

新たな脅威HGVに対処 するための研究開発

R&D for Counter HGV's

航空装備研究所誘導技術研究部

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本発表のポイント

The objective of this presentation

- HGVを迎撃するミサイルの必要性や求められる技術に関する、航空装備研究所の考えについて説明します。

Explain the necessity of counter HGV's Missile and necessary technology

- 防衛装備庁が、来年度以降に研究試作を行う迎撃ミサイルの概要について説明します。

Overview of ATLA's research for counter HGV's missile

長射程迎撃ミサイル (AD-SAM) の 必要性

Need for long range counter HGV's missile (Area Defense Surface to Air Missile)

研究の前提 Background










我が国の地理的特徴

- 周辺に強大な軍事力を有する国家が集中
- 東西南北に約3,000kmに及ぶ国土
- 大都市に人や資産が集中

Geographical characteristics of Japan

- There are countries with powerful military forces in the vicinity
- Land extending 3,000km from southwest to northeast
- Concentration of people and assets in large cities

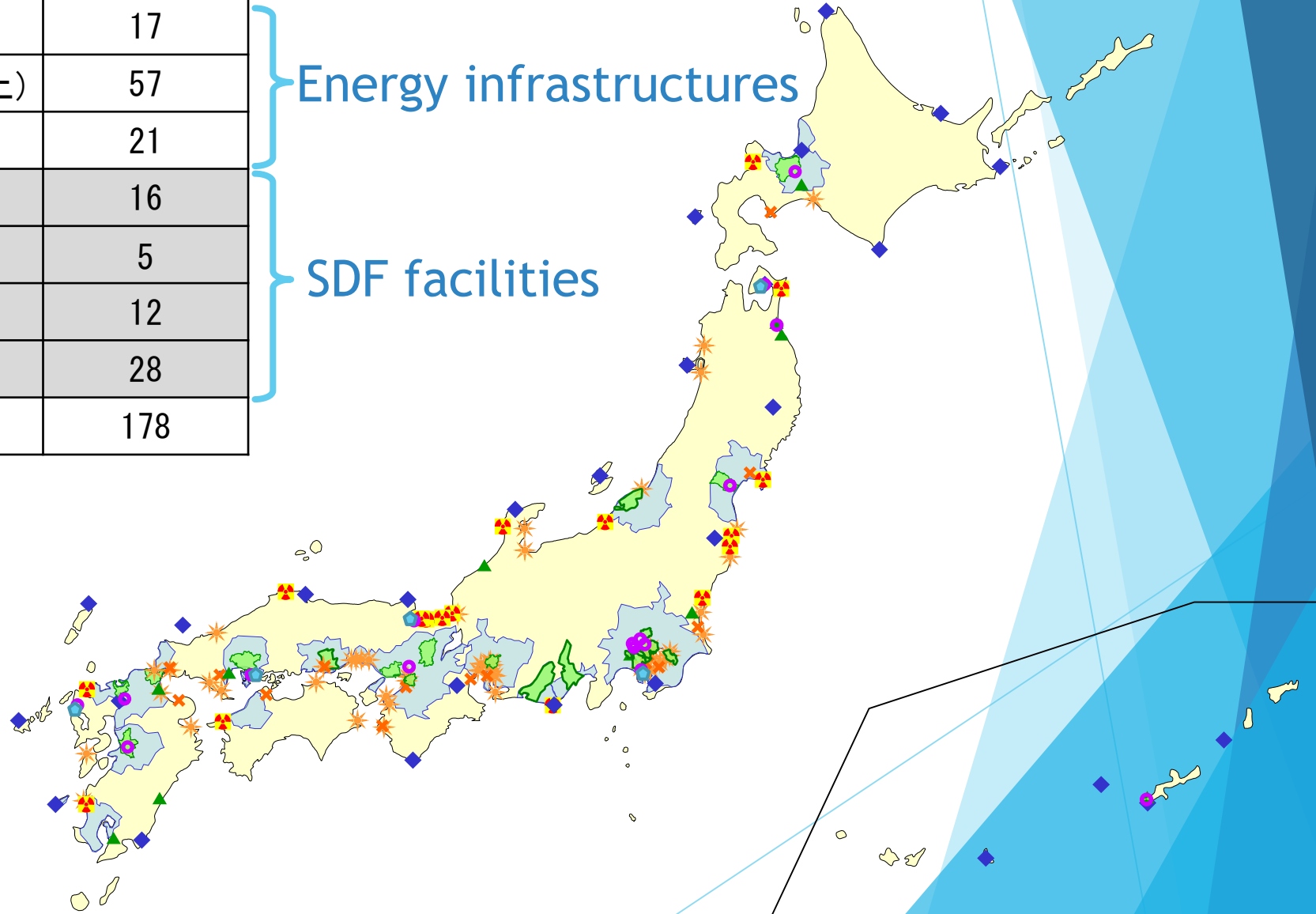


シンボル	防護対象	数
	大都市圏・都市圏	(14地域)
	大都市圏の中心市・那覇	22地域
	原子力発電所	17
	火力発電所(100万KW以上)	57
	製油所	21
	自衛隊司令部	16
	自衛隊主要艦艇基地	5
	自衛隊航空基地	12
	レーダサイト	28
合 計		178

Densely populated areas

Energy infrastructures

SDF facilities



昨年1月11日の北朝鮮による発射

Launch test by North Korea on 11 January 2022

北朝鮮メディアは「発射されたミサイルから分離された極超音速滑空飛行戦闘部は、距離600km辺りから滑空再跳躍し、初期発射方位角から240kmの強い旋回機動を遂行して1,000km水域の設定標的に命中した。」と発表



Distinguished Feat of WPK in History of Leading Juche-based Defence Industry Success in Another Hypersonic Missile Test-fire Respected Comrade Kim Jong Un Watches Test-fire in Field

Pyongyang, January 12 (KCNA) -- **Kim Jong Un**, general secretary of the Workers' Party of Korea (WPK) and president of the State Affairs of the Democratic People's Republic of Korea (DPRK), watched the test-fire of hypersonic missile conducted by the Academy of Defence Science on Tuesday. He was accompanied by Jo Yong Won, member of the Presidium of the Political Bureau and secretary for Organizational Affairs of the WPK Central Committee, vice- directors of the departments concerned of the Party Central Committee and leading officials in the sector of the national defence science.

The 8th WPK Congress set forth a strategic task of developing the hypersonic missile sector on a preferential basis for the sector of the national defence scientific research in order to bolster up the country's war deterrent, and the Party Central Committee has powerfully led the whole course of developing the hypersonic weapon system for implementing the task.

