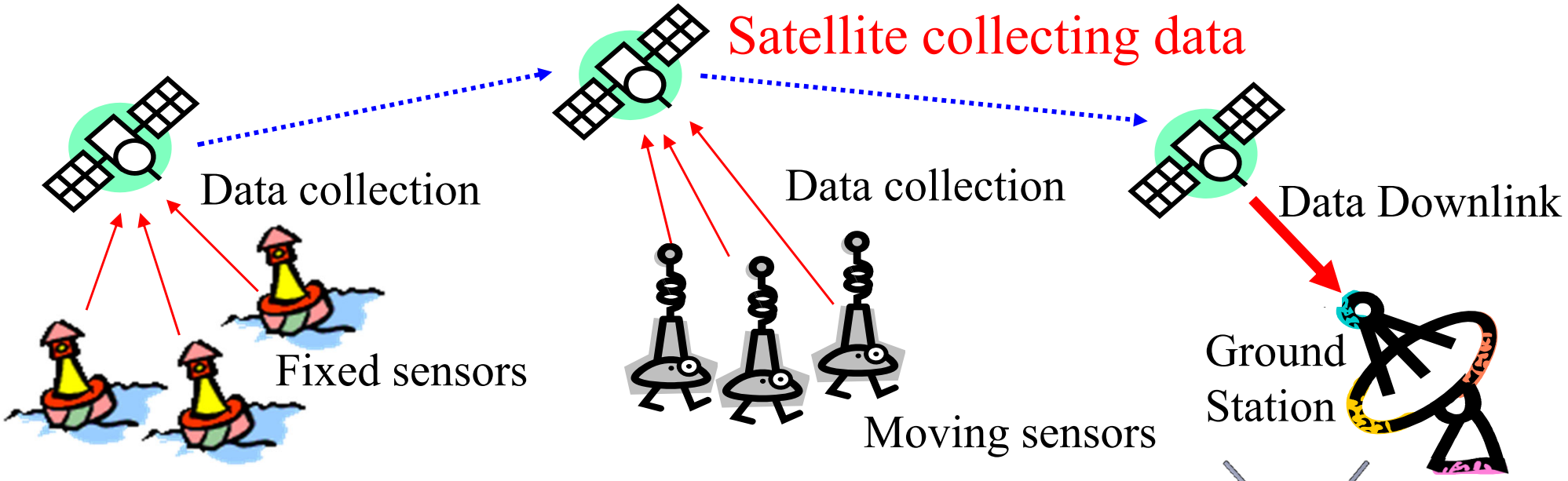
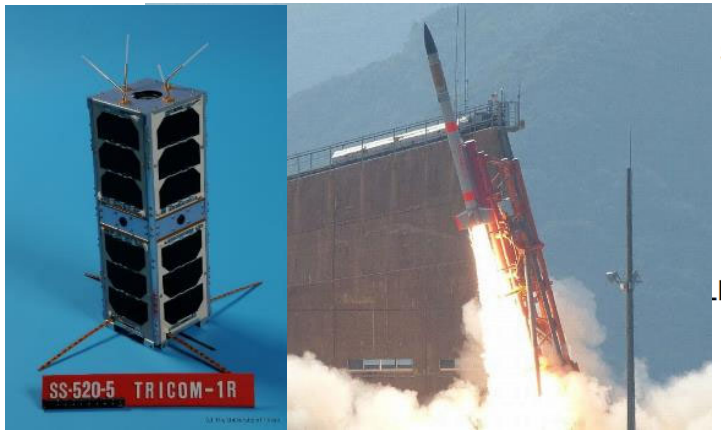
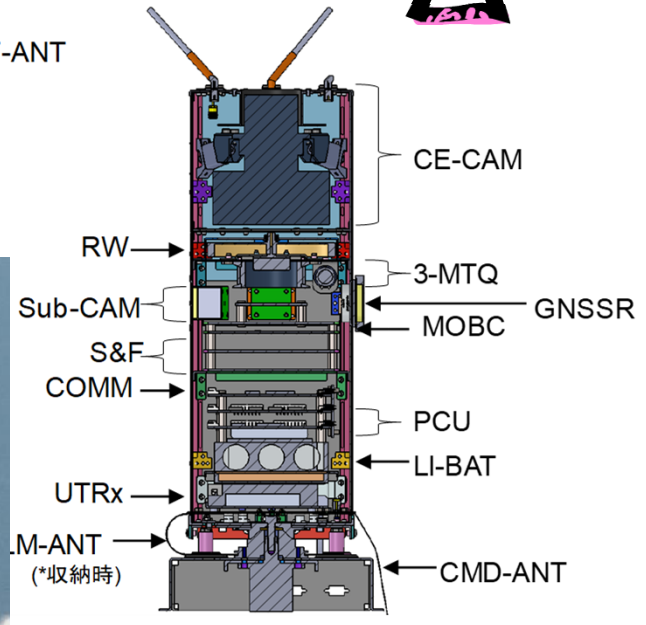
IoT Satellite Concept



