小型衛星ビジネスの成長とGSaaSの現状

2021/05/11

Infostellar 倉原直美

SATCOM mega-constellations, 400/year

SpaceX (Starlink), Amazon (Kyper), OneWeb, AST&S, etc.
5-10 companies

Constellations, 350/year

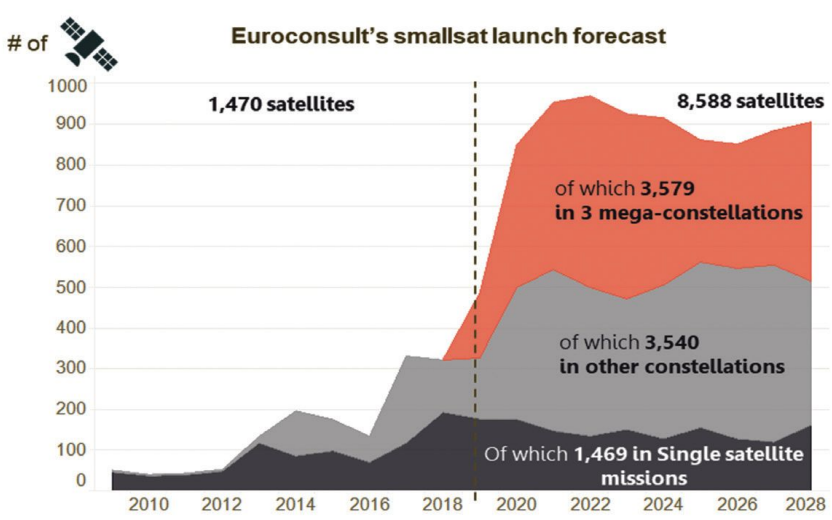
Planet, Spire, Blacksky, Iceye, iQPS, Synspective, etc.
10 - 20 companies

Remote Sensing and IoT/M2M

Single satellite, 150/year

Space Agencies (NASA, ESA, JAXA, ISRO, etc.) and Government agencies
Academic or early phase space companies (future constellation players)
About 100 organizations

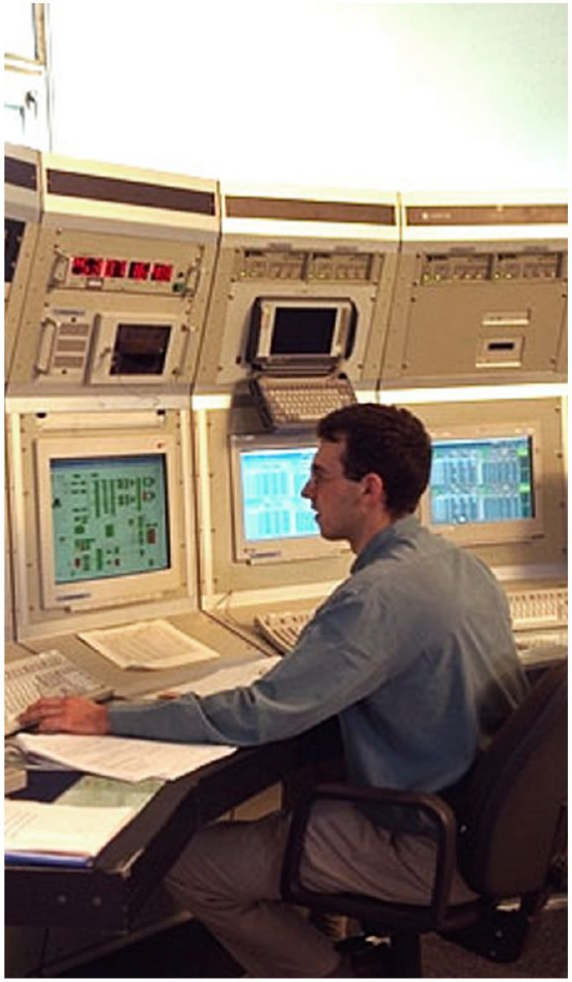
Remote Sensing, Science, Technology Demonstration, etc.