The respected Comrade **Kim Jong Un** was briefed on the hypersonic missile weapon system by the president of the Academy of Defence Science before the test-fire.

The test-fire was aimed at the final verification of overall technical specifications of the developed hypersonic weapon system.

Toward daybreak, the Juche weapon representing the power of the DPRK roared to soar into sky, brightening the dawning sky and leaving behind it a column of fire, under the supervision of **Kim Jong Un**.

After its release from the missile, the hypersonic glide vehicle made glide jump flight from 600 km area before making a 240 km-long turning maneuver from the initial launch azimuth to the target azimuth and hitting the set target in waters 1 000 km away.

The superior maneuverability of the hypersonic glide vehicle was more strikingly verified through the final test-fire.

Kim Jong Un highly appreciated the practical achievements made by the scientists, technicians and officials of the missile research sector and by the Party organizations concerned that brought a great success in the field of developing hypersonic weapon which is of the most important strategic significance in the five core tasks of the five-year plan for building up the national defence capability set forth at the 8th WPK Congress. He gave special thanks on behalf of the Party Central Committee to them.

Stressing the need to further accelerate the efforts to steadily build up the country's strategic military muscle both in quality and quantity and further modernize the army, **Kim Jong Un** encouraged the national defence scientific research sector to continuously make admirable successes in the historic sacred cause for remarkably increasing the war deterrent of the country, true to the Party's strategic policy of national defence development and strategic guidelines.

That day he called the core members in the sector of hypersonic weapon research and development to the office building of the Party Central Committee and warmly congratulated them. He had a photo session with them, expressing great expectation and conviction that they would help bolster the war deterrent of the country with their continued ultra-modern scientific research achievements for national defence and reliably guarantee the sovereignty and security of the state. -0- www.kcna.kp (Juche111.1.12.)



