MOD(ATLA)'s Technology Strategy

- These documents were published on August 31.

1. Japan Defense Technology Strategy **(JDTS)**

- The main body of MOD(ATLA)'s technology strategy

2. Medium-to-Long Term Defense Technology Outlook **(DTO)**

- Forecasting the technology areas which will be very important for our mission in medium to long term future (approx. 20 years)
- Publishing every 5 years (as a general rule)

3. Technology R&D Vision for Unmanned Equipment

- Presenting a concept for future defense equipment and its R&D road map on necessary technologies for around 20 years.
- ATLA has already started with developing a few visions.

1. JDTS ~Objectives of Technology Policy~

- Two objectives were settled in order to establish consolidation defense infrastructure by **strengthening Japanese technology consisting the basis of defense capability.**

(1) Ensure Technological Superiority

- ✓ Technological superiority to strengthen our defense capability.
- ✓ Significantly important to National Security from a viewpoint of avoiding "Sputnik crisis."
- ✓ Bargaining Power for the International Cooperative R&D projects.

(2) Delivering superior equipment through effective and efficient R&D.

- ✓ Considering cost into account throughout the equipment's life cycle.
- ✓ Creating effective and efficient defense equipment consistent with the priority of defense buildup plan.

1. JDTS ~Approaches~

☐Three approaches to achieve the objectives

①Technology Survey

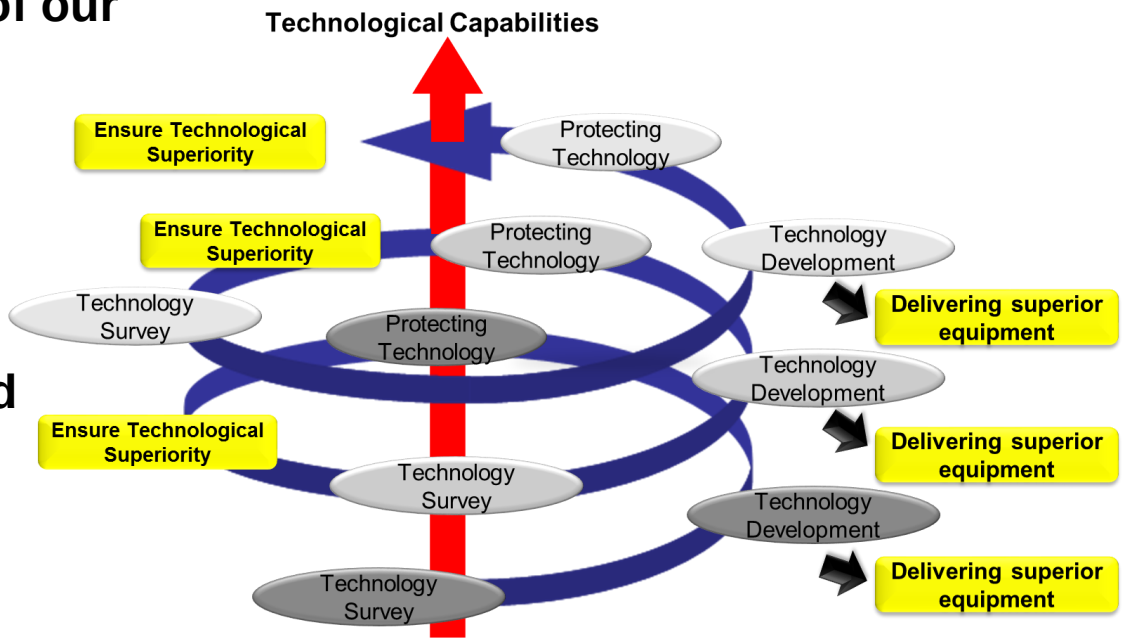
- Collecting Information as base of technology policies
- Implementation of the Medium-to-Long term Defense Technology Outlook

②Technology Development

- Optimized acquisition of defense equipment through project management
- Formulating a R&D Vision
- R&D to steadily assume the basis of our national defense
- Innovative Science & Technology Initiative for Security

③Technology Protection

- Appropriate technology control and the use of intellectual property



1. JDTS ~ Technology Survey~

☐ To ensure Technology superiority and to deliver advanced equipment through effective and efficient R&D, 3 perspectives should be taken into consideration.

Technological superiority

③ Fields possibly generate game-changing technologies with minimum investments.