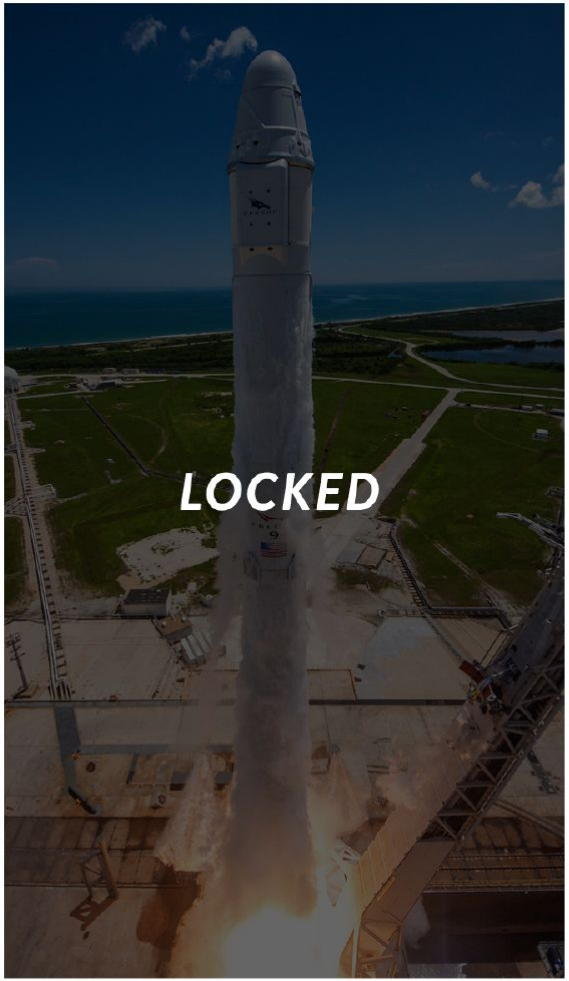


- ***Euroconsult 2018 10-year launch forecast***

" Euroconsult anticipates almost a quintupling in satellite demand between 2020 and 2029 with an average of **1,250 satellites to be launched** on a yearly basis. In comparison to the 260 yearly satellites launched in the previous decade, this skyrocketing number cements the structural changes occurring in the market and the industry, not only in the number of satellites but also in terms of satellite missions and operators, both governmental and commercial."

