

2019

# Guidebook to the Ministry of Defense Japan Self-Defense Forces (JSDF)

~Space/Cyber/Electromagnetic spectrum~



Drop by a cosmetic store, as if searching for treasure.

click

Find an interesting app, make videos and have fun.

So cute!

Lining up in front of a famous sweet shop with some friends.

I am not an adult, yet not a child

Recently though, I have started to think about things.

Studying and after-school time are enjoyable in their own way.

Hey, have you decided on your course?

What do you want to be in the future?

Right, what do I want to be in the future?

Kawanishi Airi (17),  
2nd year high school student



Only one year left until "serious summer," as described by 3rd year high school students.

In what direction am I heading?

I'll think more seriously next year.

Blank screen

I'll forget it for now.

Knocking

Um...

Nodding

Welcome back!

Hey big brother!

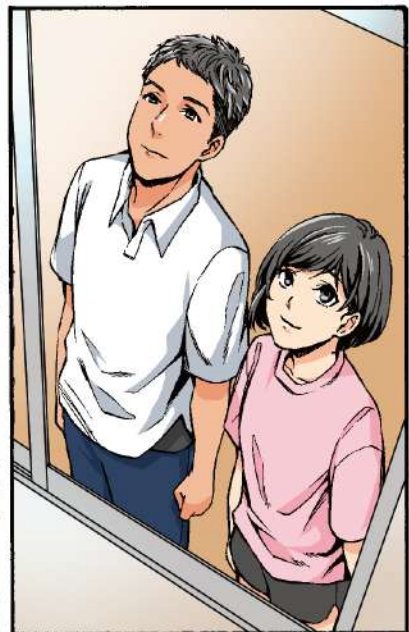
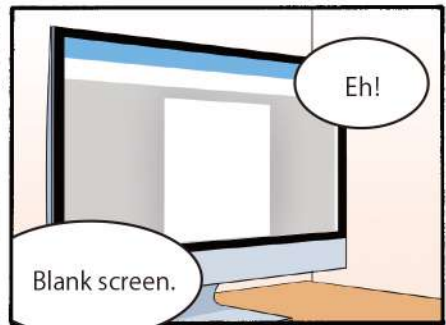
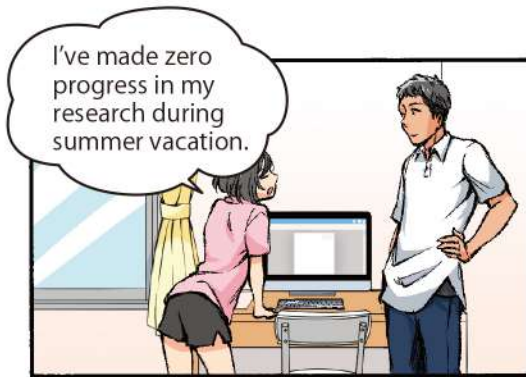
Hi Airi!

What?

You look glum, what's up?

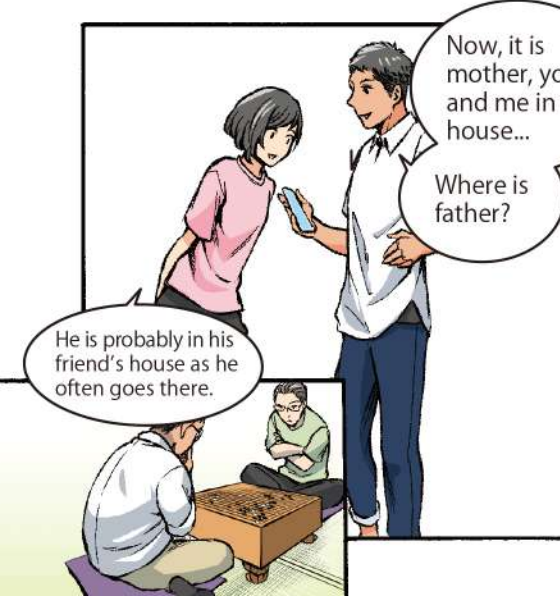
Older brother, Kawanishi Shota(22), is five years older than Airi. 4th-grade student at Department of Computer Science, Schools of Science and Engineering of National Defense Academy.

