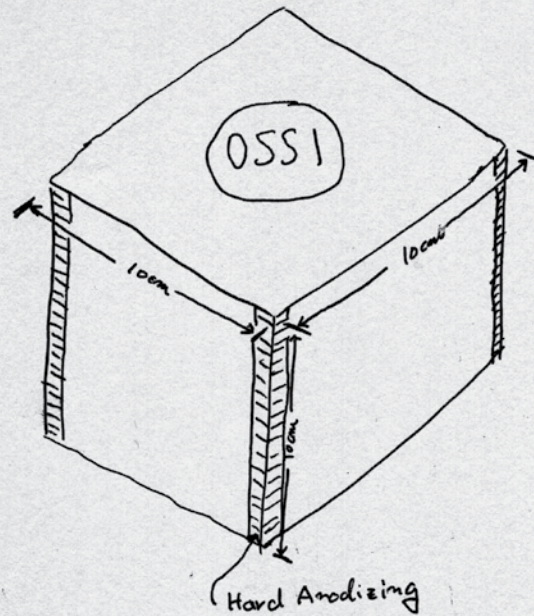


GaAs > Silicon

상용으로 쓰이는 태양열 판과 달리 고효율의 솔라셀을 이용해서 태양열 판을 만들어야 하고 솔라셀을 기판을 부착할 때는 우주용 실리콘 접착체를 사용해야 한다. 문제는 이러한 부품들의 대부분이 수출제한 품목이라는 것이다. 하지만 다음과 같은 대안이 있다.



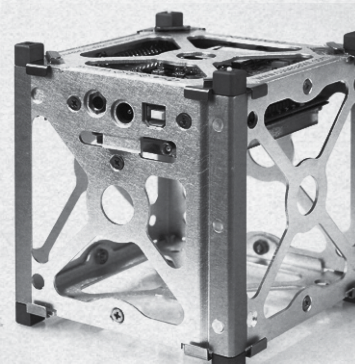
TASC Solar Cell
by Spectrolab



Aluminium Alloy 6061/7075
< 1.33kg

가볍고 진동에 잘 견디며 빗금친
곳은 전기 절연성이 있어야 한다.

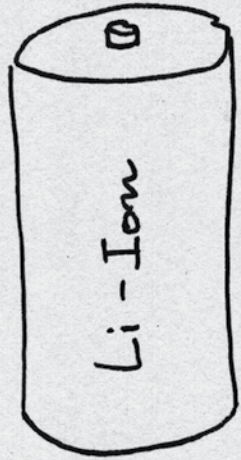
기존의 키트로 파는 것들이 가격이
너무 비싸기 때문에 직접 제작한다.



Cubesat Kit from
Pumpkin Co.

전통적으로 우주 공간의 냉혹함으로 상용 배터리는 사용할 수 없었으나 최근 몇몇 위성들이 핸드폰에 들어가는 것과 같은 리튬 이온 배터리로 발사에 성공하였다.

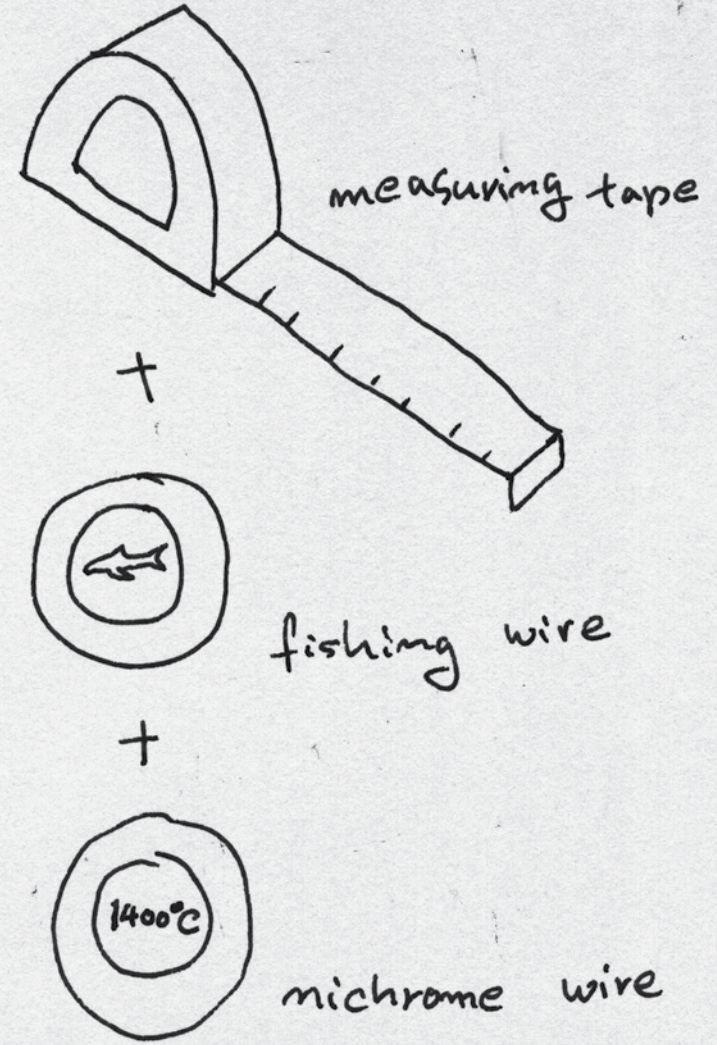
안테나 제작을 위해 필요한 일상 도구들



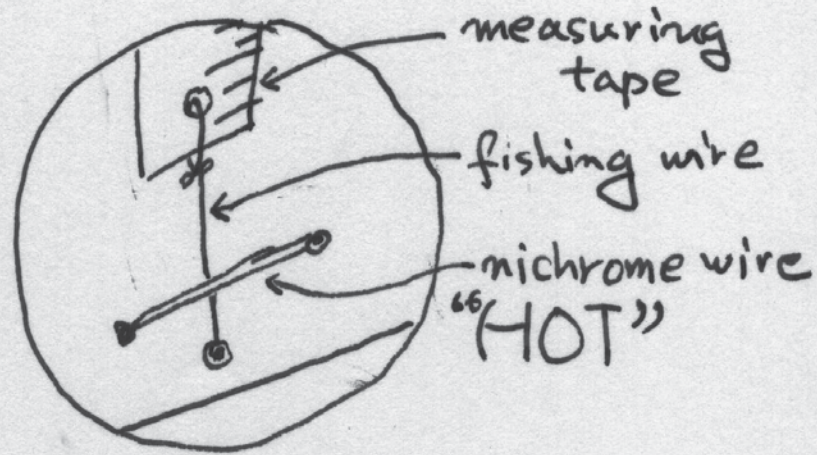
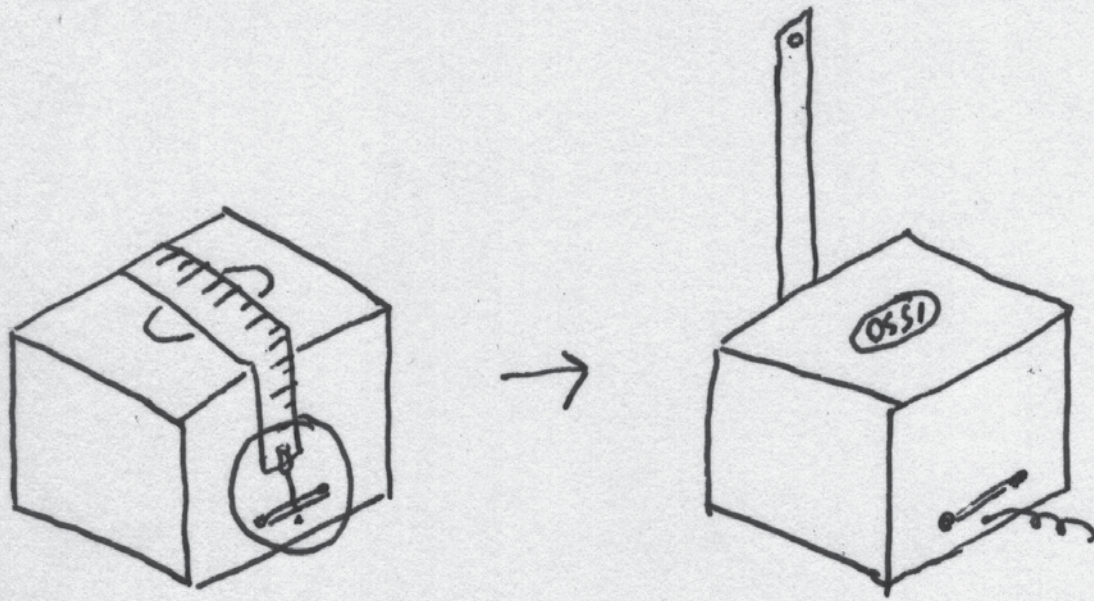
Cell phone
Battery
↓
O.K!