- ***Euroconsult 2020 update to launch report***

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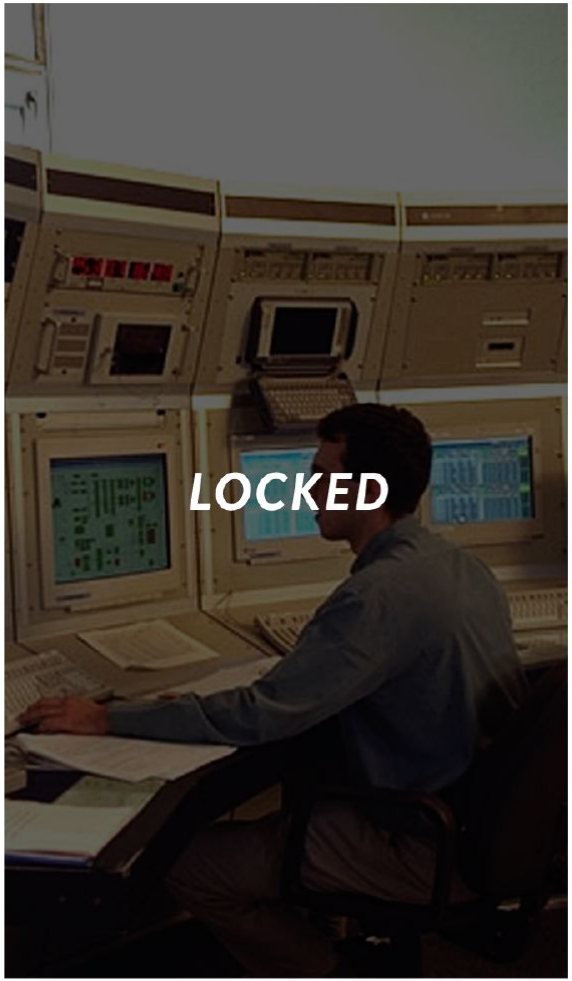