- Incorporating commercial technologies to the defense field that are aggressively being developed at private company level. (e.g. AI + Various sensors, AI + Robotics, QDIP Sensor + Satellite)

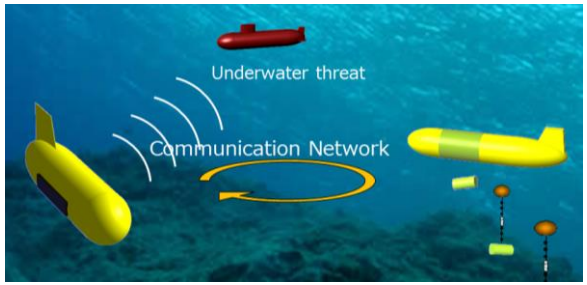

High-resolution camera


Drone

+


AI


QDIP*1 Sensor



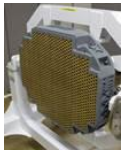
(e.g. LDUUV*2 (Large-capacity battery + Robotics + Wireless energy transfer))

*1 QDIP : Quantum Dot Infrared Photodetector
*2 LDUUV : Large Displacement Unmanned Underwater Vehicle

① Domestic fields with outstanding technical bases that may provide future technical superiority by increasing defense investment.

(e.g. High-power Directed energy, various sensors, material etc.)


High power laser


Semiconductor sensor


Composite material

Aggressive investment

② Severe to obtain superiority against other nations, and possibly create future disadvantage strategically unless a certain level of technology is retained.

(e.g. Advanced Technology Demonstrator, Scramjet, Large UAVs etc.)


Advanced Technology Demonstrator

2. DTO ~Implementation of Medium-to-long Term DTO~

To propose advanced Game-changing technologies that must be focused to obtain foreseeing next 20 years.

Expecting to withdraw outstanding advanced commercial technologies, and to facilitate the growth of technologies that can be considered to implement the defense equipment by publicizing the outlook.

Important Activities

Effort for Unmanned Technology

- Unmanned technology including autonomous, swarm control and power supply to respond to 4D* missions, ensure operator's safety, and to overcome functional & performance restrictions derived from manned system.

*Dangerous,Dirty,Dull,Deep

Effort for Smart and Network Technology

- Artificial Intelligence for Smart technology including advanced autonomy, and to process Big data promptly.
- Information and Communication technology to enable wide-area distributed “System of Systems” capable to resist cyberattack.

Effort for High-power Energy Technology

- High-power Energy technology including High-power laser & Microwave for immediate response and long duration combat that can offset enemy's quantity advantage cited as saturation attack using cruise missile.

Effort to Improve function & performance of Legacy Systems

- Material, sensor and guided missile component technology to improve function & performance of legacy systems.

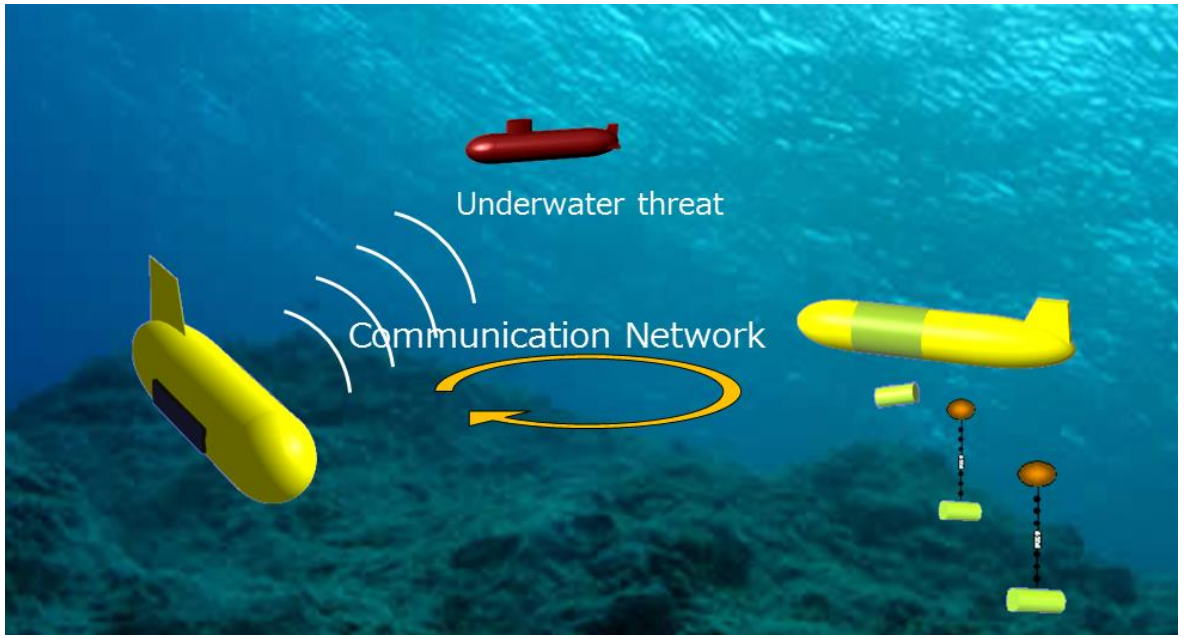
2. DTO ~Future Equipment and Potential Technologies~