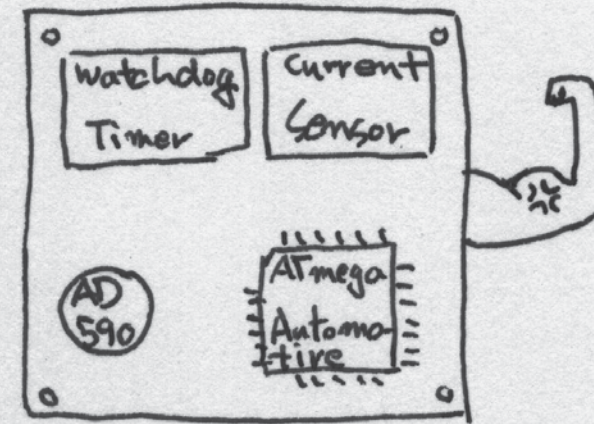
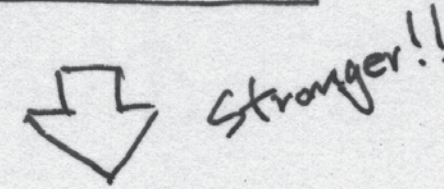
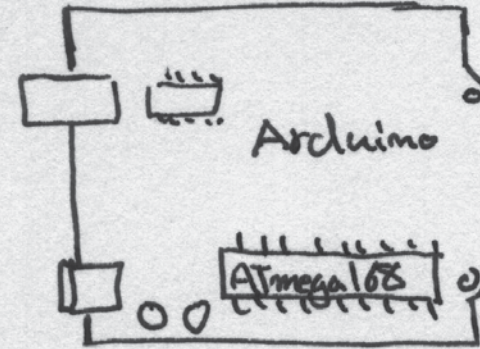
LI-1S1P-2200 by
Rosebatteries.com



뉘시줄에 줄자를 묶어 위성에 감아 놓고 있다가 발사가 이뤄진 후 우주공간에서 니크롬선 양단에 높은 전압을 걸어 뉘시줄을 끊어 주면 안테나가 펼쳐진다.

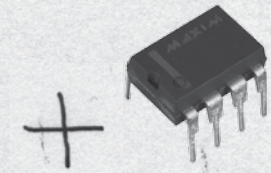
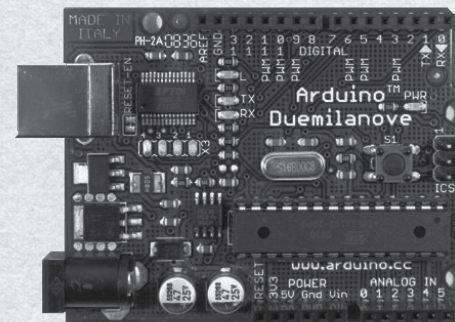


Controller

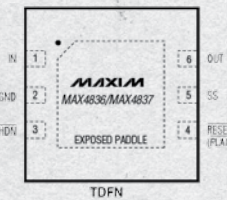


현재 많은 작가/취미가들이 쓰고 있는 마이크로 컨트롤러 보드를 이용하여 인공위성 메인 컨트롤러를 만들면 많은 호응과 함께 공동개발의 이점을 취할 수 있다.

하지만 우주환경에서 그대로 동작하는 것은 무리가 있기 때문에 우주 방사선에 어느 정도 견디고 온도변화에 대응하기 위해 Watchdog Timer와 Current Sensor를 추가했고 마이크로 컨트롤러를 상용급에서 밀리터리급으로 업그레이드했다.