UNLOCKED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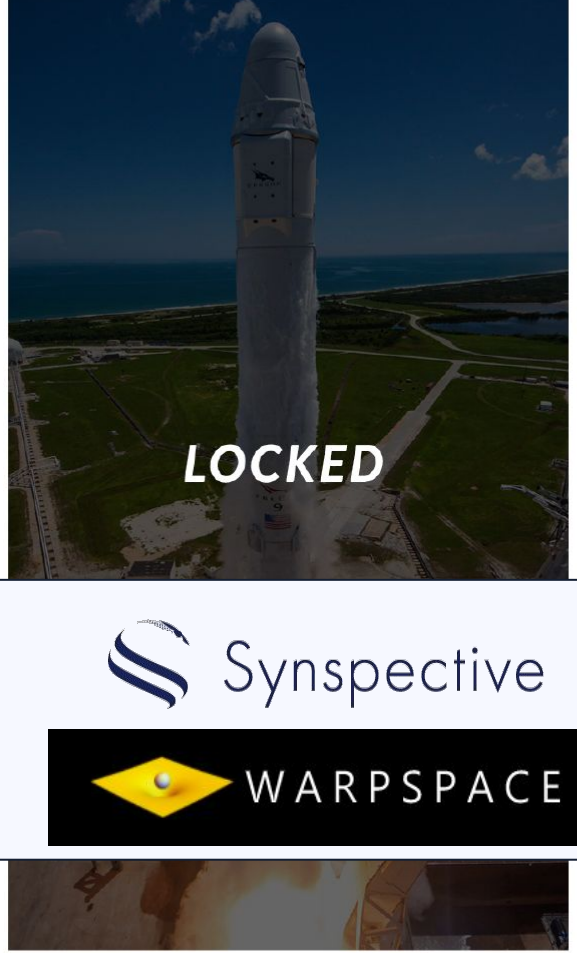
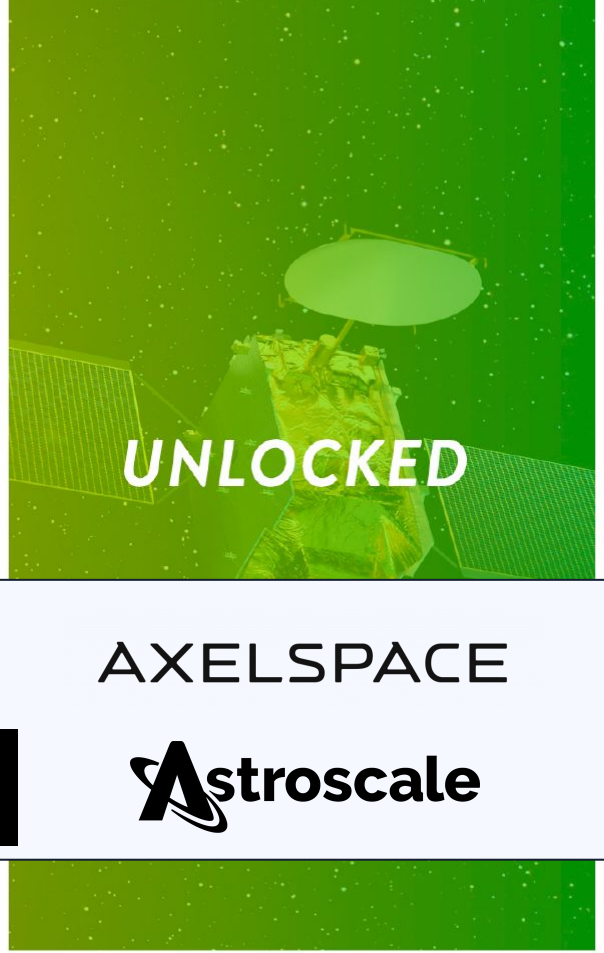
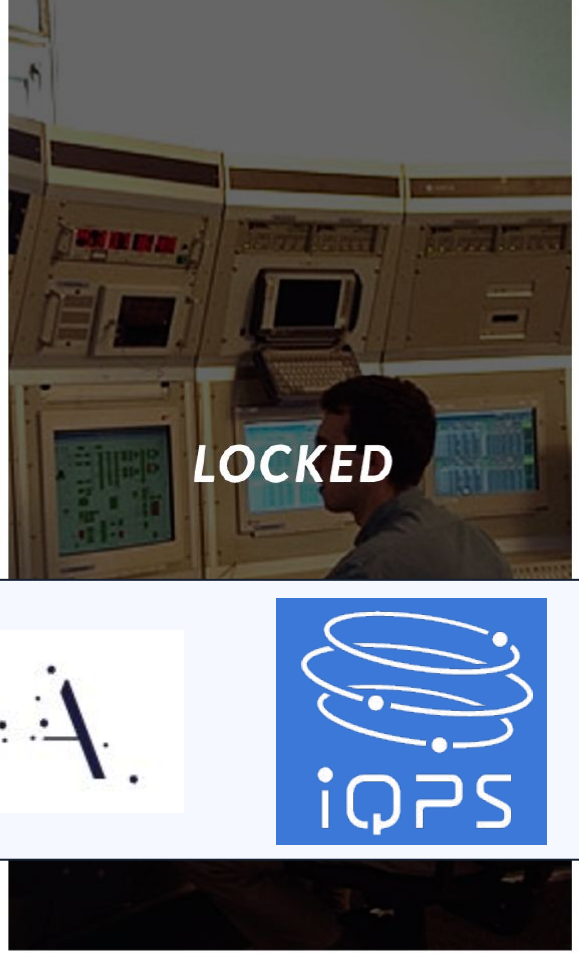






