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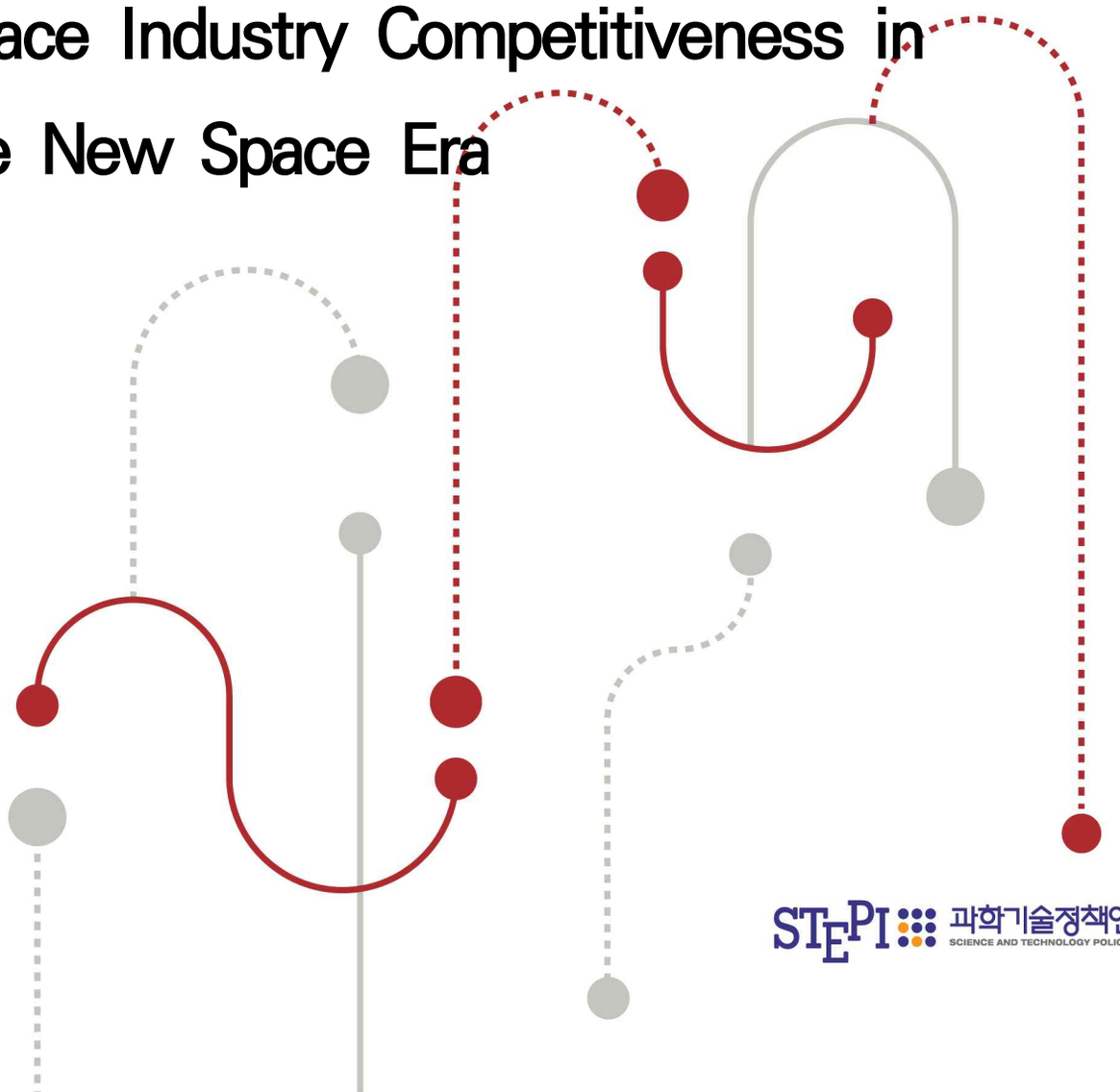

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Plans for Public-Private Partnership Expansion to Improve Space Industry Competitiveness in the New Space Era

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| Summary |

■ **It is necessary to examine PPP (Public - Private Partnership) for a shift from government-led to private-led space development.**

- PPP to establish a cooperative system among technology innovation entities is rising as the key mechanism of innovation.
  - Importance of active and organic links and partnerships among key technology innovation entities is increasing in line with the rapid development of scientific technology.
  - PPP (public - private partnership) to establish a cooperative system between private companies and public research organizations is rising as an important mechanism of innovation.
  - Governments of major countries are recognizing PPP in the space field as an important means of innovation.
- In overseas countries, PPP for a shift from government-led to private-led space development is being promoted.
  - Space development was a typical government-led R&D field. Recently, however, PPP for innovation is drawing attention as the technological innovation capacity of the private sector has increased considerably.
  - Recently, overseas governments are recognizing PPP as an important means of innovation in the space field because of the cost effectiveness of R&D in the private sector, diversification of options to ensure minimal costs in relation to the short lifespan of space assets, and the effect of risk dispersion concerning increasing costs and project schedule delays.
- In Korea, it is also necessary to examine the establishment of PPP.
  - PPP policy design to emphasize the role of private companies as a partner in innovation investment is necessary (Korea Institute of S&T Evaluation and Planning, 2014)
  - The 3rd Master Plan for Space Development Promotion (2018 - 2022) and the implementation plan for 2021 suggest “private-led” space

development as a key strategy of fostering the space industry.