朝鮮中央通信Webサイトより抜粋⁶

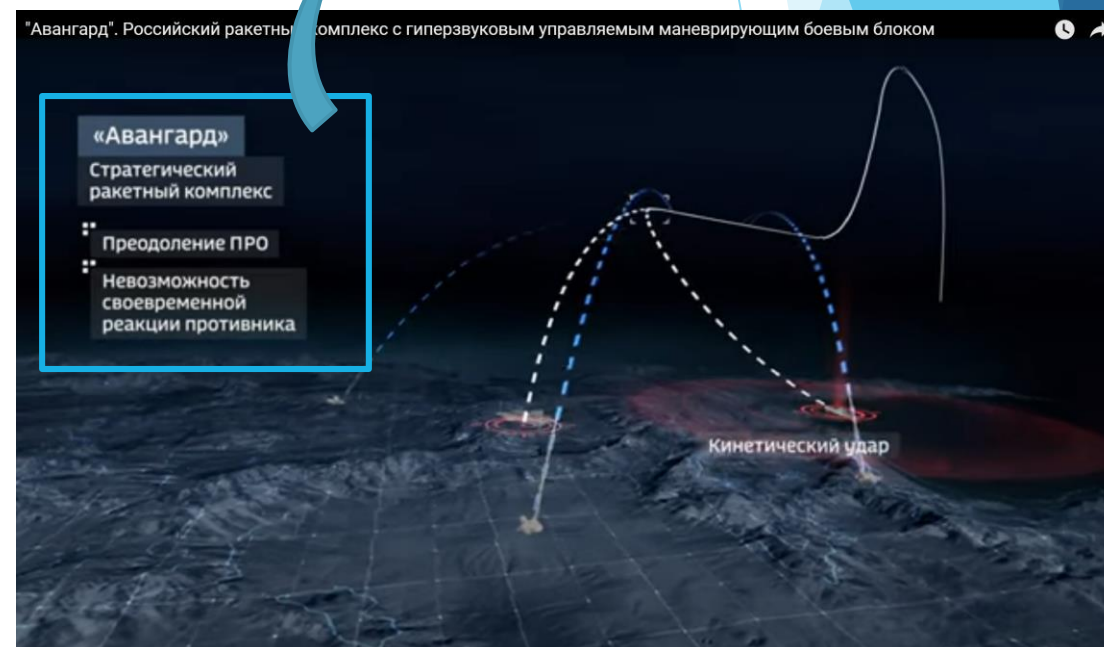
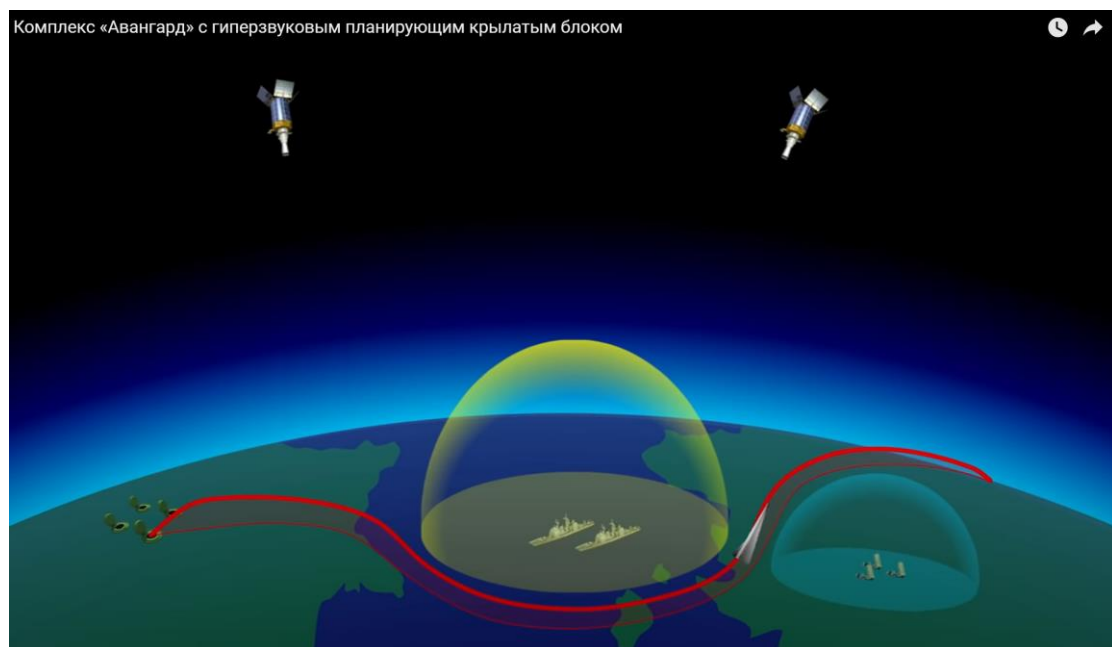
アヴァンガードについてのロシアの主張