Synspective

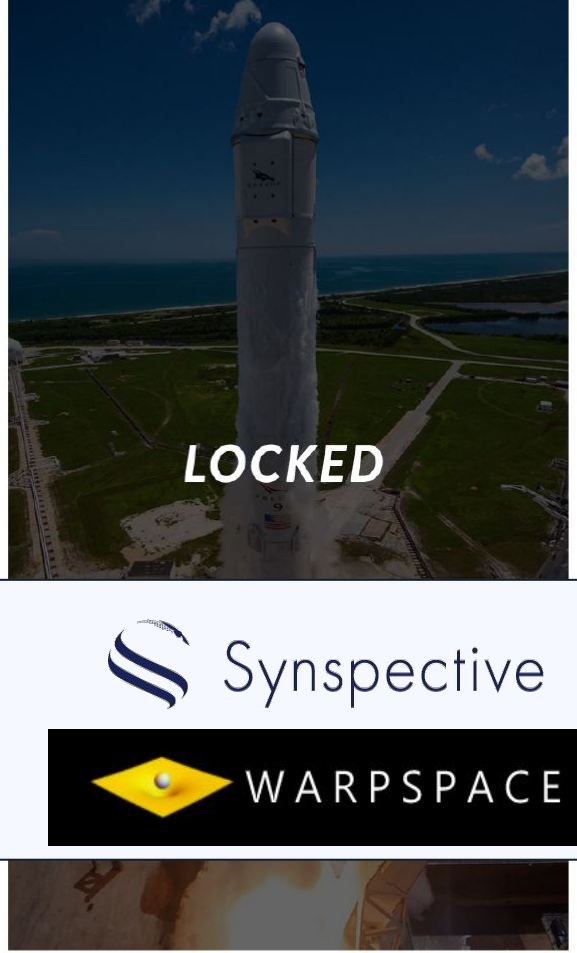
WARPSPACE

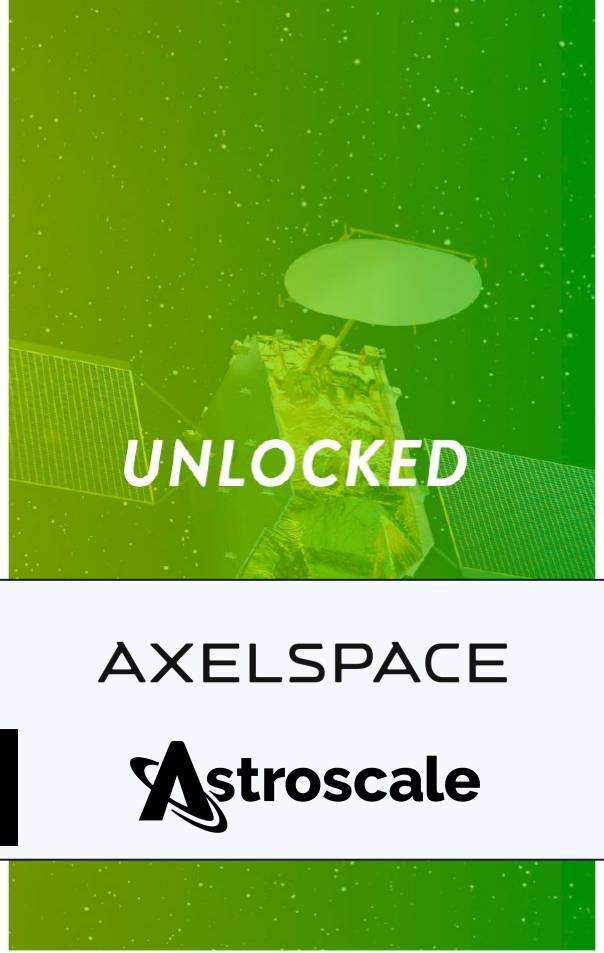
AXELSPACE

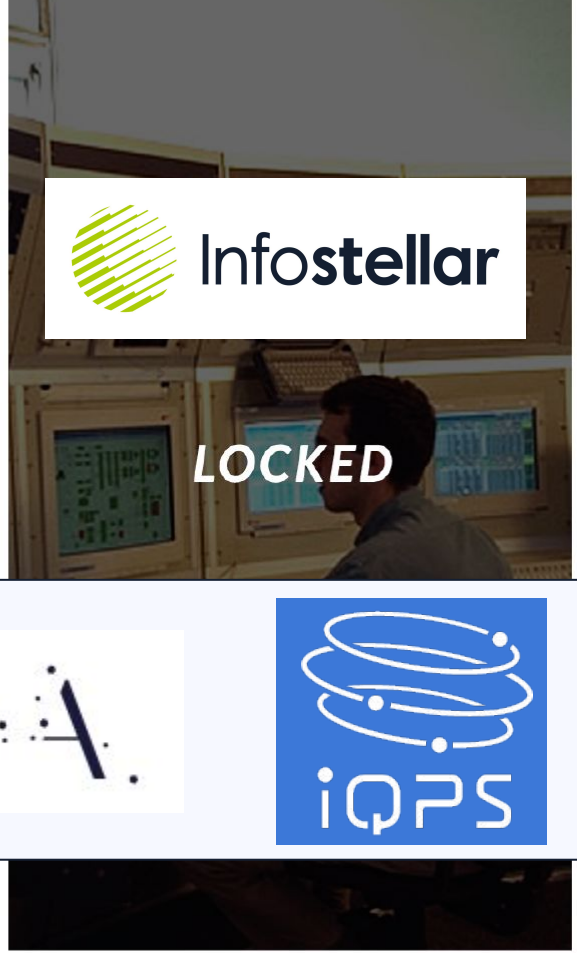
Astroscale

iQPS

UMITRON







Synspective

WARPSPACE

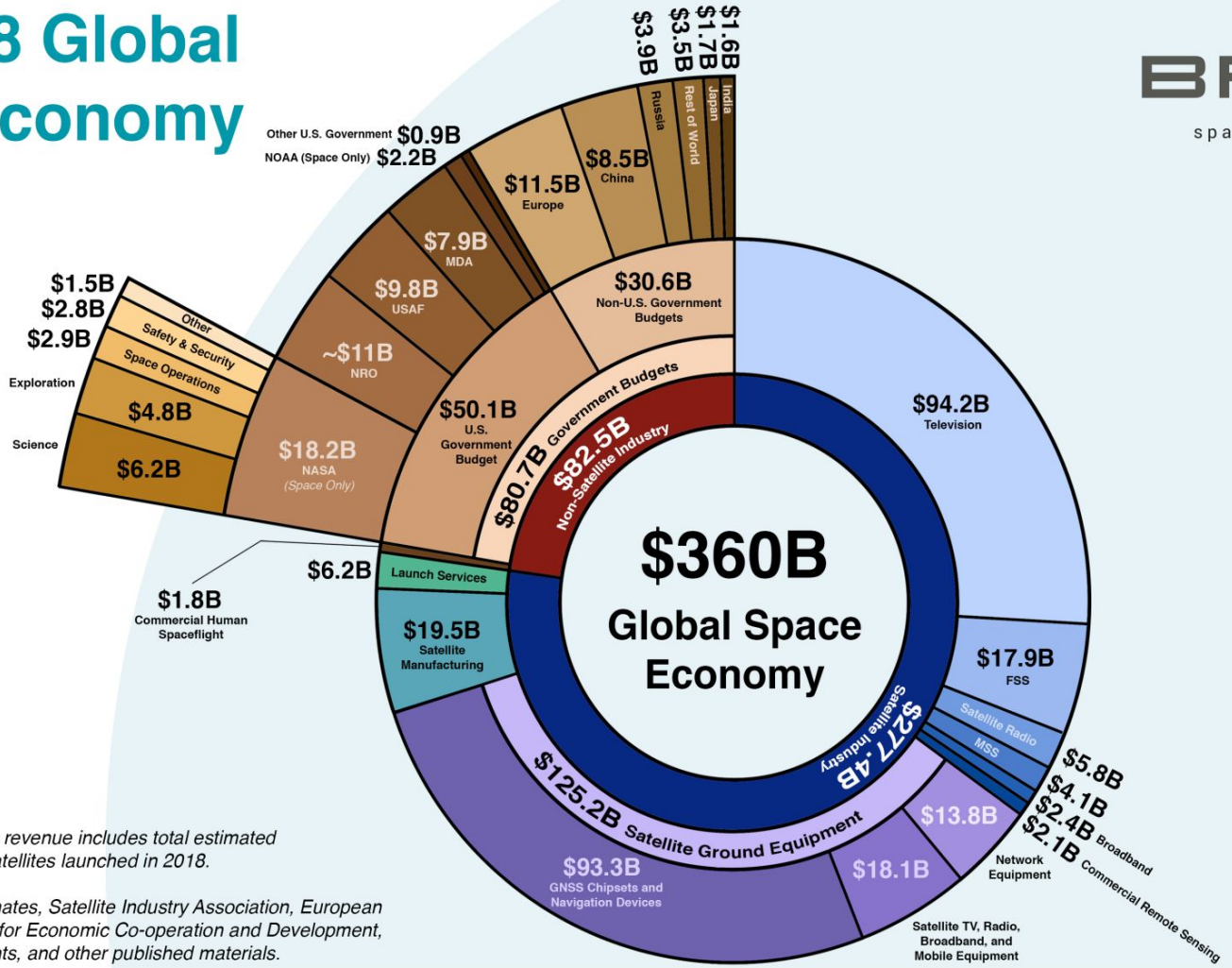
AXELSPACE

Astroscale

iQPS

UMITRON

The 2018 Global Space Economy



Note: Satellite manufacturing revenue includes total estimated manufacturing revenue for satellites launched in 2018.

Sources: Bryce internal estimates, Satellite Industry Association, European GNSS Agency, Organisation for Economic Co-operation and Development, government budget documents, and other published materials.

How to make MONEY?