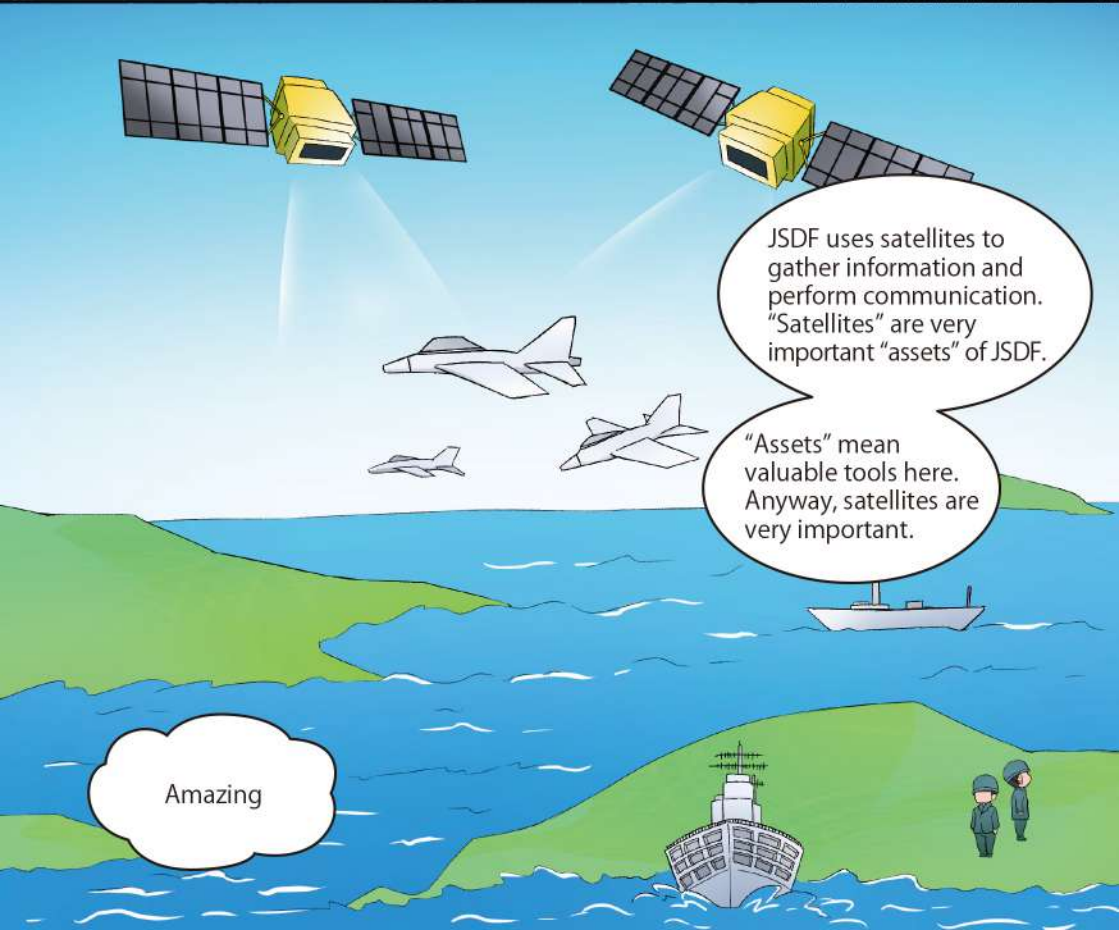
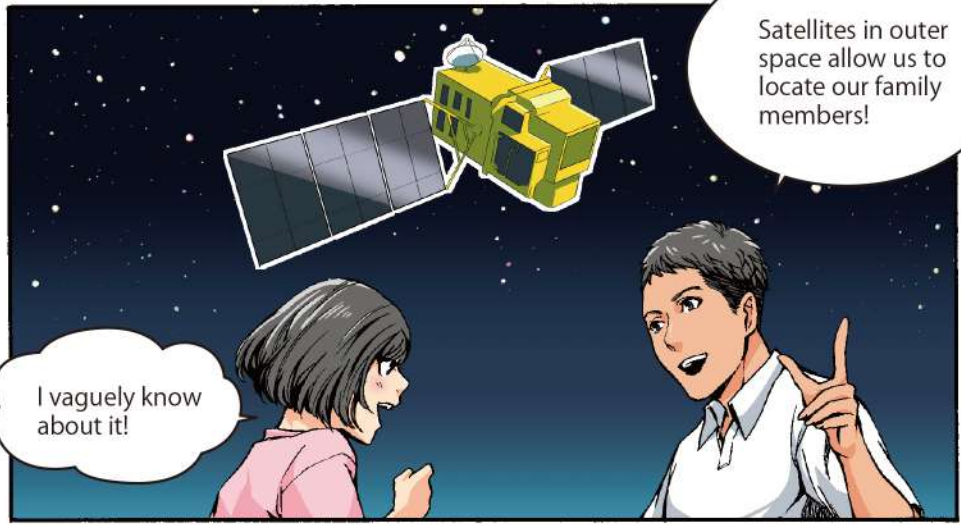
Usually, he lives away from home. However, he always comes home for long vacations.





# Episode 1: Protecting outer space









Protecting outer space?

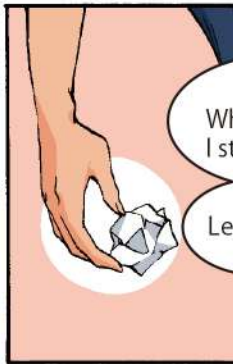
What does that mean?



Therefore, JSDF is now trying to protect "outer space" where satellites operate.



Here, look at this trash!



Well...  
Where should I start?

Let's say...



Nowadays, trash is one of the hottest topics around the world.

Actually, "space debris," which is trash, floats in outer space.

Space debris?



Let me use your PC...



You often hear on the news, "A satellite was launched." Space debris includes coating of a rocket that peels off during a launch, fragments of old satellites, and tools or gloves which astronauts leave behind during spacewalks.



I had no idea there is a trash problem in outer space.







Look at this.  
Outer space is  
borderless.

Outer space has infinite possibilities when satellites are used in it! Therefore, nations around the world are eager to use outer space with satellites. As a result, outer space is now jammed up with space debris.



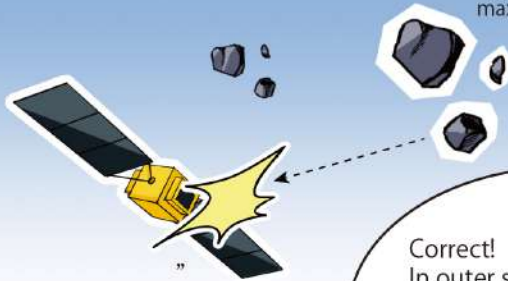
Really!  
Space debris could hit something. Sounds scary!



### Space debris

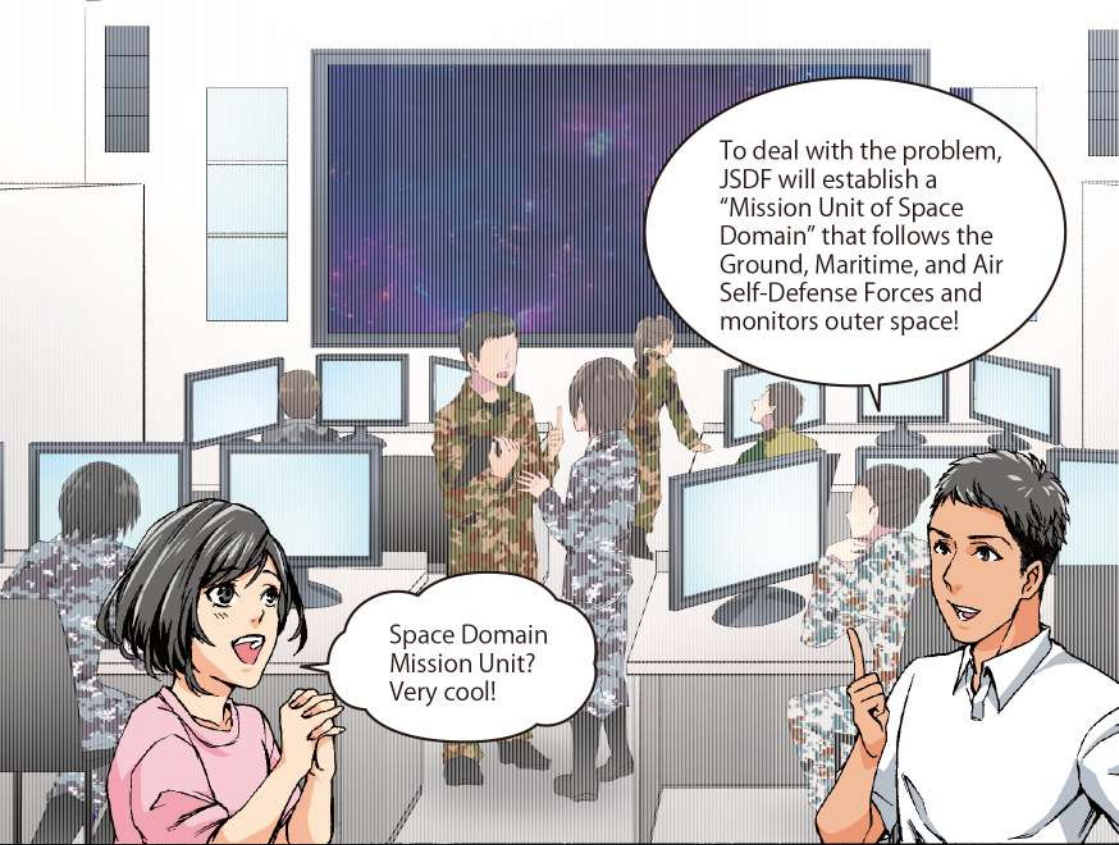
Circling the earth at an approx. speed of 7 km/s.\* Even a small fragment could cause major damage.