Russian MOD announcement on Avangard

ロシア国防省は、アヴァンガードはミサイル防衛システムを克服する旨を主張

<Avangard>
Strategic
missile system

「Overcoming missile defense
「impossibility
timely
enemy reaction



DF-17 についての中国官製メディアの記事

Global times report on DF-17

環球時報は「従来の弾道ミサイルとは異なり、DF-17は飛行中に軌道を変えることが可能であり、敵がそれを迎撃する可能性を最小限に抑えることができる」と報道

Ministry of National Defense of the People's Republic of China Chinese (GB) Chinese (Big5)

LEADERSHIP MINISTRY DEFENSE POLICY CMC DEPARTMENTS MILITARY SERVICES THEATER COMMANDS NEWS PUBLICATIONS

News / Top Stories

DF-17 ballistic missile makes debut at National Day parade

Source : Global Times Editor : Dong Zhaohui 2019-10-01 18:45:23



Making their debut in the general public for the first time, DF-17 missiles join the National Day parade held in Beijing on October 1, 2019.
Photo: Zhang Haichao



Photo: Fan Lingzhi/GT

China showcased the new DF-17, a ballistic missile said to be hypersonic with a very high defense penetration capability, for the first time at the National Day parade on Tuesday, with Chinese military expert saying that it is almost impossible to be intercepted by enemies.

DF-17 conventional ballistic missiles were displayed at the event in Tiananmen Square.

The DF-17 is a very recently developed type of short to medium-range missile.

It will play a vital role in safeguarding China's territorial integrity, as regions including the South China Sea, the Taiwan Straits and Northeast Asia are all within its striking range, Yang Chengjun, a Chinese missile expert and quantum defense scientist, told the Global Times, noting that South Korea has been deploying the THAAD air defense system and Japan is fielding SM-3 interceptor missiles, which are security threats to China.

The DF-17 missile features a hypersonic glide vehicle as its warhead, which can travel at 10 times the speed of sound, UK-based media outlet Daily Mail reported in June.

The very high speed leaves enemies with little time to react, military observers noted.