□ Unmanned technology

Unmanned technology including autonomous, swarm control and power supply to respond to 4D* missions, ensure operator's safety, and to overcome functional & performance restrictions derived from manned system.

*Dangerous,Dirty,Dull,Deep

✓ Example : Long endurance large size UUV technology (autonomous underwater operation, long endurance, underwater communication technology, etc.)



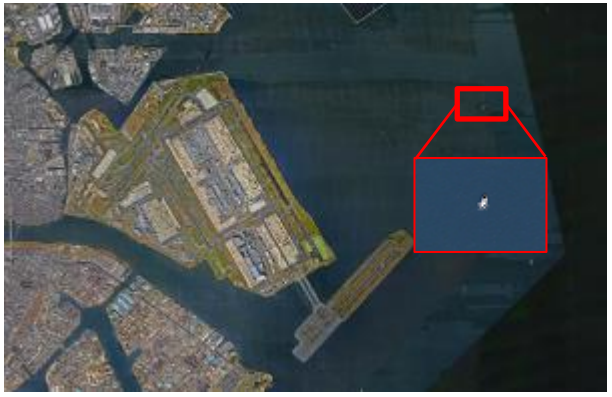
➢ Long endurance UUVs in support of submarines will reduce the workload of operator.

2. DTO ~Future Equipment and Potential Technologies~

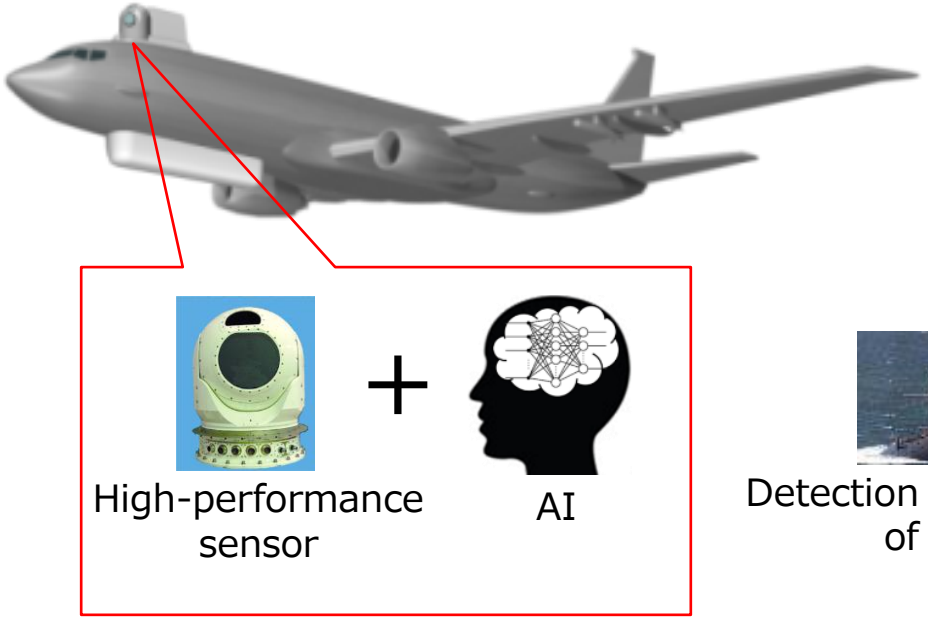
☐ Smartification / Networking

・AI (Artificial Intelligence) for smartification including advanced autonomy and to process large amount of information rapidly.
・ICT (Information and Communication Technology) having survivability to cyberattack and realizing system of systems.

✓ Example of smartification : Remarkable improvement of Airborne warning and surveillance capability



High performance sensor equipped with 30 times higher resolution than 4K.