\*Approx. nine times faster than max. speed of an F-15J fighter

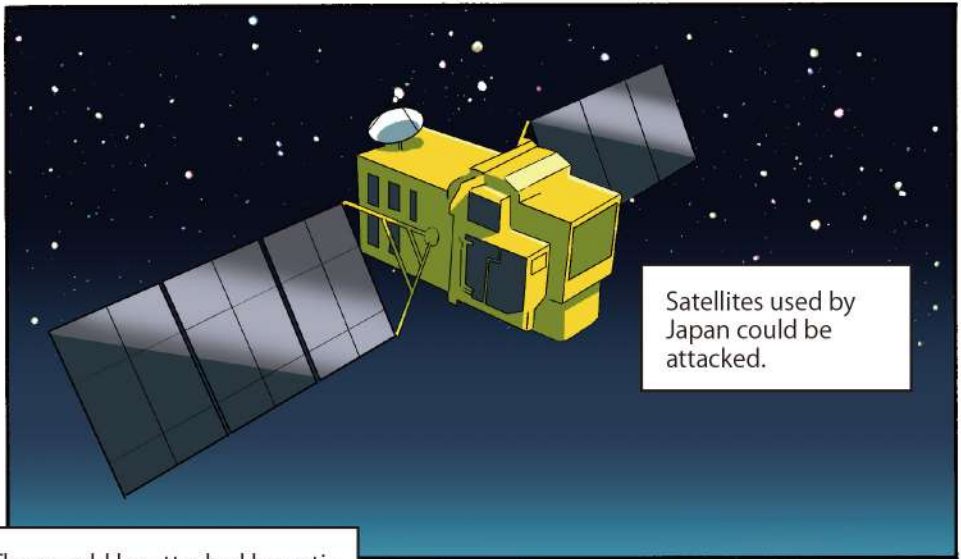


Correct!  
In outer space, this space debris that I explained moves at a really fast speed. If it hits a satellite, there would be severe damage.



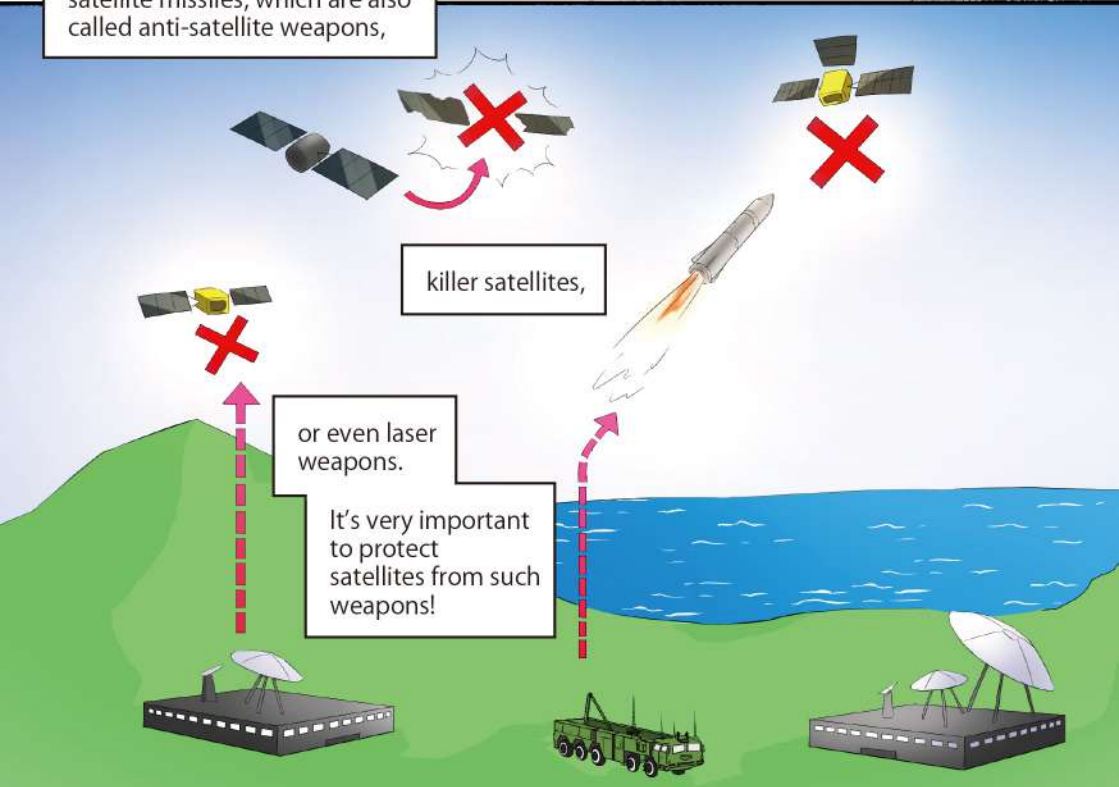






Satellites used by Japan could be attacked.