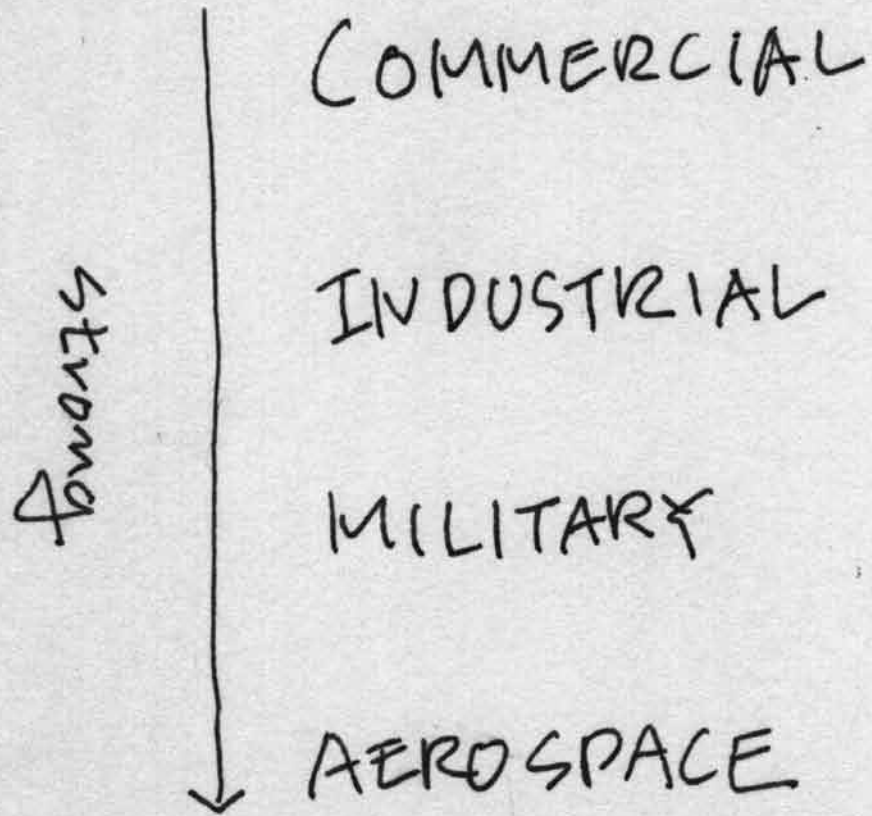


MAX706
Watchdog Timer



MAX4836
Current Sensor

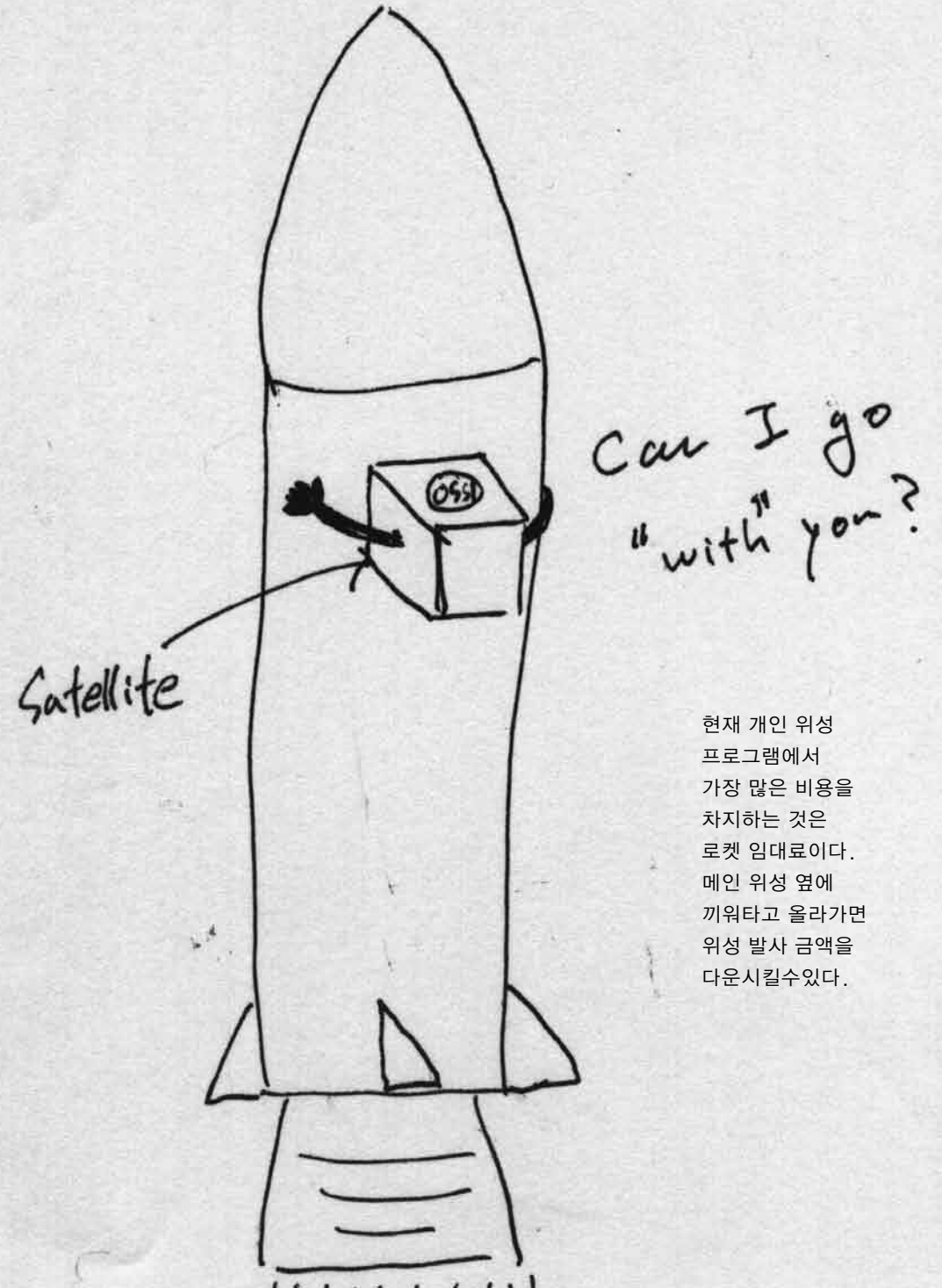
Reliability As ART



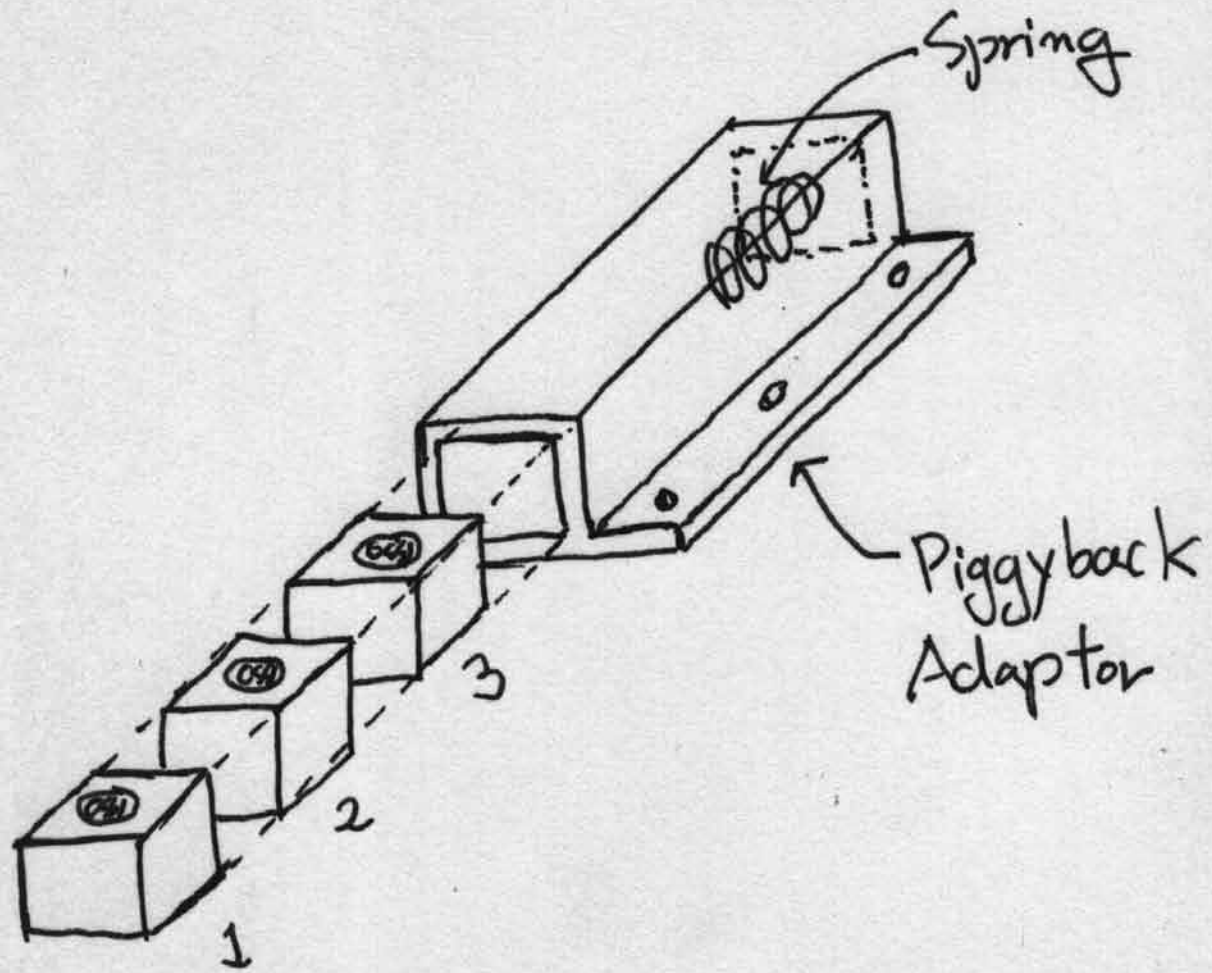
우주와 같은 환경에서 쓰이기 위한 전자부품들은 방사능에도 견뎌야 하고 온도 변화에 잘 대응해야한다. 신뢰성 있는 전자 장치에 컨텐츠가 결합되면 어떤 일이 벌어질까? "이 세상에서 가장 강력한 무기"는 방사능에도 견딜 수 있으면서 쉽게 복사될 수 있는 아름다움을 저장한 디지털 장치가 아닐까?