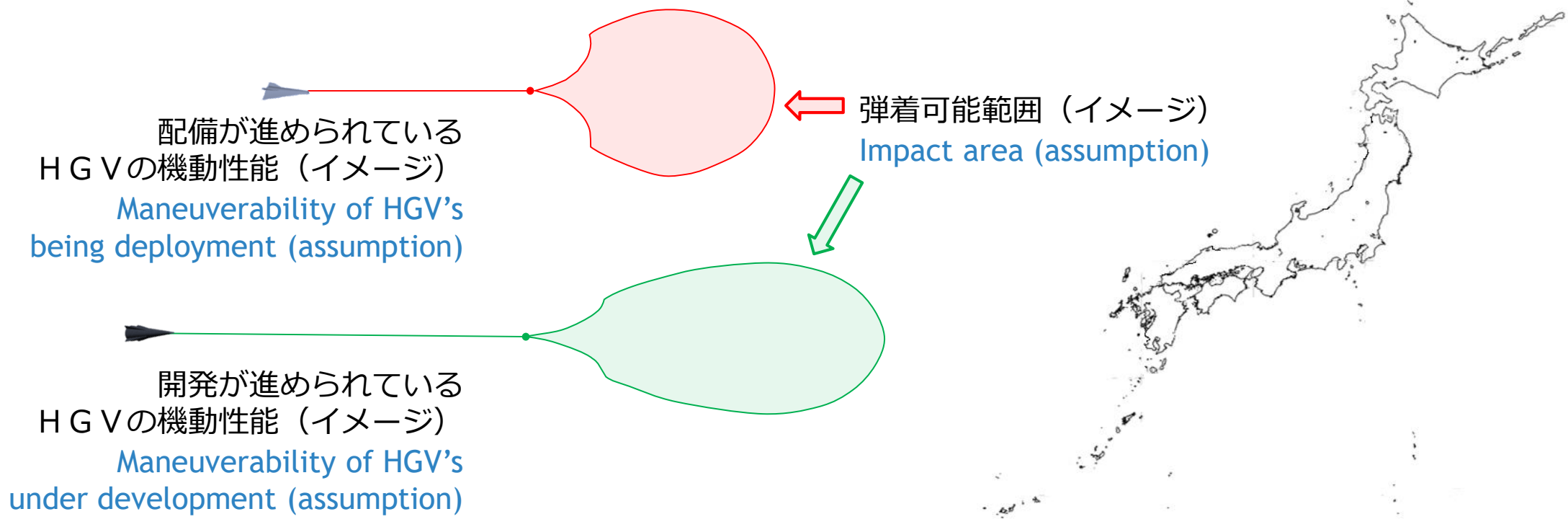
Unlike traditional ballistic missiles, the DF-17 can change its trajectory in mid-flight, giving enemies a minimal chance of intercepting it, Yang said.

If hostile air defense systems like THAAD, SM-3 and Patriot get the chance to capture the DF-17's launch and prepare for its arrival in advance, there is some possibility of interception, but this rarely happens since a launch in actual combat will be done secretly, Yang said.

Other countries have also been developing hypersonic weapons, like the US AGM-183A and Russian Avangard missiles.

HGVの機動性能と我が国の国土

Maneuverability of HGV's and the land of Japan



- HGVは旋回により幅広い範囲に弾着可能
HGV's can impact a wide area by maneuvers
- 迎撃ミサイルの射程が短いと、迎撃範囲をかいくぐられる可能性
HGV's can avoid interception area if the interceptor has a short range

研究の前提 Background

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Geographical characteristics of Japan

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- 長射程のAD-SAM (Area Defense SAM) が必要
AD-SAM is needed as long range interceptors

長射程迎撃ミサイル（AD-SAM）に 必要な技術

Required technologies for long range counter HGV's missile (AD-SAM)

HGVに対処する迎撃ミサイルに必要な能力 (機能)

Required capabilities of AD-SAM for counter HGV's

- HGVを**遠方で迎撃**できる能力

Intercept at a long distance from homeland

- 高空において**HGVの軌道変更**
に対応できる能力

Respond to HGV's maneuvers at high altitude

HGVに対処する迎撃ミサイル(AD-SAM)に必要な技術

Required technologies for AD-SAM

- 大型ロケットモータ技術
- 高速環境下シーカ誘導技術
- 広帯域高感度赤外線検知器技術
- 高速環境下機体構造耐熱技術
- 高高度高速飛しょう複合制御技術
- 航跡管理／航跡予測技術
- Large size rocket motor
- High performance guidance system
- High performance IR-sensor
- Heat resistant material/airframe
- Hybrid control (side-thrusters and control surface)
- Track management and prediction

HGVに対処する迎撃ミサイルシステムに必要な技術

Required technologies for AD-SAM system

- ネットワーク交戦技術
- 長距離センサ技術
- C2BMC capability
- Long range radar

防衛装備庁は、これらの技術を用いたHGV対処用の迎撃ミサイルに関連する研究を令和5年度から開始します

ATLA will start research on AD-SAM for counter HGV's from JFY2023 onwards


迎撃ミサイル(AD-SAM)に必要な技術

Required technologies for AD-SAM(*)

高速環境下シーカ誘導技術、
広帯域高感度赤外線検知器技術
High performance guided system,
High performance IR-sensor