They could be attacked by anti-satellite missiles, which are also called anti-satellite weapons,



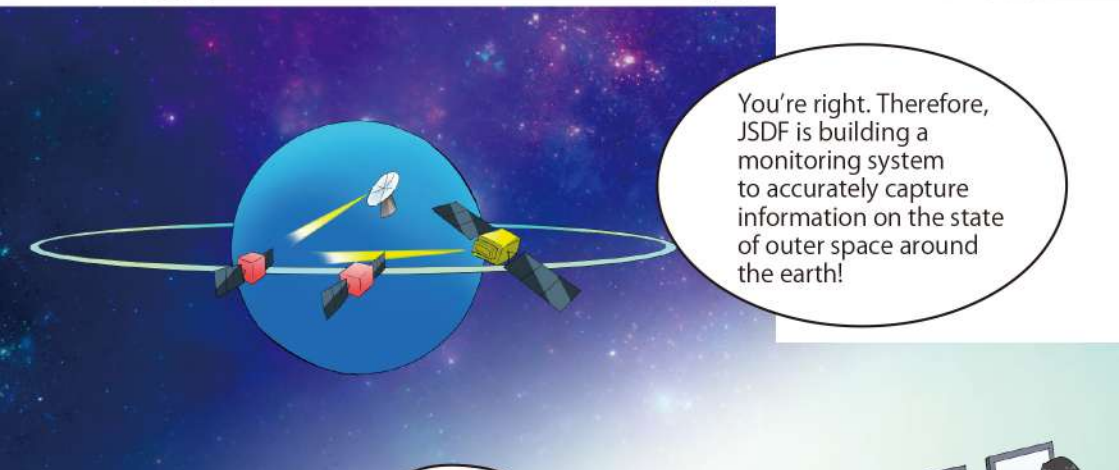
killer satellites,

or even laser weapons.

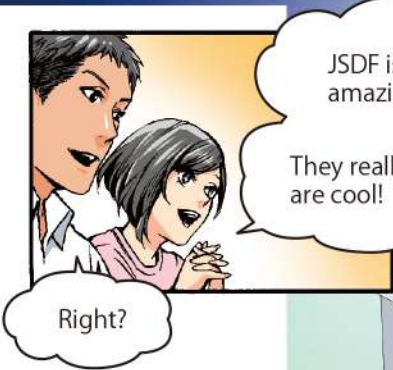
It's very important to protect satellites from such weapons!



Oh, no. It would be terrible if an attack like that happened.



You're right. Therefore, JSDF is building a monitoring system to accurately capture information on the state of outer space around the earth!



JSDF is pretty amazing!

They really are cool!

Right?







Relevant Japanese authorities are not the only ones which the monitoring system will cooperate with.

The system will cooperate with systems of US forces, too.



Yes! Now I feel a sense of familiarity with outer space.

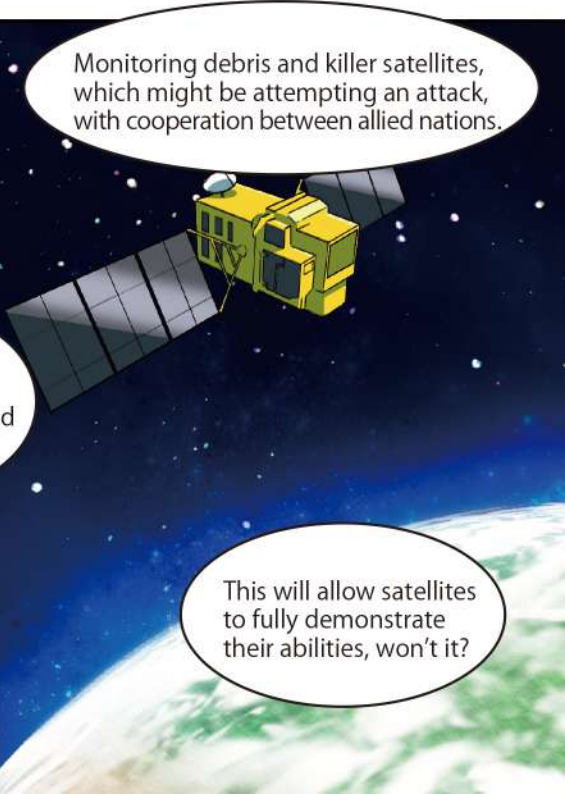


Eh, just now you said, "It's too far away and unrealistic!"

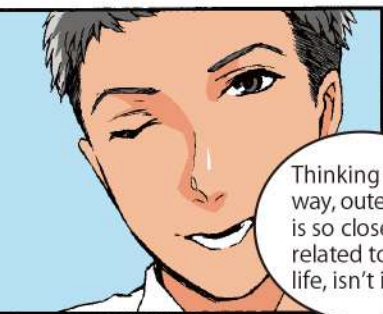
Yeah, but...



Monitoring debris and killer satellites, which might be attempting an attack, with cooperation between allied nations.



This will allow satellites to fully demonstrate their abilities, won't it?



Thinking that way, outer space is so closely related to daily life, isn't it?



Satellites are related to weather forecasts that we check every day, to Internet communication through the use of PCs or smartphones, to satellite broadcasting, to GPS for location information of aircrafts and ships!



Yep.

So, I should start with...

Satellites can fulfill their abilities once outer space is protected.



What is?

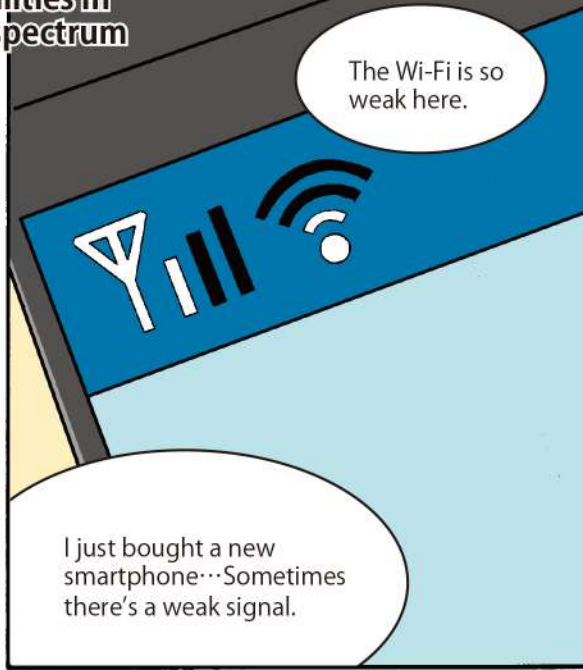


Oh, it's happening again!