Reliability Is ART!

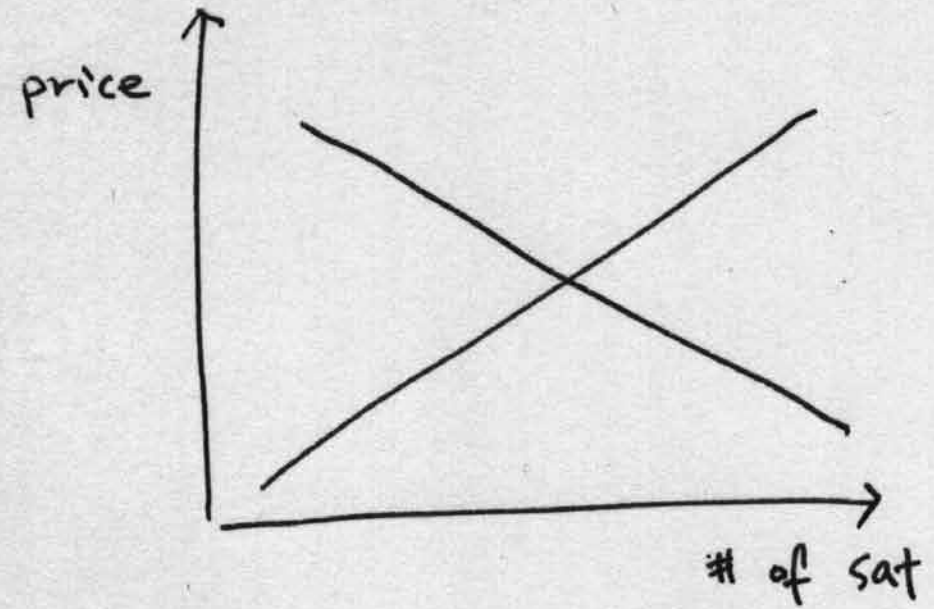
Piggyback Riding



현재 개인 위성 프로그램에서 가장 많은 비용을 차지하는 것은 로켓 임대료이다. 메인 위성 옆에 끼워타고 올라가면 위성 발사 금액을 다운시킬수있다.



로켓 머리 꼭대기 내에 위성 3개를 싣고 자궁처럼 품어가는 어댑터



GROUP LAUNCHING

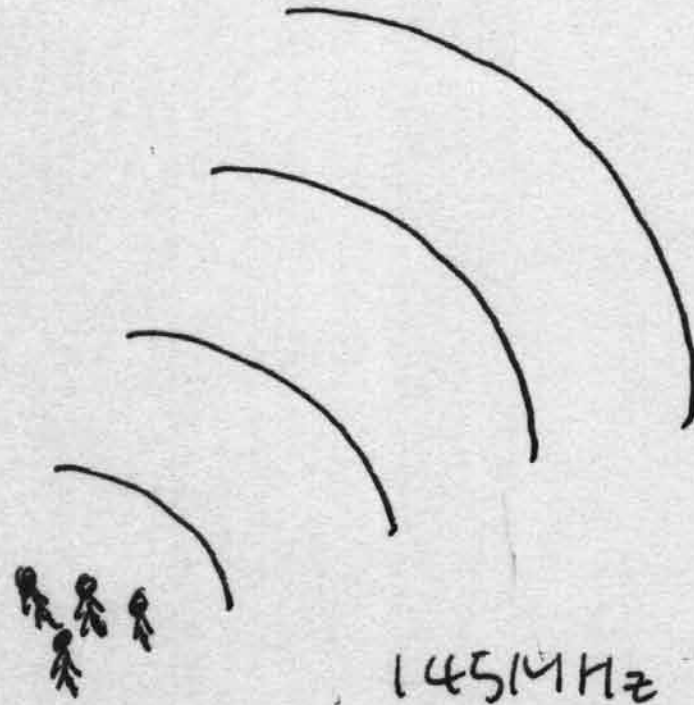
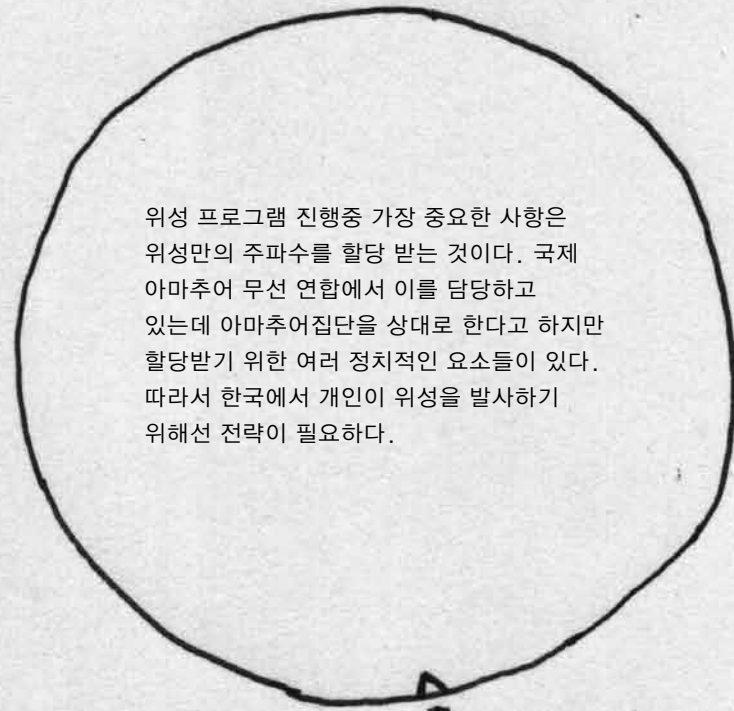
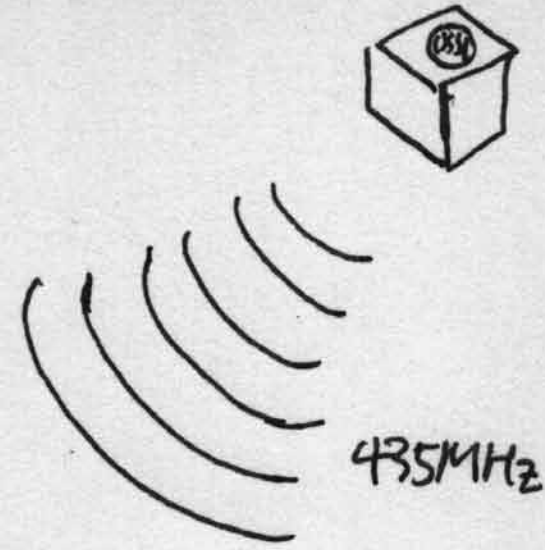


COST DOWN

위성 공동구매를 통한 가격 다운!