Application areas: disaster prediction, water level monitoring, soil moisture, PH…..

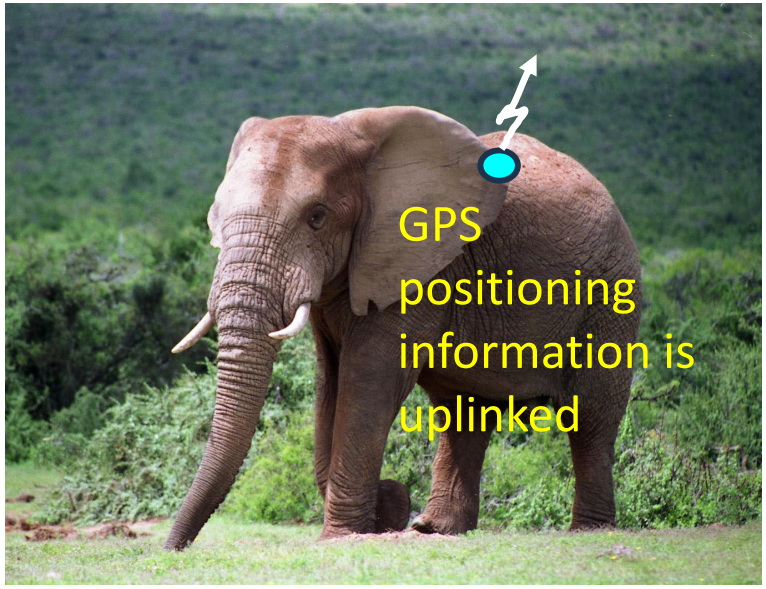
Low power transmission is key: 8 -130 mW RF power, low data rate (300bps) transmission was successful. (2018)





3kg TRICOM-1R

Various “use cases” have been proposed.



Monitoring Animal
Movements over wide area

Wild Fire Detection and Monitoring
(temperature sensor network)

Flood Detection and Monitoring
(Water Leven Sensor Network)

Agriculture Field Monitoring
(PH, moisture level sensors)

Key Points to conduct “useful” IoT mission

- Find real users of your IoT missions who
  - have strong desire to solve some social or environmental problems
  - have some fund (even if it is not so large) to develop (or buy) at least ground sensors and to do IoT experiments
  - will willingly collaborate with you to conduct the experiments

- Please contact your government or local governments, companies or institutes to collect real needs from them and find above real users

STEP 2: Selection of Frequency for IoT Uplink

1. A type of radio station called "specific low-power radio station" allows usage of radio transmission without needing a license for each transmitter, under the condition of operating below a certain transmission power.
2. A "Technical Compliance Certification" must still be obtained, but once this is done, an individual license is not needed for each ground transmitter. Using this approach can greatly simplify the licensing process.
3. However, this frequency and its corresponding transmission power limit vary by country, so we would like you to investigate the values in your respective countries

Current Plan: The receiver on satellites will be designed as SDR (Software Defined Radio) which can cover several frequency bands so that its "waiting frequency" can be switched when the satellites fly over different countries. Antenna design is the key technical issue as antenna is usually designed for a certain frequency and cannot cover varied frequencies. We should design such flexible antenna.

Example of Japan "specific low-power radio station"

Country	Frequency	RF power limit	Note
Japan	920.5～928.1MHz	< 20 mW	
Japan	315MHz	< EIRP 0.025 mW	Antenna (ground, satellite) will become large
Japan	426MHz band, 429MHz band, 449MHz band	< 10 mW	Antenna (ground, satellite) will become large
Japan	1200MHz band	< 10 mW	Attenuation of RF power is severe, so communication distance becomes short