- It is necessary to examine PPP that places a focus on technology innovation in spreading the R&D outcomes.

■ **PPP refers to a relationship of cooperation between public and private sectors on specific matters. It is divided into various types according to the systematic conditions and methods of cooperation.**

- PPP is divided into three types according to systematic conditions (law, autonomy, business feasibility) and also three types according to the methods of cooperation (private consignment, private investment, private support).
  - (Systematic Conditions) ① Government providing policy or administrative guidance based on legal force, ② Government proposing project and the private sector autonomously participating in the project, ③ Private sector entering into a contract for a government SOC project
  - (Cooperation Methods) ① Government using the expertise of the private sector, ② Cooperation based on the Act on Public - Private Partnerships in Infrastructure, ③ Government support for projects with a high level of risk or low feasibility of profit generation

| Summary |

〈Table〉 PPP Type

Classification		Description	Example
Basis of Partner-ship	Law	Cooperation based on legally prescribed effect	Regional development, private school operation, etc. based on the law
	Autonomy	Government proposal, autonomous participation by private	Technology import, investment induction, environmental cooperation, etc.
	Business Feasibility	Cooperation based on contract	SOC investment contract
Division of Roles	Private Consignment	Government authority partially entrusted to private sector	K-water consignment of regional waterworks or dam project consigned
	Private Investment	Investment and operation by private sector based on the law	SOC project investment and operation by private sector
	Private Support	Government supporting project of which feasibility of profit generation is low	Private participation in basic science studies, etc.

Source: Moon-su Kang(2011)

- In the space field, PPP is divided into four types according to market maturity.
  - ① Private support and technology transfer, ② private participation in government R&D, ③ government investment and private development, ④ government purchasing private service

■ **In overseas countries, PPP in the space field is being promoted in terms of the burden of cost and risk, period, and goals. Based on project contract conditions and the division of roles, PPP that satisfies both private companies and the government is promoted.**

- The purpose of PPP in the space field is for the government and private companies to use the strengths of one another.
  - The government can ensure efficiency, such as through cost savings, for space development that requires an enormous amount of funds. It can disperse risk in relation to the cost and schedule in the course of

project implementation.

- Private companies create profits instead of taking on the risk of space development and can also build technological competency, secure customers in the public sector during the course of technology commercialization, and thus ensure a competitive edge in the market.

● PPP in the space field has been promoted through the division of roles and based on contract conditions.

- While the government handles the public use of the project outcomes, private companies are encouraged to participate in the projects as they are given exclusive rights to commercial use of the project outcomes, and thus provided with profits.
- In the case the private sector lacks competency, partnership is maintained from the start to the end of a project through a public - private consortium.

〈Table〉 Characteristics of Overseas PPP Cases in the Space Field

Classification		Participants	Characteristics, such as Contract Conditions
Europe	Germany TerraSAR-X TanDEM-X	(Private) Astrium(Inforterra) (Public) DLR	• Typical example of PPP in the space field where the public use of the project outcome is handled by the government and the private sector is given exclusive rights to commercial use
	France CO3D	(Private) Airbus (Public) CNES	• Flexible partnership contract with a focus on the private company's domestic and international cooperation
Canada RADARSAT		(Private) MDA (Public) CSA	• (RDARSAT-2) Satellite owned by private sector
Japan JAXA		(Private) Investment and Development Consortium (Public) JAXA	• Consortium establishment and cooperation for the entire cycle of system - investment - HR - PR - development

| Summary |

■ **Korea is recently undergoing transition from government-led to private-led PPP. However, there are systematic limitations.**

- (Issue 1) Limitations in the method of national R&D project promotion that hinders private companies' participation in space development
  - PPP in the space field in Korea is promoted as a national R&D project of the Ministry of Science and ICT for which the Korea Aerospace Research Institute (KARI) is the managing organization and private companies mainly participate in the project through service contracts.
  - However, if private companies participate in government-led R&D as service providers, it is difficult for them to build technological innovation or system integration competencies.
  - Profit generation alone is insufficient in motivating private companies to participate in a national R&D project as a managing organization.
- (Issue 2) Restriction on conversion of national space development project to procurement project by the WTO GPA
  - Private companies have demanded conversion of the method of space development project implementation from R&D to procurement. However, there is an issue concerning restriction of the conversion by the WTO GPA (Government Procurement Agreement).
  - If the security and national defense-related exceptional clauses of the WTO GPA can be applied to space development projects, there is no obligation to open the domestic market to overseas companies even after the conversion to government procurement-type project implementation.
- (Issue 3) Lack of motivation for government-invested research institutes and investment by private companies about PPP in the space field
  - In 2014, a plan for developing government-invested small- and medium-scale research institutes into advance bases was implemented.