Freq. Pizza

사용 주파수
지구 → 위성: 약 145MHz
위성 → 지구: 약 435MHz
잘보면 FM 라디오 주파수
근처이다. FM 라디오 해킹을
통한 인공위성 신호 듣기
워크샵을 기획 중이다

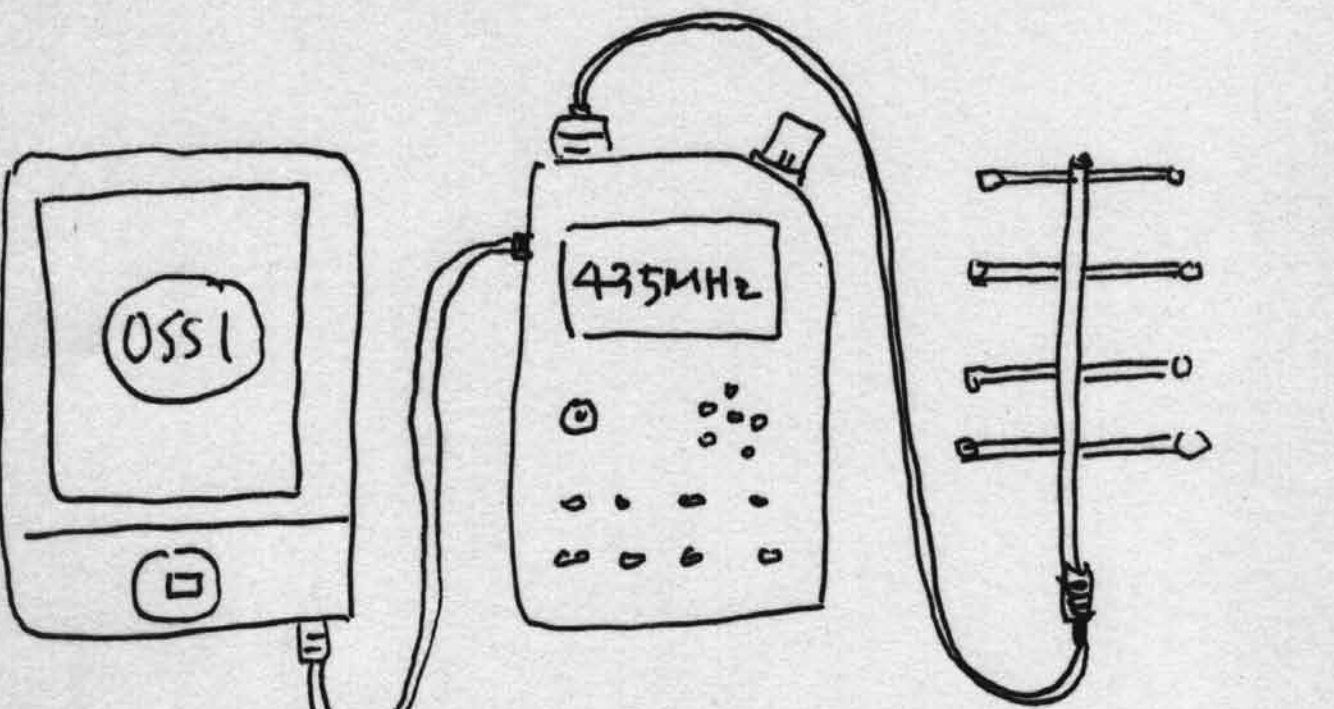


“ Can I have
some ? ”

Amateur

Mode J

Portable Ground Station



iPod as "TNC"

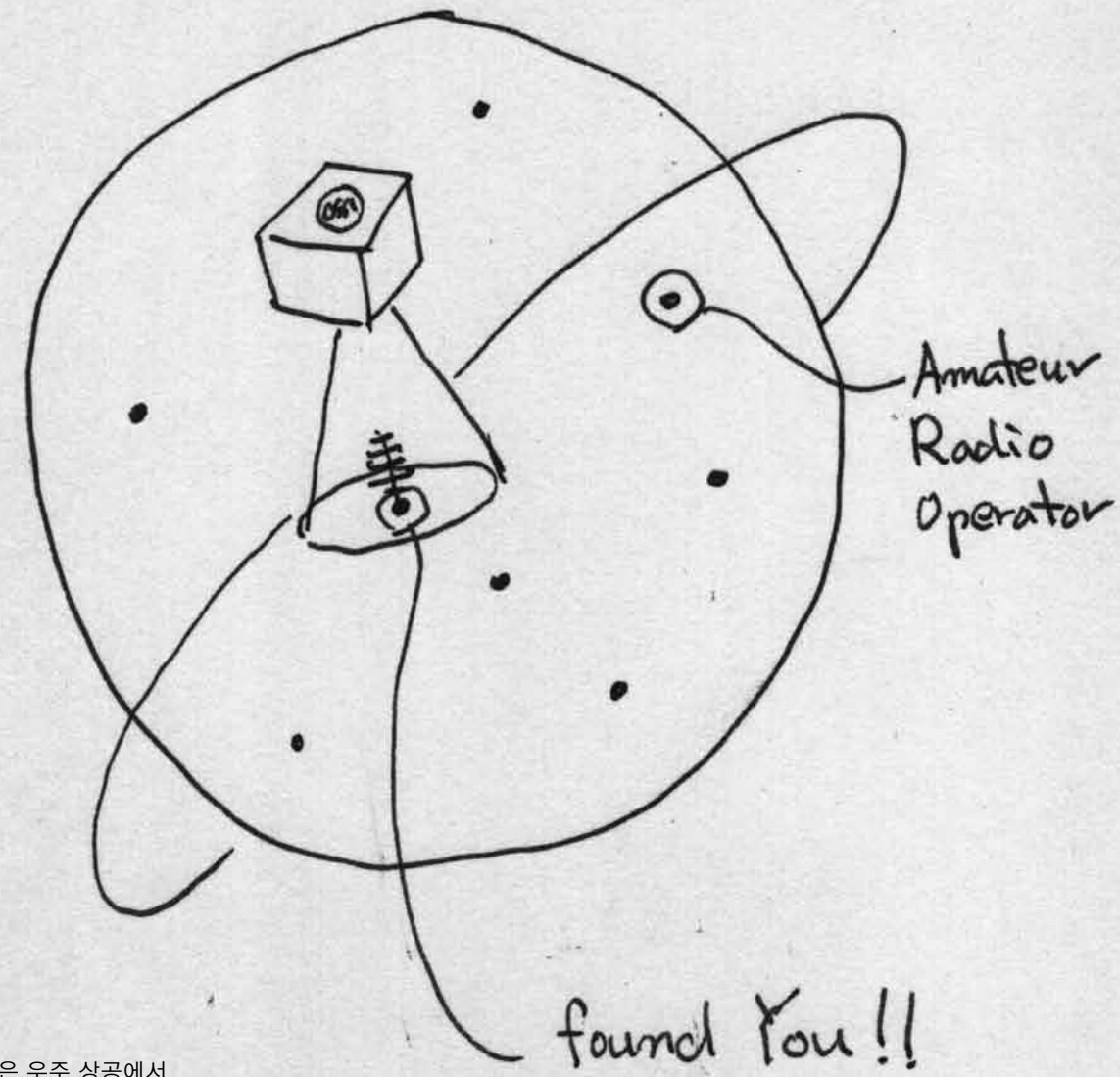
Radio

Yagi antenna



Hello, my satellite!!

아이팟+무전기+TV 안테나만 있으면 휴대용 지상국을 만들 수 있다. 아이팟 프로그래밍을 통해 인터넷과 연결도 할 수 있고 내 위성의 위치도 알 수 있다.



