

AIST DRONE TECH CONSORTIUM (ADTC)

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AIST Advanced Drone Technology Consortium Secretariat

**〒305-8568Tsukuba Central2, Umezono 1-1-1,
Tsukuba-shi, Ibaraki-ken,**

National Institute of Advanced Industrial Science and Technology (AIST)

TEL : 050-3521-0831 E-mail: M-adtc-info-ml@aist.go.jp

AIST DRONE TECH CONSORTIUM (ADTC)

The Advanced Drone Technology Consortium (ADTC) is a membership organization comprising AIST researchers and companies engaged in advanced drone technology. Its secretariat is located at the National Institute of Advanced Industrial Science and Technology (AIST). The consortium aims to foster collaboration with AIST researchers and promote mutual exchange and friendship among its members. We are holding the following events.

Business activities

Online seminars

We will select themes and speakers from AIST's wide range of technical fields and also arrange individual meetings with researchers.

Example Themes "Flight Safety and Semiconductors," "Hydrogen Energy," "Flying Cars" etc.

※Held approximately three times a year

※The theme may change based on member requests, industry trends, and other factors.

Overview of the latest cutting-edge information

We will provide the latest drone-related technical overview information from AIST, which conducts cutting-edge research and development across a wide range of technical fields, via our newsletter on an ongoing basis.

Technical consultation

We accept technical inquiries from members through the consortium secretariat.

Information dissemination

We regularly distribute newsletters containing updates on research and development activities across diverse technical fields within AIST, along with related information

Documentation provision

We will provide information about events hosted by AIST and other organizations

Materials distributed at seminars, etc, will be sent to you via email upon request to the Consortium Secretariat

Support for forming working groups (WG)

Members with shared objectives can form working groups (WGs) and collaborate to develop activities such as joint project planning

Example Themes "High-Altitude Long-Endurance Hydrogen Fuel Cell Airship Drone"

Site visits, special lectures

We hold tours of factories, research facilities, and other sites approximately once a year.

"Flying car-related technologies" ※Held approximately once a year.

(Non-members are also welcome to participate.)

※All of the above services are free of charge for members who pay their dues.

※For details regarding business activities and other matters, please request materials by email from the Consortium Secretariat.

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Contact Us



AIST DRONE TECH CONSORTIUM

Strategic Technology Network for Solving Social Issues 

【Purpose】 The purpose of the AIST Advanced Drone Technology Consortium is to build a network that leverages drone (unmanned aircraft) technology, facilitates exchange among researchers from different fields, and fosters the creation of new ideas and research synergies.

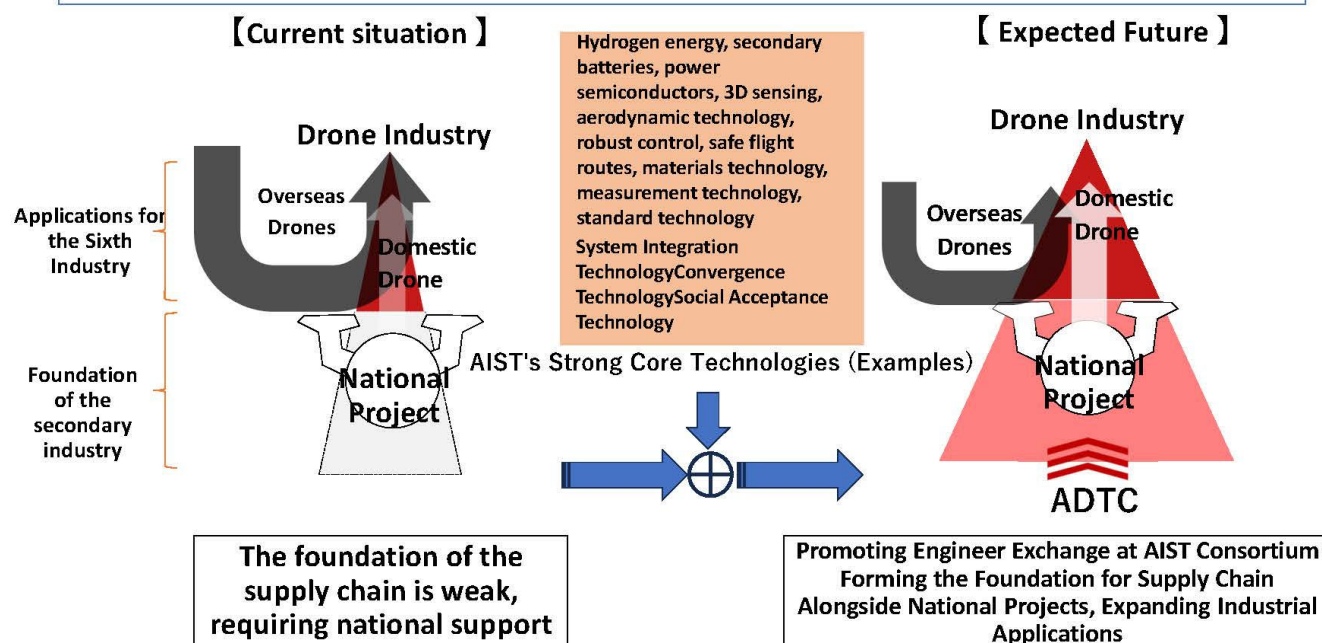
Through these activities, we aim to achieve the following effects:

- Researchers and engineers mutually enhance each other's skills.
- Share knowledge for the application and practical implementation of technology.
- Deepening collaboration with diverse stakeholders including industry, academia, and public research institutions.