However, with almost no support for SMEs and general researchers, the tendency to avoid SME support projects is continuing.

- Government-invested research institutes hold seminars and OJTs through joint design technology transfer contracts. However, the personnel of such institutes are failing to sufficiently handling the operations.

● (Issue 4) Discrepancy between government policy and states of industries, such as in relation to the mandatory application of the localization rate

- The design and assembly competency for system engineering businesses have reached the global standard. However, the supply of key parts is still being dependent on importation with the localization rate remaining at around 50%.
- For the "Space Pioneer Project," the goal of the localization rate is over 97%. An unrealistic goal, as such, can lead to an increase in overall satellite development costs, and also lower the commercial competitiveness of domestic companies.

Task 1. Design a policy to convert private companies from the "target of policy benefits" to "partners in innovation investment"

● To spread the government's R&D outcomes, a PPP policy to emphasize the role of private companies as innovation investment partners must be designed.

- The domestic space industry is in a small scale and lacks technological competency and human resources. A majority of these companies participate in the government's space development projects as contract-based service providers rather than promoting independent business model development or overseas market development.
- To encourage private companies to increase long-term investments and stable employment by themselves, policy credibility in terms of long-term vision and plan of national space development projects must

be improved first.

- What private companies expect from PPP is “investment return.” Therefore, a private investment-type PPP design is necessary to expand the private-led project implementation or private participation in the projects.
- To encourage private investment from the perspective of market activation, it is necessary to prepare a systematic foundation on which private companies invest in a space development project at a certain rate and achieve investment returns through exclusive satellite management or satellite data use.
- Application of the TIPS project of the Ministry of SMEs and Startups to the space field can be examined so as to have investors participate in the project selection and assessment processes under the condition of providing investment in a certain amount through venture capital as part of the private investment-led R&D cost support project.

Task 2. Improve the system to strengthen the motivation of private companies for participation in PPP projects

- It is necessary to convert the national space development project implementation method from R&D to procurement.
  - In 2020, the Ministry of Science and ICT amended the R&D project processing regulations to fully exempt private companies from paying matching R&D costs and apply exceptions to the regulation on nonpayment of labor costs by companies if the space development outcomes are owned by the State.
  - However, it is necessary to consider fundamental changes that enable a public procurement-type contract through which a company participating in a national space development project as a managing organization can receive sufficient compensation in profits.
  - In particular, it is necessary to reexamine and respond to the

applicability of the exceptional clause of the WTO GPA, which is currently applied solely to the national defense field, to the space field.

- The detailed index estimation method for the localization rate needs to be adjusted.
- While domestic companies are relying on importation for the supply of major parts, the localization rate, which is used as a key index of the space development project, cannot encourage business conversion of domestic companies.
- It is necessary to limit the localization target items to strategic materials, core technologies, and value-added items, or review the adjustment of the index estimation method to be based on the added value ratio so as to ensure international competitiveness of domestic companies.
- In particular, as global value chains for the satellite industry are diversifying, overseas procurement can be more effective for strategic parts rather than domestic development.

Task 3. Strengthen role of PPP hub organizations in the space field

- Spreading of the technological power and expertise of KARI, which has extensive experience and advanced competency in space development, to the private sector must be prioritized.
  - A greater number of opportunities must be provided to private companies to utilize the technologies of KARI by reviewing free concession of intellectual property rights owned by KARI as well as exempting initial royalty payments, and allowing running royalty payments.
  - When technology transfer or commercialization targets are identified through a demand survey on private companies, a regulation to enable private contracts with companies that submitted detailed demand or

commercialization ideas must be reviewed.

- For the commercialization of an R&D outcome of KARI, it is necessary to secure a budget for a follow-up verification study in relation to safety, effectiveness, and reliability of the developed technology.
  - A company's burden for a verification study can realistically limit technology commercialization. Therefore, it is necessary to reduce the company's burden by expanding support for the verification study concurrently with the transfer of expertise between the technology transferrer and transferee.

Task 4. Activate exchange of human resources and establish cooperation channels between public and private sectors

- "Transfer of specialized personnel" is an infallible way to transfer technologies of the government-invested institutes to private companies. However, currently, there are not sufficient inducements.
  - Developed technologies are transferred to companies through people. Realistically, however, there are not many cases of researchers from government-invested research institutes moving to private companies.
  - A project and a system to utilize highly experienced retired scientists are being implemented. However, it is limited to one person per company. As such, the system application also needs to be expanded.
- An effective consultative body between the government and private companies needs to be organized in order to strengthen PPP in the space development field.
  - Although irregular talks are being held, it is necessary to organize a consultative body through which opinions of domestic companies on technological demand and difficulties are collected on a regular basis and the status of reflection of such opinions in policy can be checked.
  - In order to establish a full-time consultative body that is led by the

private sector to receive opinions from and suggest ideas to the industry, creation of a space subcommittee was proposed to the "Private R&D Council by Industry" launched in March 2021.