Amateur Radio Operator

found You!!

인공위성은 우주 상공에서 스프링을 통해서 튕겨나가게 되고 로켓 추진체가 따로 없기 때문에 지상에 있는 사람들의 협조로 위성을 찾게 된다.

Funding

Usage

Thought

Mission

Developing satellite with open source resources
Building satellite with COTS components
Operate satellite in conjunction with artists
Funding satellite program with cultural events
Demonstrating private satellite program is possible

Technical Specification

Dimension

1U Cubesat (100mm x 100mm x 100mm, <1.33kg)

Telemetry

J Mode, AX-25

Bus

QBC: ATmega168 Automotive MCU with Arduino IDE environment
EPS: Li-Ion battery with MPPT charge controller / TASC solar cell
COMMS: J-Mode UHF / VHF Transceiver

Payload

Particle detector (GM tube or CEM) with random number generator
Radio background emission detector with random number generator

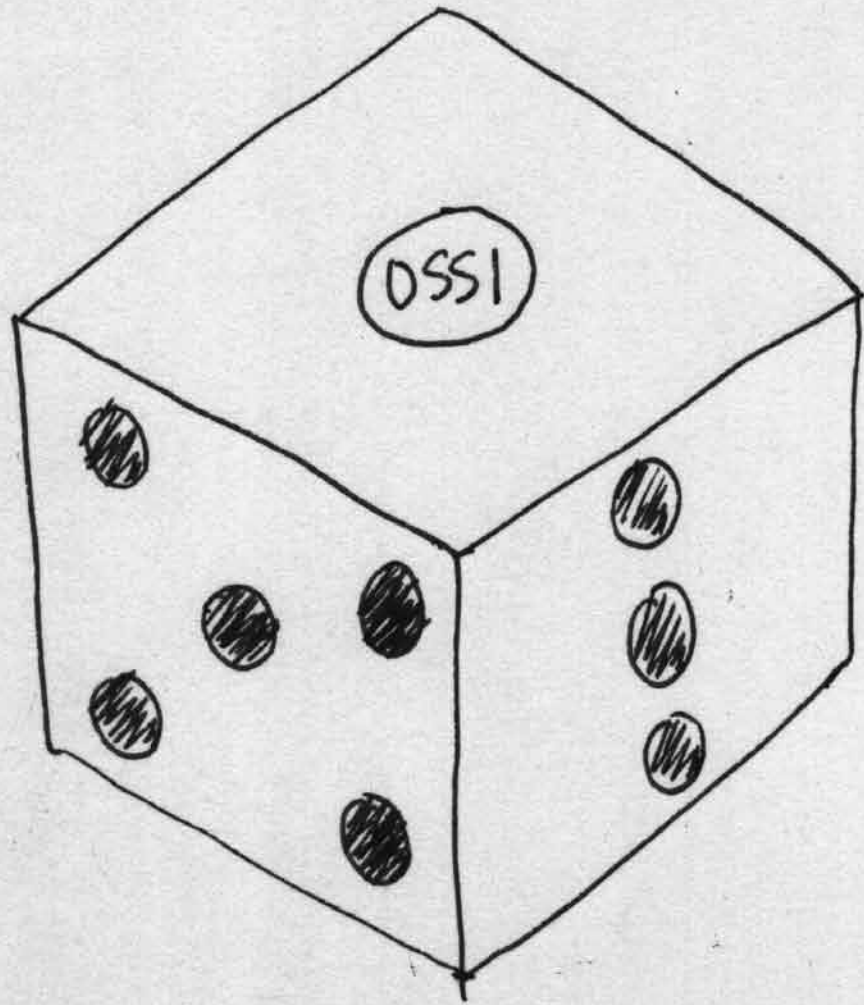
Schedule

Flight Module

09' Q4: Frequency Coordination
09' Q4: Building
10' Q1: Testing
10' Q3: Launching
11' Q1: 200\$ satellite Mass Production

Events

09' Q3: Site, Soft goods, Forum, Workshop, Book publishing
09' Q4: 60th IAC exhibition, Art Museum exhibition
10' Q1: TBD
10' Q2: TBD
10' Q3: Music Festival



Satellite

GOD

D.I.Y

Man - Made

Launch

Resurrection

Communication

Pray

Reply

N/A

Miracle

N/A

Kill Switch

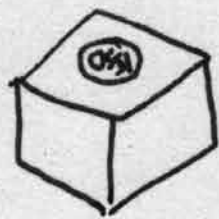
Die

"A life is beautiful combination of
Randomness"

Big Bang



Cosmic Microwave Background



Lottery Number



1 28 33
7 5
9 14
19 40 42

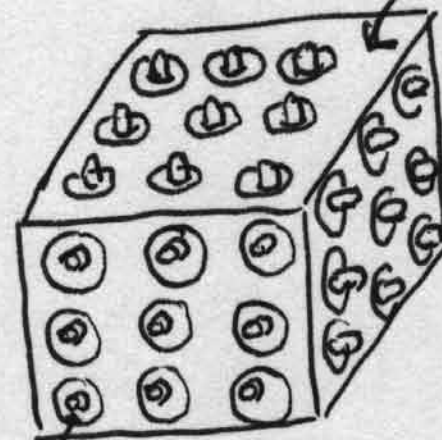
earth

빅뱅의 증거로 알려진 마이크로 웨이브를 센싱하여 랜덤한 숫자를 만들어 지상에 뿌려준다. 이 랜덤한 숫자는 로또 번호들인데 실제 로또로도 이용가능하고 컴퓨터 그래픽 발생에도 이용된다.

```
lottoNumber = srand(bigBang);  
commPacket = rand(lottoNumber);
```

Meteor Satellite

Controlled



Polished Al. Panel

Super bright LED

Space Romance 2.0

지상에서 콘트롤 가능한 별뚱별. 소원을 빌고 싶을 때 지상에서 원하는 장소를 선택해 버튼을 누른다. 깜박이는 패턴은 Morse 부호이다. 메시지 예약도 가능하다.

Wish when you want to!

Funding Rule

Funding through small donations
Funding through cultural events
Funding through selling art products

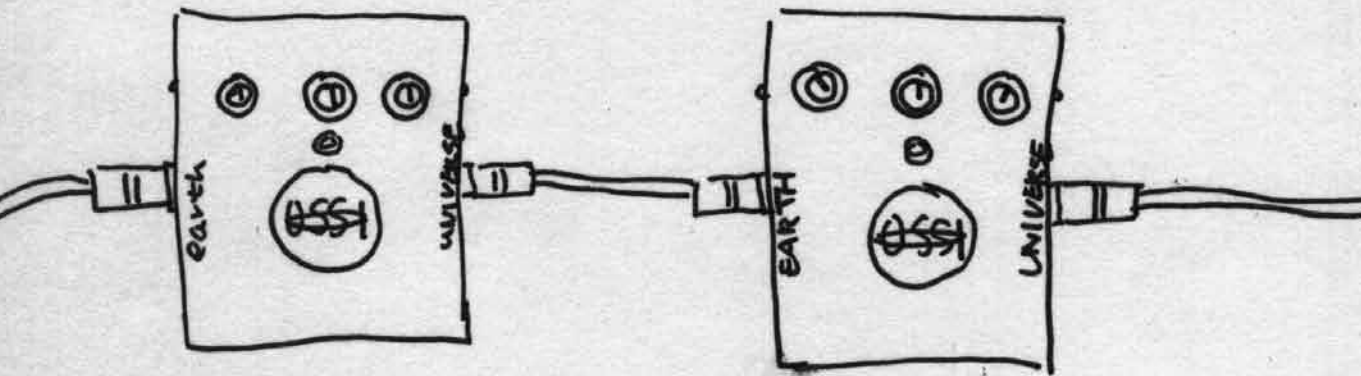
If you buy OSSI products,
you can apply for
"satellite lotto."