Through this network, we aim to contribute to the advancement of Japan's industrial sectors as a whole.

【Business Overview】 We will undertake the following businesses related to advanced drone technology.

- Research and information exchange on the latest advanced drone technologies and related fields domestically and internationally..... (Utilizing advanced technology insights for Japan's industries)
- Provision of technical data developed by AIST..... (Utilizing AIST technologies for Japan's industries)
- Planning industry-academia-government collaborative research projects..... (Promoting industry through working group mechanisms)
- Disseminating and raising awareness of advanced drone technology via public seminars and websites..... (Providing timely information using the latest DX technologies)



- Establish a forum for technology exchange and a network of engineers to facilitate the commercial application of AIST technologies
- Disseminate information on AIST's broad range of technologies relevant to the advanced drone sector, which relies on diverse systems
- Form working groups (WGs) for each foundational elemental technology underpinning the drone industry, with each WG aiming to establish technological foundations and supply chains within the industrial sector

【 Contact Us 】 Secretariat M-adtc-info-ml@aist.go.jp

Homepage https://unit.aist.go.jp/icps/ja/consortium/drone_consortium.html



AIST DRONE TECH CONSORTIUM

AIST DRONE TECH CONSORTIUM

Strategic National Technology Development for Solving Social Issues

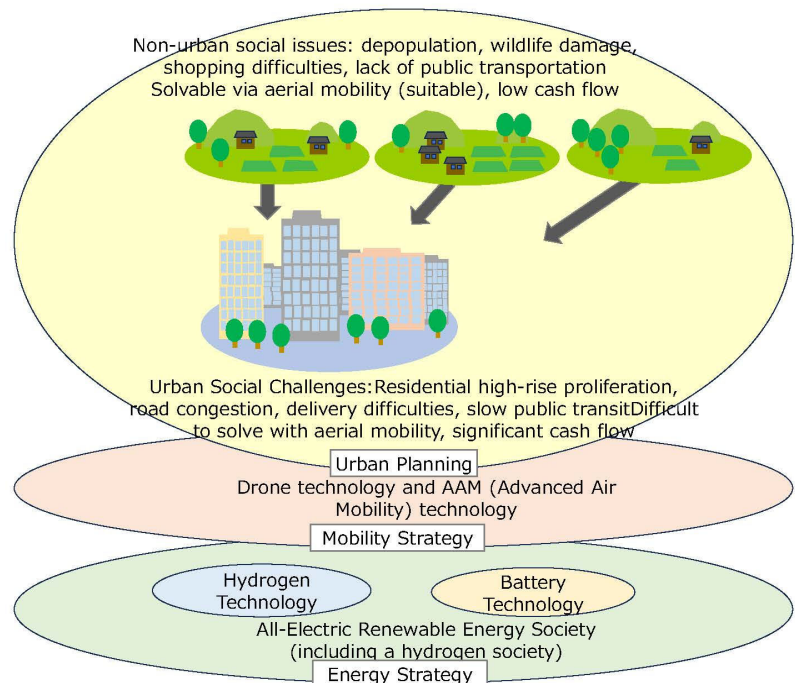


[Activities] In recent years, advancements in technologies such as AI and DX (Digital Transformation) are significantly changing social infrastructure. This transformation aims to improve people's living environments, enhance QOL (Quality of Life), and solve societal challenges. In mobility technologies for transporting goods and people, automation is rapidly advancing in response to the "2024 Problem" (driver shortage) caused by the declining working-age population. AIST aims to address these technological challenges by pursuing the following:

- Developing new integrated technologies tailored to Japan's national territory and social structure.
- Promoting "international standardization" as a method for solving societal challenges using technology.
- Realizing global technological development with economic security in mind.

Through these efforts, we will lead technological innovation that underpins future society.

[Examples of Research and Development]
In the aviation industry, research is advancing on "all-electric aircraft" powered by renewable energy and "hydrogen fuel" to reduce fuel weight, all while prioritizing safety and aiming for a sustainable society. Furthermore, alongside the trend toward taller buildings and full electrification in urban structures, there is a growing need for multi-layered development in the "air" space, in addition to ground and underground areas. As a result, "aerial mobility technology" is expected to support this urban multilayering and strengthen industrial competitiveness.