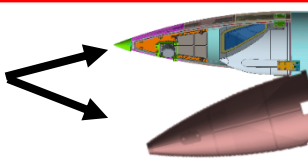
光波ドーム
Fore body,
window

赤外線センサ
IR sensor



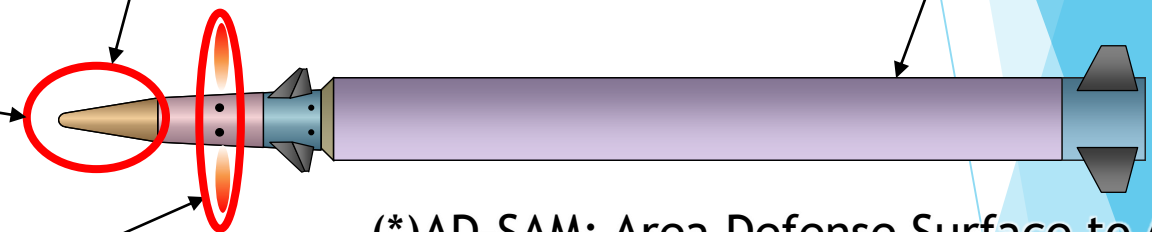

高速環境下機体構造耐熱技術
Heat resistant material/airframe

ドームカバー
Shroud



大型ロケットモータ技術
Large size rocket motor

大型ロケットモータ
Large size
rocket motor



(*)AD-SAM: Area Defense Surface to Air Missile

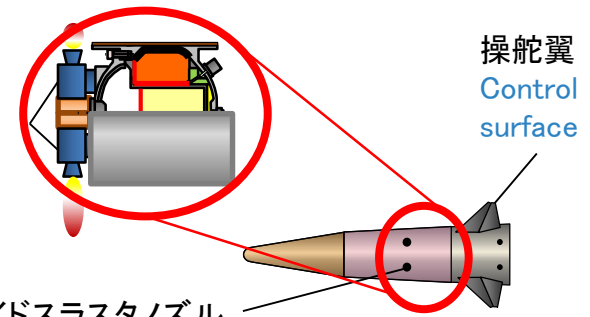
高高度高速飛しょう複合制御技術
Hybrid control
(side thruster and control surface)