Detection and identification of periscope

➢ The fusion of AI and high performance sensor equipped with extensive and simultaneous surveillance capability provides assistance to the operator when detecting and identifying surface targets.

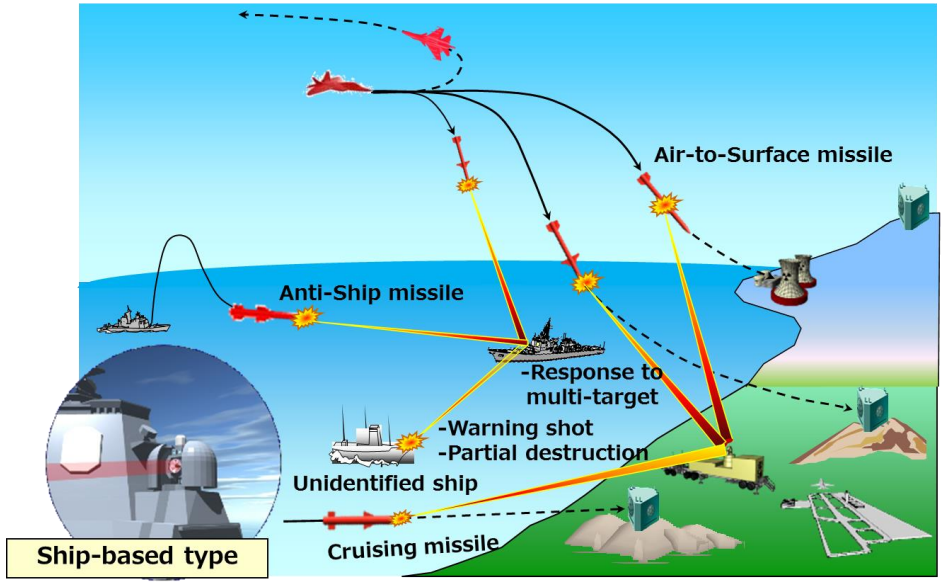
2. DTO ~Future Equipment and Potential Technologies~

☐ High Power Energy Weapons

High power energy technology including high power laser and microwave provide the capability of instantaneous and persistent engagement, enabling to counter quantitative superiority of enemies such as saturation attack by cruising missiles.

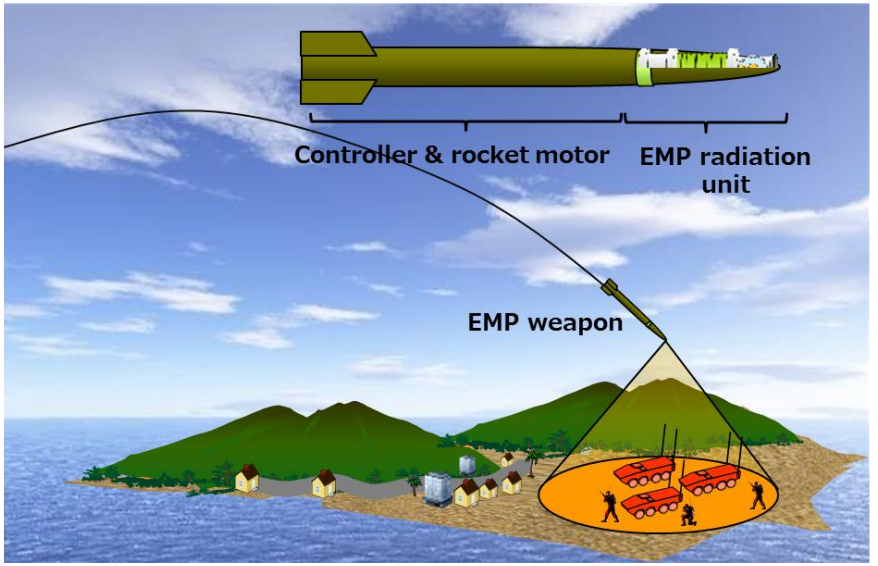
✓ Examples of High Power Directed Energy Weapons

(Ex.1) High power laser weapons



- Attacking at the speed of light with unlimited ammunition.
- Counter hostile saturation attack

(Ex. 2) EMP* weapons



- Neutralize hostile forces with minimum human suffering.