## Episode 2: Strengthening capabilities in the electromagnetic spectrum



### Electromagnetic spectrum

Radio spectrum

Visible light

X-rays

Infrared rays

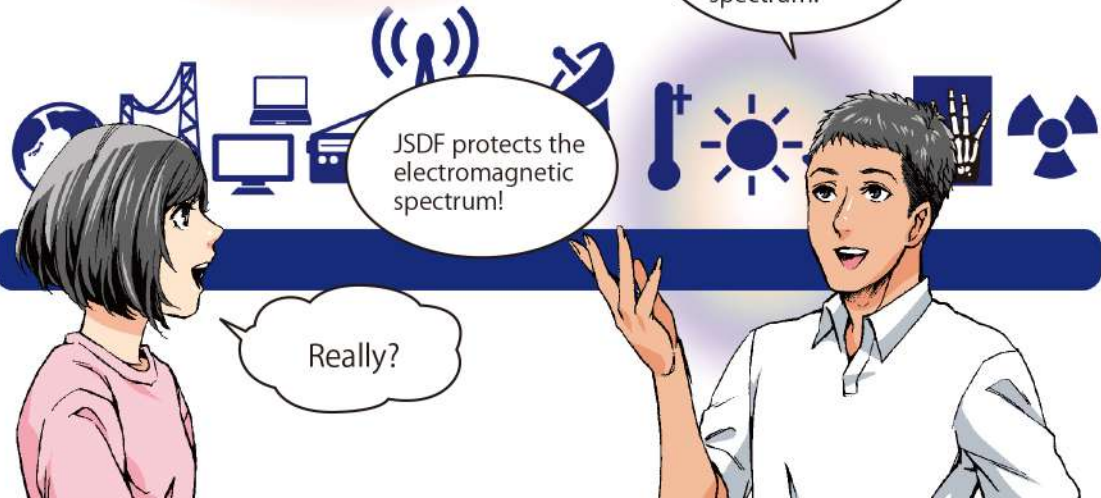
UV rays

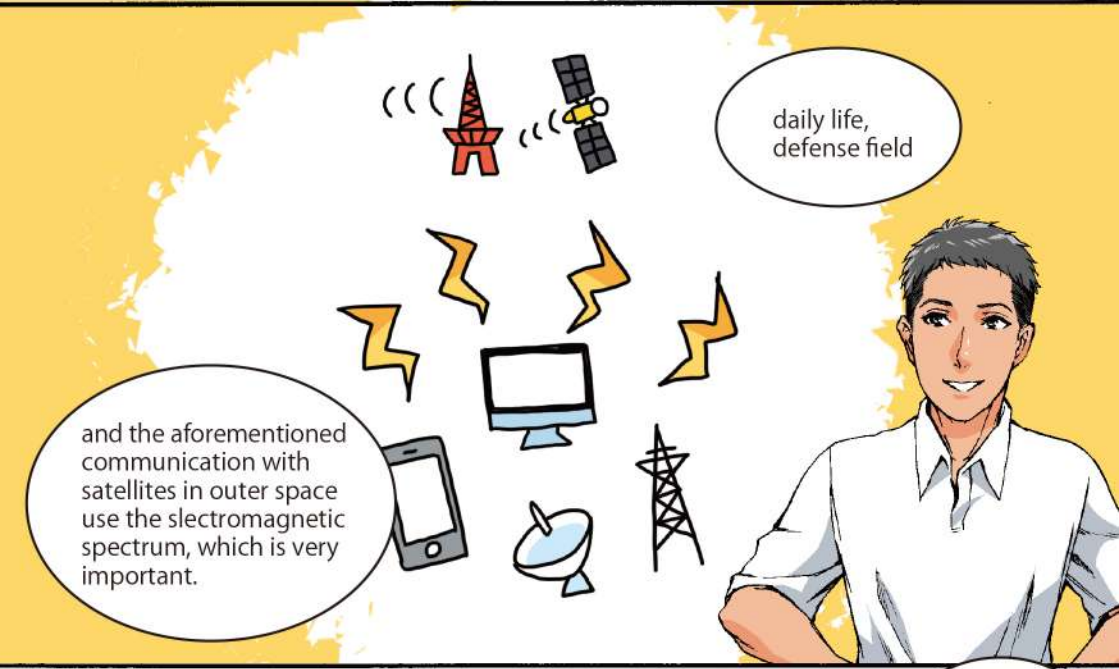
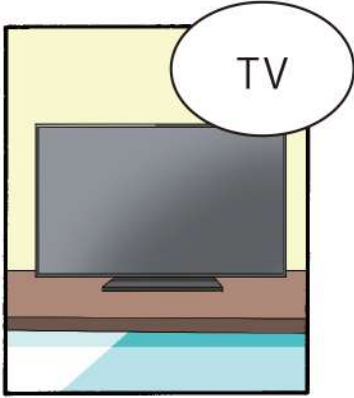
Radio spectrum by which you and your friends are troubled, infrared rays, visible light, X-rays, etc.

These are all collectively called electromagnetic spectrum.

JSDF protects the electromagnetic spectrum!

Really?









Warfare that uses electromagnetic spectrum is known as "Electric Warfare".



Now, major countries including Japan are paying close attention to this.



The electromagnetic spectrum scares me because it's invisible.

Not worked  
on the radar.