サイドスラスト
ノズル
Side thruster

操舵翼
Control
surface

サイドスラストノズル
Side thruster

キルビークル
Kill vehicle



航跡管理／航跡予測技術
Track management and prediction

予想会合点
Predicted Impact Point

HGV
HG V

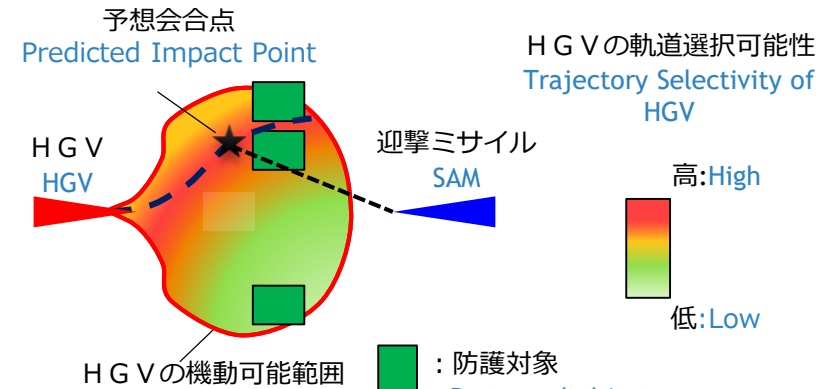
迎撃ミサイル
SAM

HGVの軌道選択可能性
Trajectory Selectivity of
HG V

高:High
低:Low

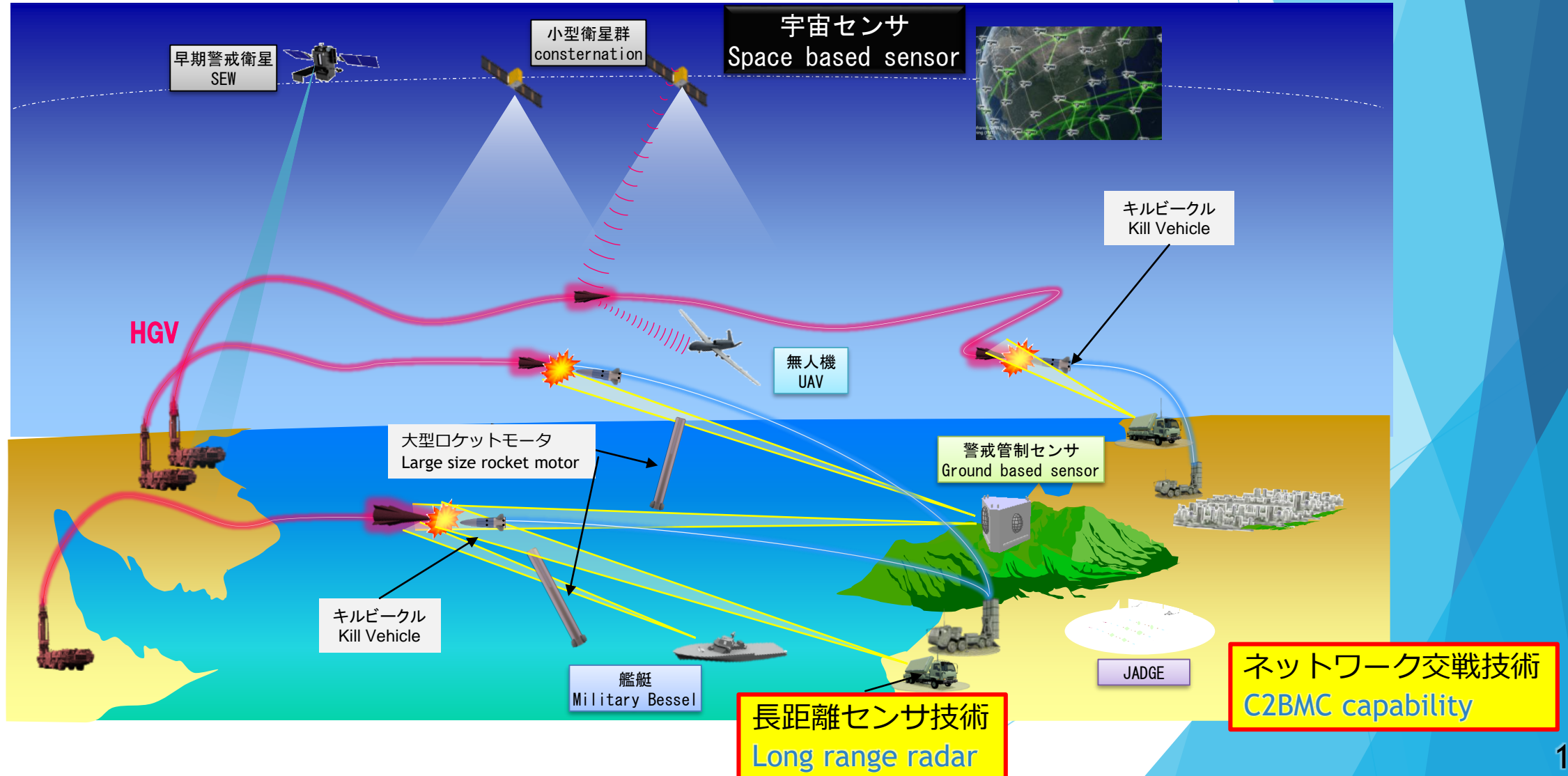
HGVの機動可能範囲
HG V maneuverable area

防護対象
Protected object

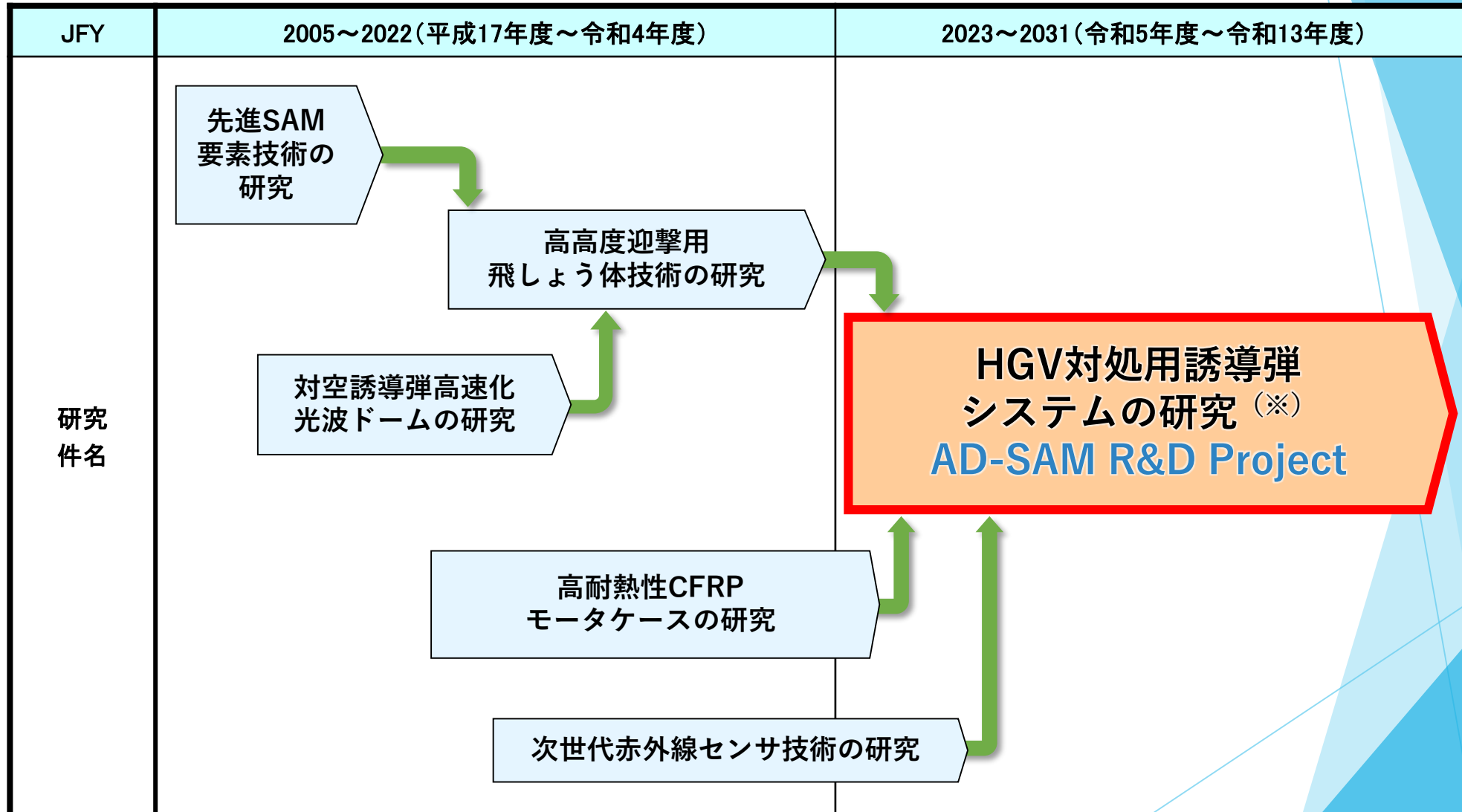


迎撃ミサイルシステムに必要な技術

Required technologies for counter-HGV's missile system



関連する研究開発事業 AD-SAM and Related R&D by ATLA



(※) 航跡管理/航跡予測技術、ネットワーク交戦技術、長距離レーダ技術に求める機能・性能について検討予定

Conceptual image

本発表のまとめ Summary

- 防衛装備庁は、HGV対処に必要な技術を蓄積しており、今後も必要な技術の獲得に邁進します
- 防衛装備庁は、我が国全域を比較的少数の射撃部隊で防護可能となるHGV対処用誘導弾（AD-SAM）の研究試作を令和13年度までに完了し、早期配備の実現に向け全力で取り組みます
- ATLA has accumulated and will continue to research and develop the Counter HGV's technologies.
- ATLA will complete the research and development of the counter HGV's missile (AD-SAM) and will make every effort to deploy it as soon as possible.