R&D phase | Development **Expected Commercialization** | FY27-

Mehr Licht!
More Photonics for Intelligence

#D09

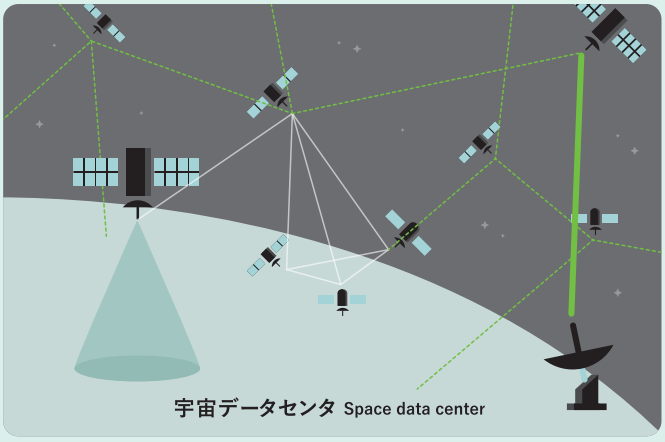
#AI & Quantum Infrastructure#Resilience#Safety and Security

Space Distributed Computing Technology

Sense and analyze onboard, sending only results for faster decisions

Technical Challenges & Goals

Observation data are outgrowing downlink capacity and on-orbit computation, so information can take hours to reach the ground. Distributing observation, AI processing, and transmission across satellites completes analysis in orbit, curbing downlink load and speeding decisions for disaster response and maritime safety.



軌道上処理 On-orbit processing
判断を高速化 Faster decision-making
通信負荷を削減 Reduced downlink load

分散処理 Distributed processing across satellites
レジリエンス向上 Improved resilience
スケーラブルなAI基盤 Scalable AI platform

要素技術 Core technologies
- 軌道上でのAI処理最適化技術 Optimized on-orbit AI processing
- 時間変化するネットワーク上でのタスク割当技術 Task scheduling for time-varying networks
- 軌道上分散処理のシミュレーション基盤技術 Simulation platform for on-orbit distributed systems

ユースケース Use cases

安全保障・海洋監視 Security and surveillance
軌道上処理 On-orbit processing ▶ 判断を高速化 Faster decision-making

防災・減災 Disaster prevention and mitigation
分散 Distributed processing ▶ レジリエンス向上 Higher resilience

農林水産・環境 Agriculture and fisheries
軌道上処理 On-orbit processing ▶ 通信負荷を削減 Reduced downlink load

Key Technologies

Core Technologies

- Run AI analysis with limited power/computation
- Allocate tasks using orbit-predicted contact windows
- Simulate constellations to validate distributed onboard processing on the ground in advance

Key Differentiators

- Task allocation over time-varying satellite links, unlike static-network ground schedulers
- Distributed processing and task allocation across satellites of different roles and operators

Use Cases

Aerospace & Defense

Synthetic Aperture Radar (SAR) imagery is analyzed in orbit and matched with Automatic Identification System (AIS) to detect vessels, congestion, and non-transmitting ships; only results are downlinked, not raw data.

Exhibitors
NTT Center for Computing Technologies

Related Links
https://www.rd.ntt/research/JN202504_33355.html