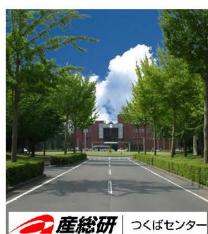


[Technology Fields Requiring Collaborative Development] • Semiconductors • Energy • Electrochemistry • Control • Communications • Supply Chain • Social Engineering • AI • Architecture • Civil Engineering

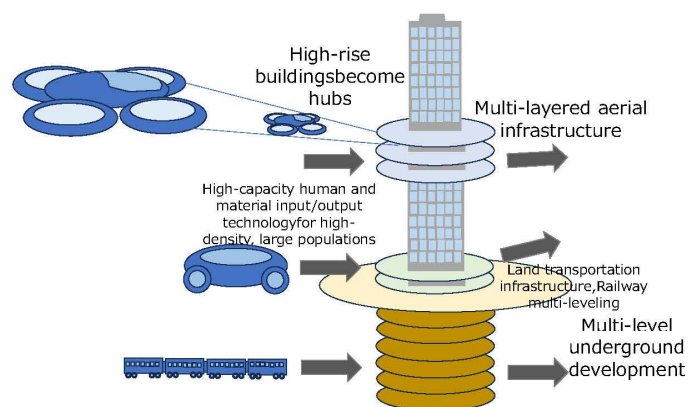
As a hub connecting diverse fields, we are currently utilizing the AIST Consortium.



【 For example, research is currently underway in the field of architecture × drones. 】



AIST + BRI = Joint Research Agreement Signed (2023.2)



Next-Generation High-Rise Building Mobile High-Capacity Input/Output Technology

AIST DRONE TECH CONSORTIUM

AIST's Technology R&D Applicable to Drones



【Activities】 Examples of AIST's Drone-Related Elemental Technology R&D

【Example 1】Advanced Power Electronics Research Center (AIST) “Integrated Power Circuit for Drones” Research Team Leader

Applications of SiC Power Semiconductors

① High-voltage operation

→ Lighter wiring

② High-temperature operation

→ Lighter coolers

Miniaturization of power modules

Through high-temperature operation of SiC power semiconductors

室温での物性値の比較

	Si	SiC4H6 (製造品)	SiC (製造品)
パルシフィック E _g (eV)	1.12 (0.78)	3.02 (2.78)	3.38 (3.08)
結晶電圧 E _g (V)	0.3 × 10 ³	3.5 × 10 ³	2.6 × 10 ³
電子移動度 μ (cm ² /V·s)	1500 (0.67)	1000 (0.43)	900 (0.38)
熱電率 α (μV/K)	11.9 (0.50)	10.7 (0.45)	10.4 (0.43)
熱伝導率 κ (W/m·K)	1.5 (0.06)	4.9 (0.20)	1.3 (0.05)
ON抵抗の値 R _{DS(on)} (mΩ)	4.8 × 10 ³	4.3 × 10 ³	1.6 × 10 ³

高電圧 → Siより高い電圧領域
熱的安定性 → 高温動作
低ON損失 → 省エネ

Siインバーター

(11kW)



Mr. Hiroshi Sato

SiCインバーター
《FUPET試作》
(10kW)

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1/36

【Example 2】Electron-Photon Science Research Division Molecular Integrated Devices Group(AIST) “CFRP Prepreg Plating for Drones” Mr. Satoru Shimada

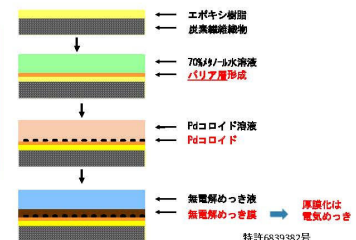
CFRP (carbon fiber reinforced plastic) offers superior lightness, specific strength, and specific stiffness, but its low conductivity makes it highly susceptible to damage from lightning strikes. Therefore, we developed a CFRP prepreg plating process.

Plating is possible on prepreg before molding!



From left: Pre-plating, copper plating, nickel plating, and gold plating Carbon fiber epoxy resin prepreg (uncured)
TR3110 381GAX (Mitsubishi Rayon)

Developed plating process



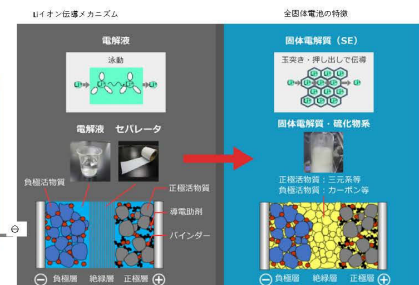
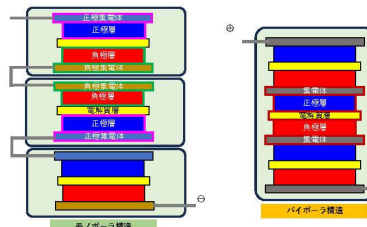
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【Example 3】Energy Conservation Research Division, Battery Technology Research Division (AIST) “All-Lithium-Ion Battery for Drones” Mr. Yoshiyasu Saito

Advantages of bipolar structure:

Reduction in the number of components such as current collectors and housings, decreased internal resistance.

In all-solid-state batteries, only Li⁺ ions flow, resulting in a transport efficiency of approximately 1 and high input/output characteristics.



The export rate is approximately 0.3 to 0.4

The payout rate is nearly 1.0.

【Example 4】Former Chairman of the New Airship System Research Association Mr. Masahiko Onda

As a long-endurance drone, airship drones offer advantages.

Furthermore, when scaled up, they provide benefits as heavy-lift drones.





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