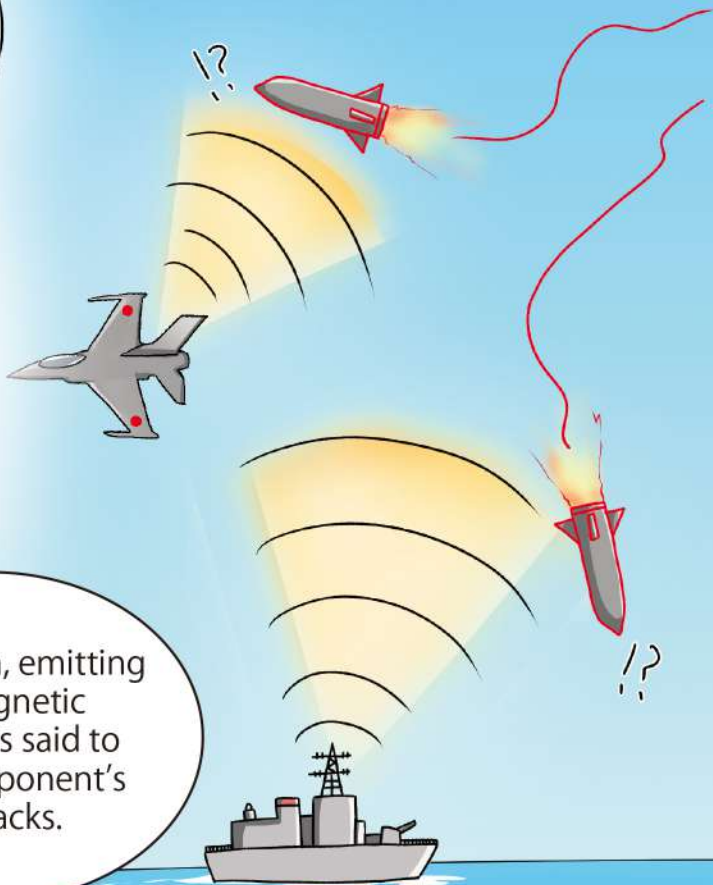
The effective use  
of electromagnetic  
spectrum is said to  
bring advantages  
to military forces  
engaged in a battle.

For example, there are  
“electronic attacks”.  
Emitting electromagnetic  
spectrum onto an opponent’s  
communication equipment  
and radars can disrupt  
the opponent’s use of the  
electromagnetic spectrum  
used by the enemy.

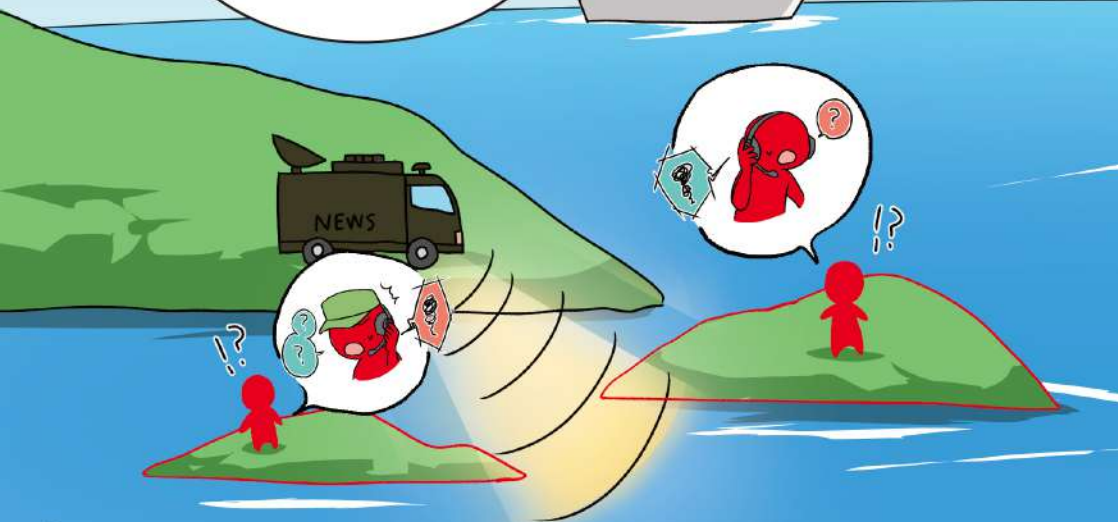
Not worked  
on the radar.