Artist

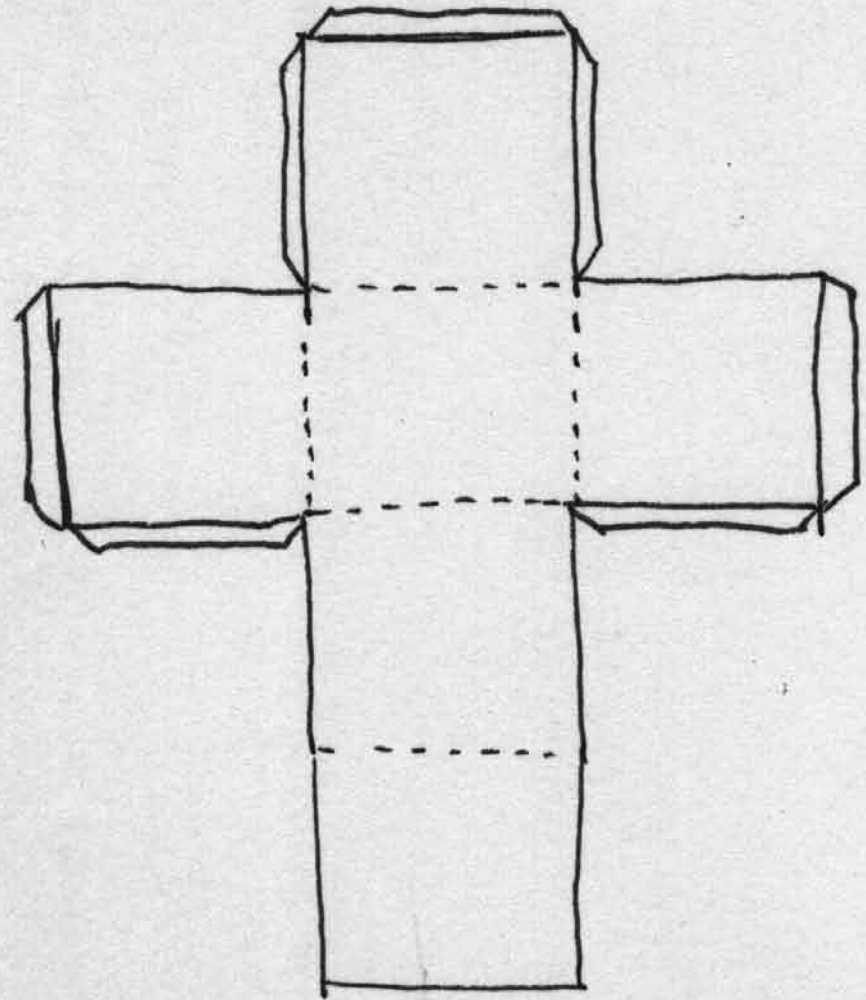
Numi(Spain) / Ohyun(Germany) / Jangsub(Korea) / DIZI (Korea) /
Jay(Korea) / Hyup(Korea) / Powderly(Graffiti Research Lab) / hhjjj(OSSI)