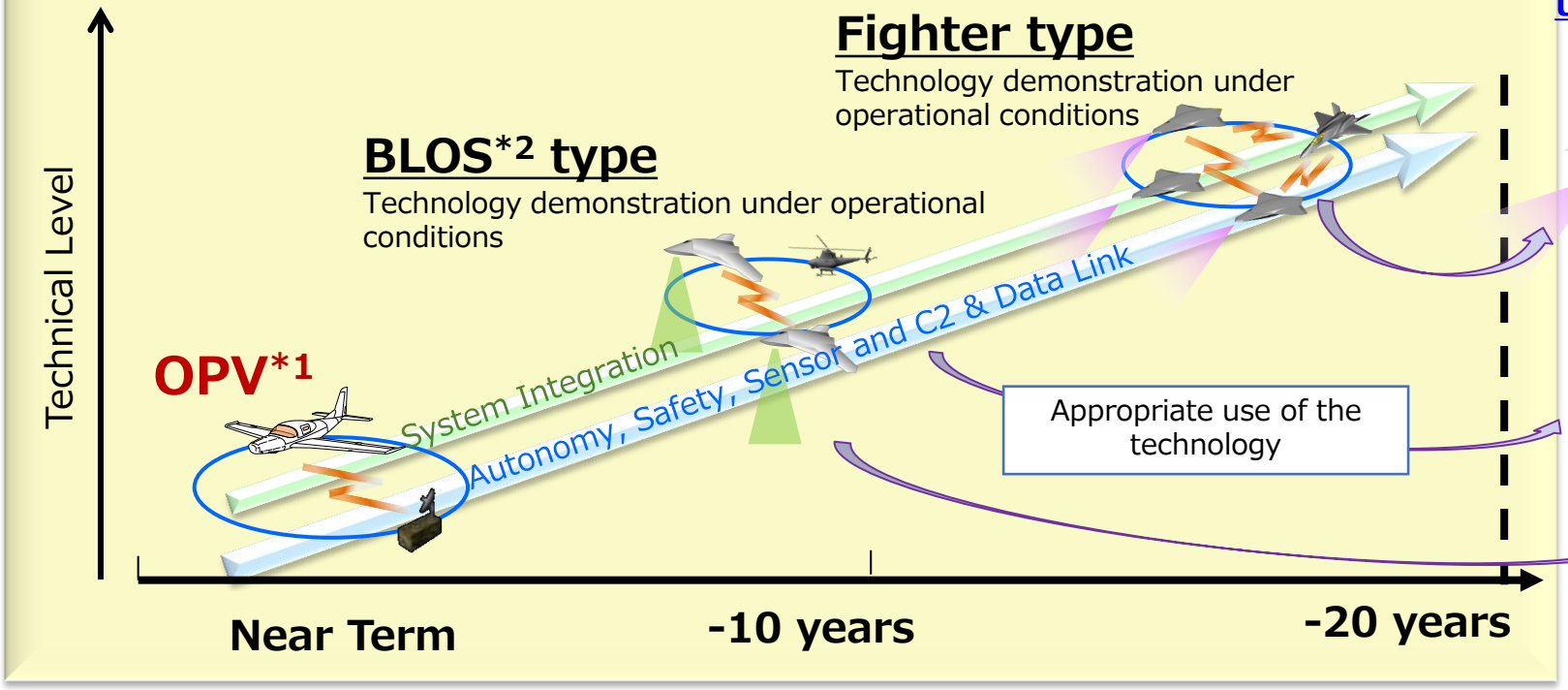
*:ElectroMagnetic Pulse

3. Technology R&D Vision for Unmanned Equipment

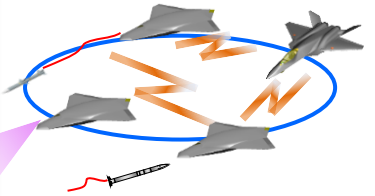
- In order to obtain advanced technologies in a strategic way, in terms of technical superiority of our nation, the MOD has begun with the systematic R&D of future Unmanned Air Vehicles within Unmanned Equipment, as the most difficult and longest term R&D is expected in the area of safety.

Autonomy — **Safety** — **C2 & Data Link**

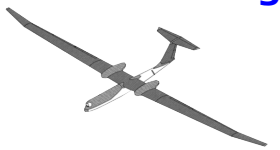
Unmanned Air Vehicles Technology R&D Roadmap



Examples of technology application



Unmanned Fighter



Unmanned Warning Aircraft for BMD

Unmanned operations

*1 Optionally Piloted Vehicle *2 Beyond Line of Site