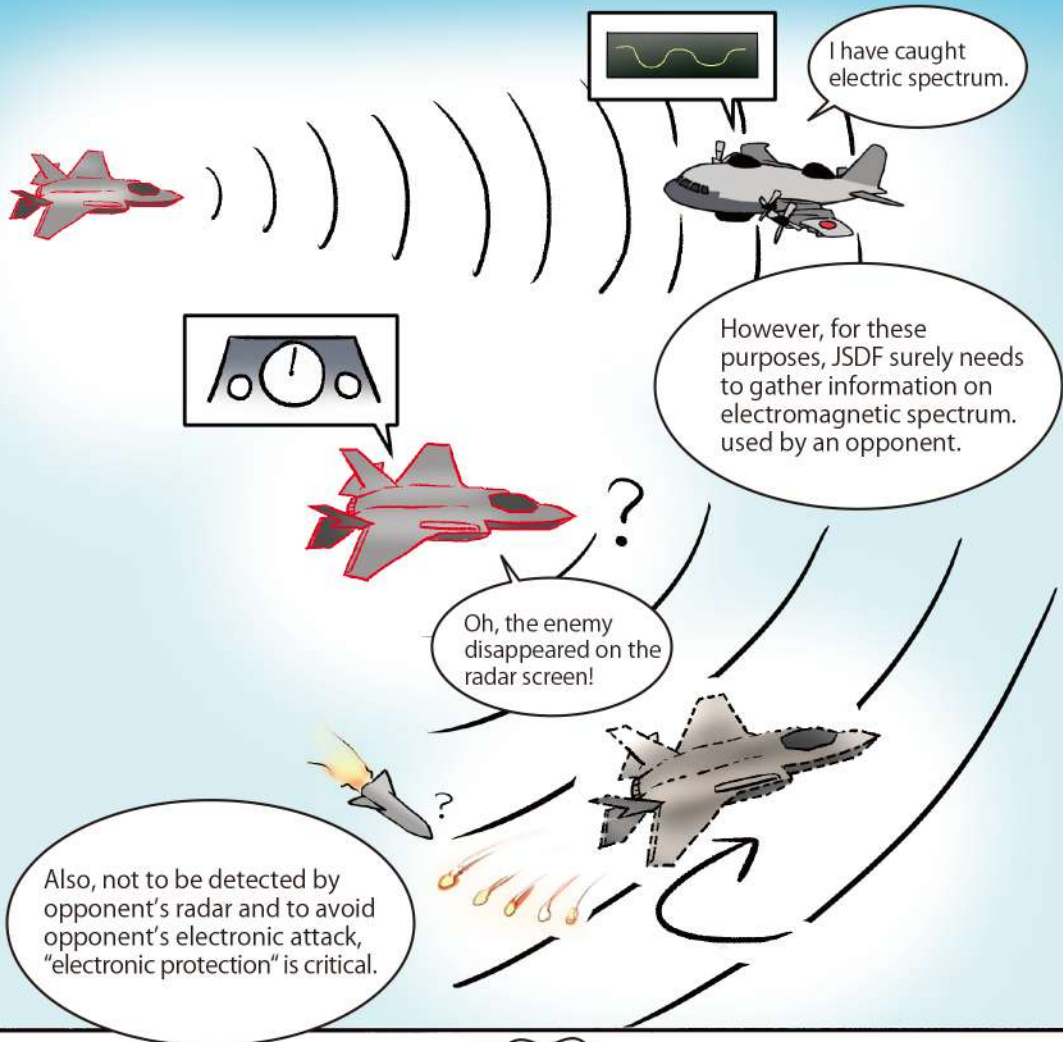






In addition, emitting electromagnetic spectrum is said to disturb opponent's missile attacks.





Also, not to be detected by opponent's radar and to avoid opponent's electronic attack, "electronic protection" is critical.

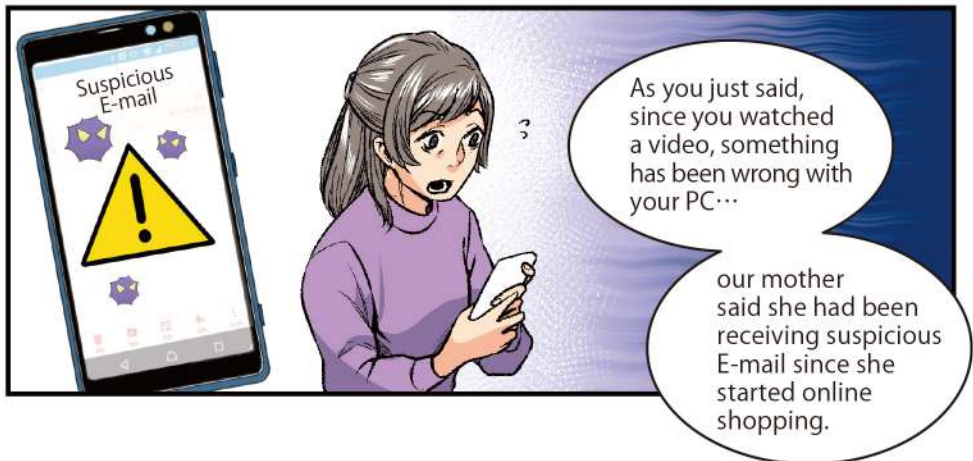
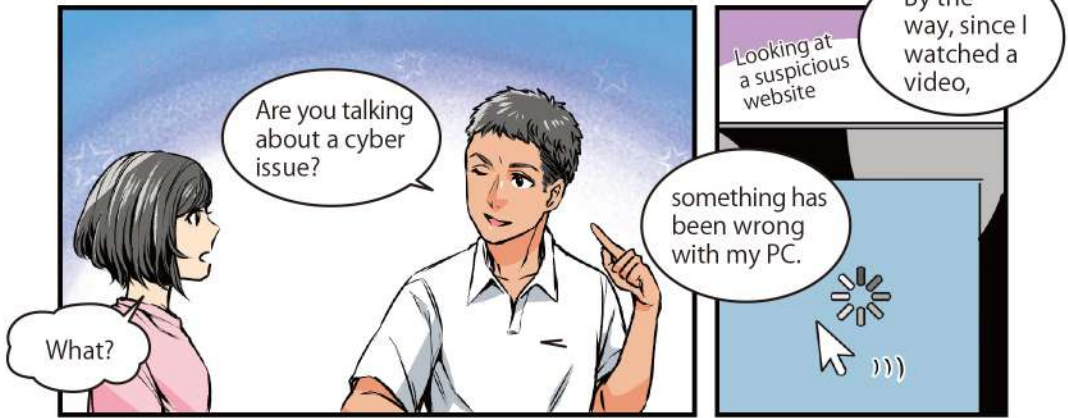


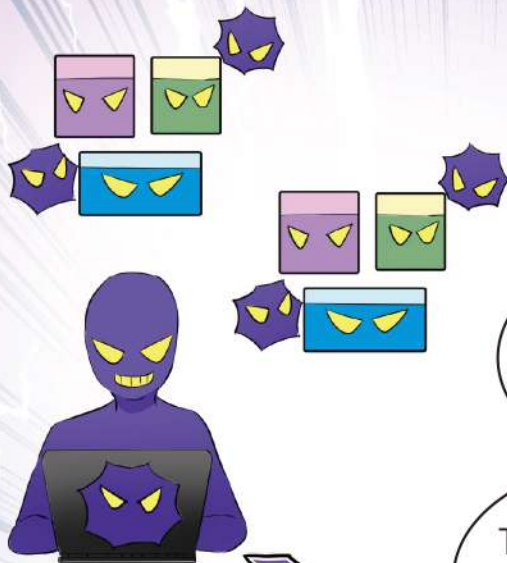
Appropriate measures are necessary all the more for its invisibility!

All aircrafts use electromagnetic spectrum to fly. Therefore, disruption of electromagnetic spectrum usage could result in serious problems.



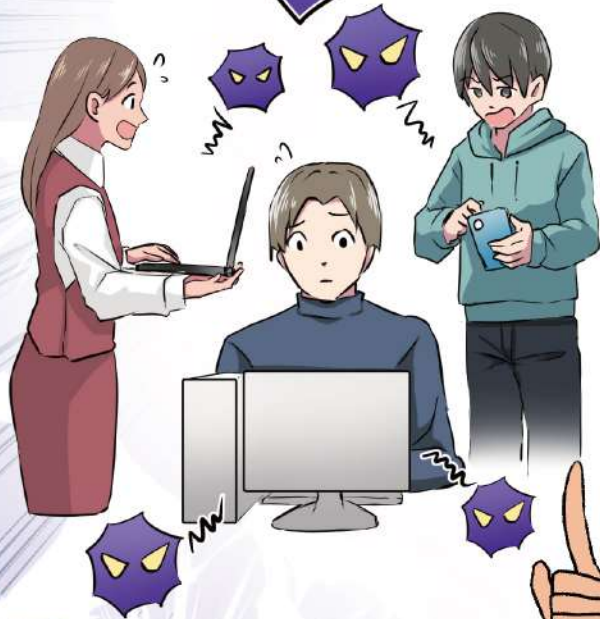
# Episode 3: Strengthening capabilities in cyber domain





Cyber attackers currently use various methods.