OSSI Effectors

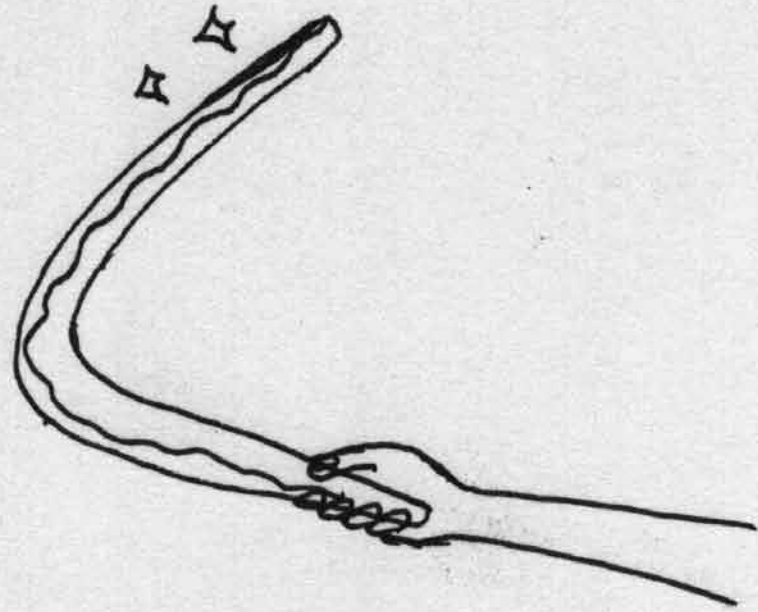


INPUT = EARTH
OUTPUT = UNIVERSE

Origami



fold your
global orbiting device

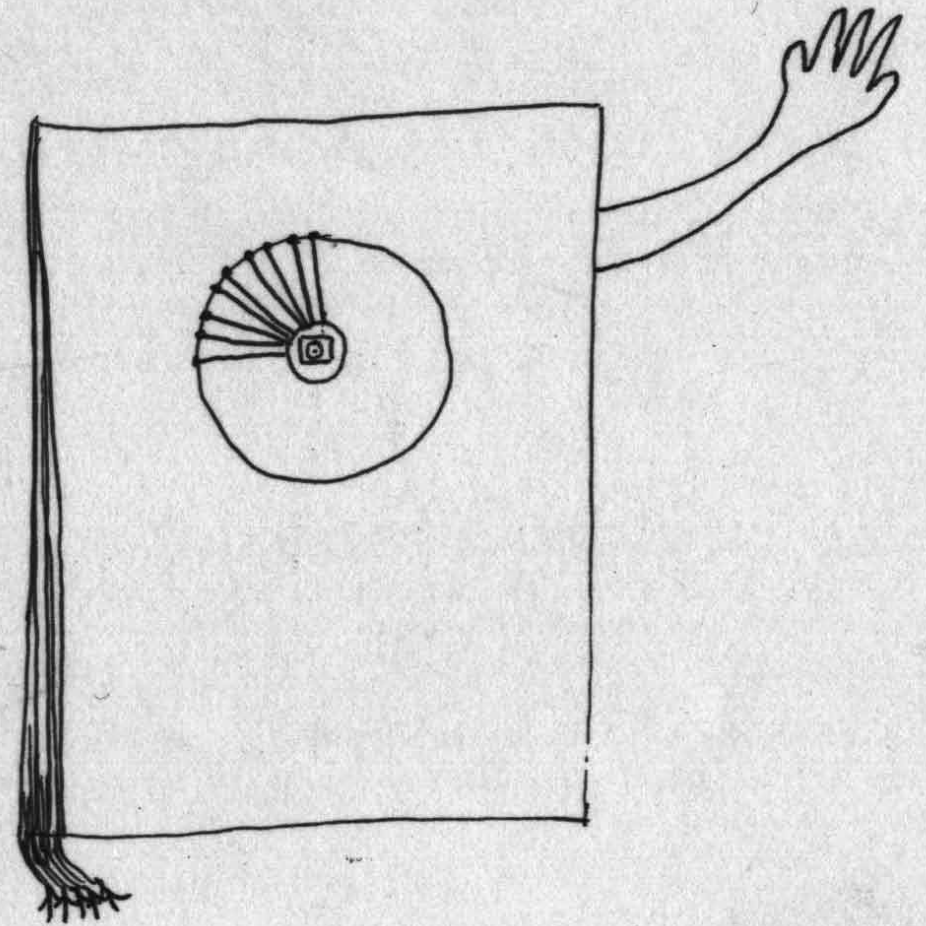
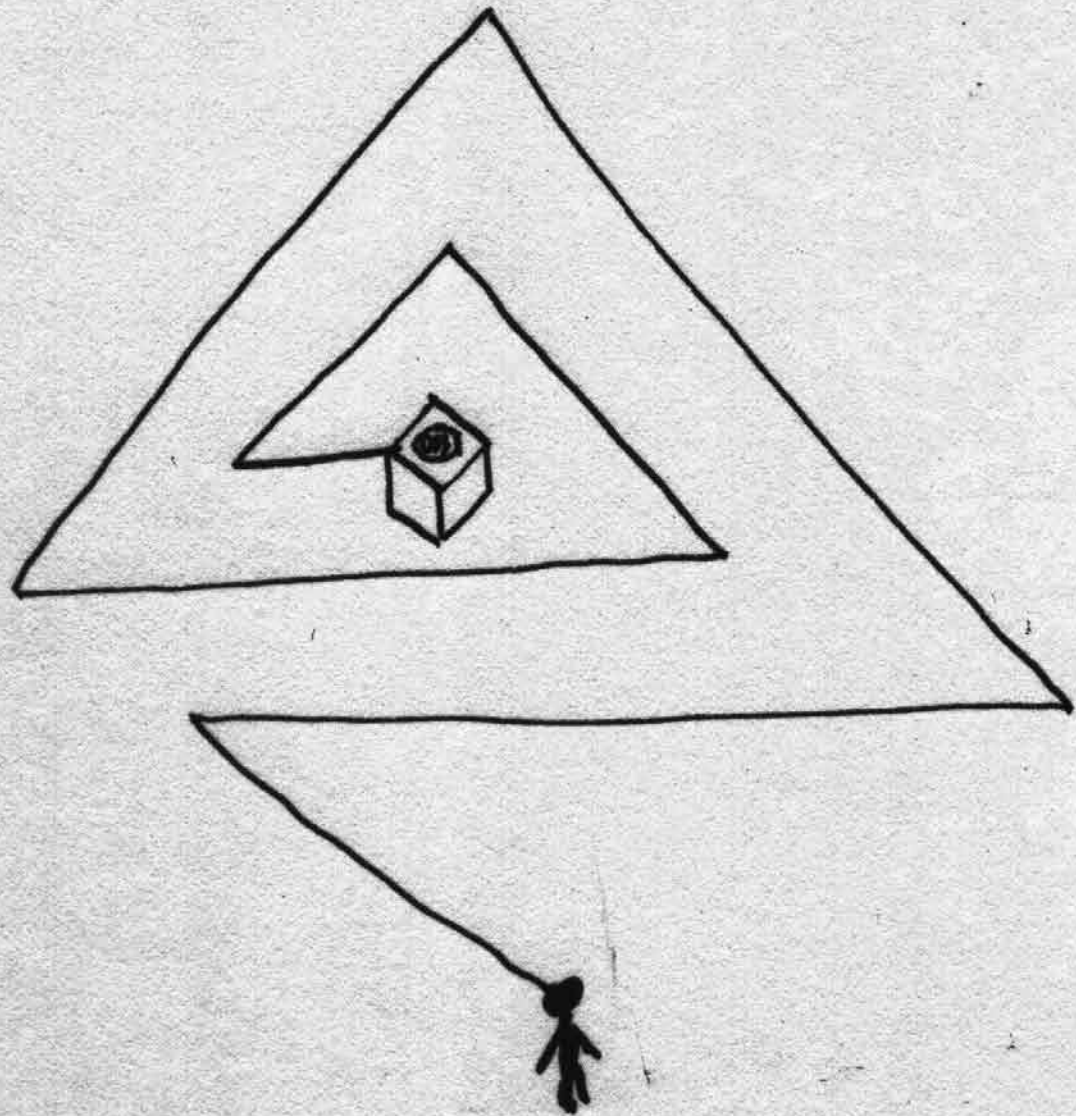


When Art become practical,
we call it technology.

When Technology become useless,
we call it Art.

FORUM

OPEN secret technology
&
Boomerang effects



FAQ

- Why do you launch satellite?
- Is it legal to launch a satellite as an individual?
- Is OSSSI-1 criticizing religions?
- Is OSSSI an art project or a technology project?
- OSSSI-1's purpose is not scientific or practical at all. How do you think OSSSI-1 can benefit the world?
- What is ROI (Return On Investment) in OSSSI?
- Don't you think you'd better spend the budget to help poor people rather than launching a satellite?
- What do you think is going to happen when once secret technologies are all available online?
- What is Very Kind Open Source™?
- What is the chance of OSSSI project being abused by terrorists?
- Who are you?



2009 Cubesat Developers' Workshop Poster
Designed by Kwon Ohyun

인공위성을 쏘아올리는 과정과 그에 해당하는 문화활동을
GOD이라는 글자에 담았다.

Very Kind Open Source™ to
Launch your own satellite!

OVER
100
MILLION
DUMMIES
BOOKS IN PRINT

Satellite FOR DUMMIES

**A Reference
for the
Rest of Us!**

FREE daily eTips at opensat.cc

Bonus:

**Art & Culture Activities
for Existential Questions**

Song Ho Jun

Artist who launched Artificial Satellite



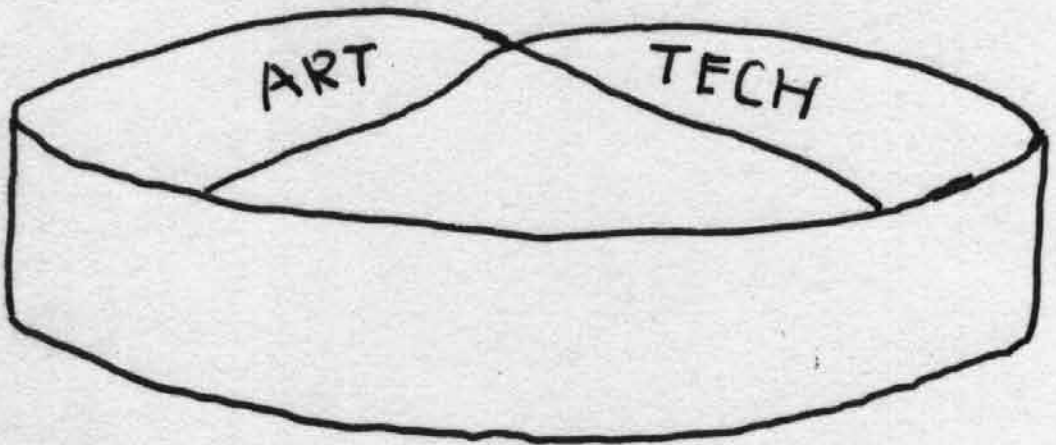
*Packed with strategies
for D.I.Y. Satellite,
Launching, and
Operating*

"Satellite For dummies", parody, 2009



Space-grade Gucci Flora, 2009
MLI Film+HeatResistant Tape

Send "Eau de toilette " to space!



Art & Tech. Moebius Strip, 2009