This challenge has to be tackled by the whole country!





Cyber-attacks target almost everyone in the world...

ranging from countries to companies, organizations, and individual people.

Really? That's a big problem!

Almost all JSDF personnel use PCs and network communications.



Therefore, cyber-attacks against JSDF systems that implant a virus or steal information result in serious problems.



What are the actual measures JSDF is taking?

Accordingly, JSDF needs to implement all appropriate measures against such attacks.



Firstly, gathering information on indications or methods of cyber-attacks!



- Viruses
- Trojan horses
- Worms
- Spyware
- Ransomware

## Malware



## Mail bombs



## Watering hole attacks

DoS attacks

SQL injections

Zero-day attacks

Session hijacking

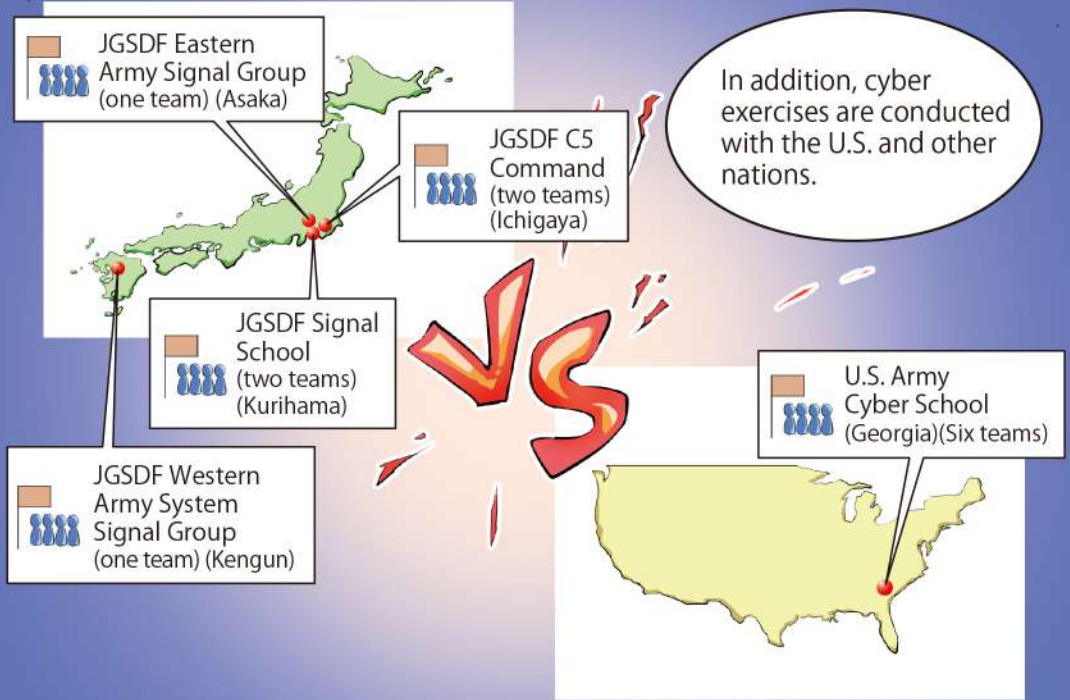
Password list attacks

Rootkit attacks

Buffer overflow attacks

Also, improving the capability to deal with cyber attacks!

Exercise on the Internet in which 12 teams from Japan and the US participate







Many female JSDF members are also engaged in measures against cyber-attacks.

Oh, really?



Amazing.



In JSDF, there are opportunities of study at universities in the US and at graduate schools in Japan, common cyber-education in GSDF, MSDF and ASDF.

Professional education is also available at the National Defense Academy where I am studying.

As cyber related units were recently established, many cyber specialists are needed.



In addition to the education, JSDF cooperates with other countries including the US and UK and exchange opinions with cyber specialists in those countries

to improve each other's skills.



Smiling  
Yes!

You're good at English...  
Are you interested in cyber defense?



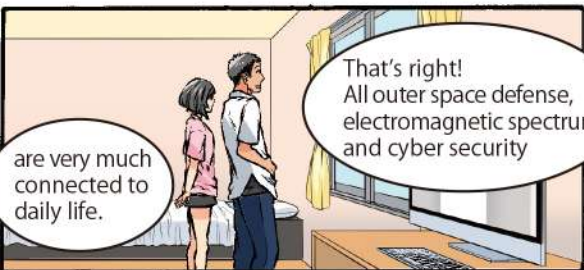


are linked to daily life.

JSDF activities



Brother, I...



are very much connected to daily life.

That's right!  
All outer space defense,  
electromagnetic spectrum,  
and cyber security



Excellent!



Are we having  
curry today?



What?



Nothing.  
Nothing!

I have to do  
some research!

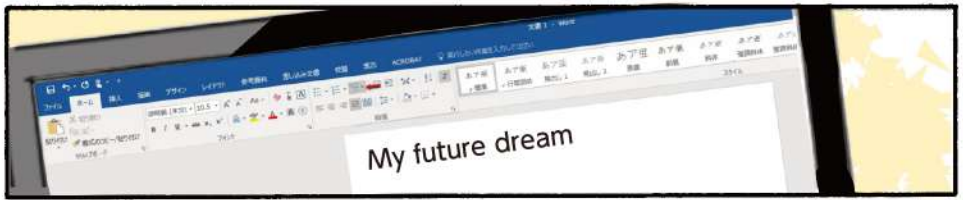


He is studying to  
protect the earth  
and outer space.

My brother is a  
future JSDFOfficer.



And I will be a...



Her dream is to become a JSDF officer just like her brother...





I want to defend Japan alongside my brother whom I respect.

I want to defend Japan alongside my brother whom I respect.

*Do your very best, future JSDF officer!*





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~ Space/Cyber/Electromagnetic spectrum ~

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