GSaaS

Ground Station as a Service
Ground Segment as a Service


Infostellar


Founded January 2016

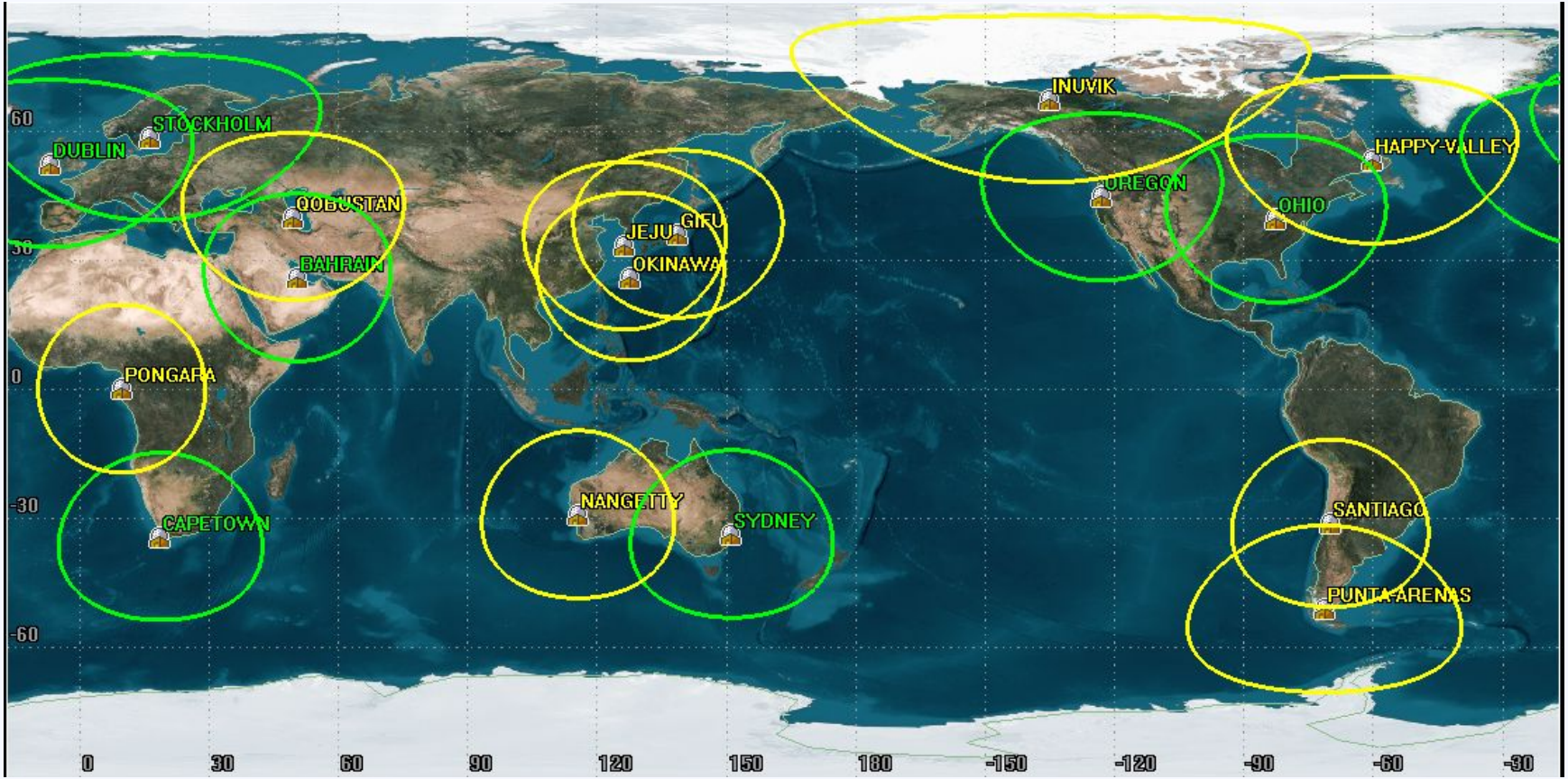
インフォステラは
ソフトウェアの力によって
衛星の通信に関する課題を解決する会社です。

投資家

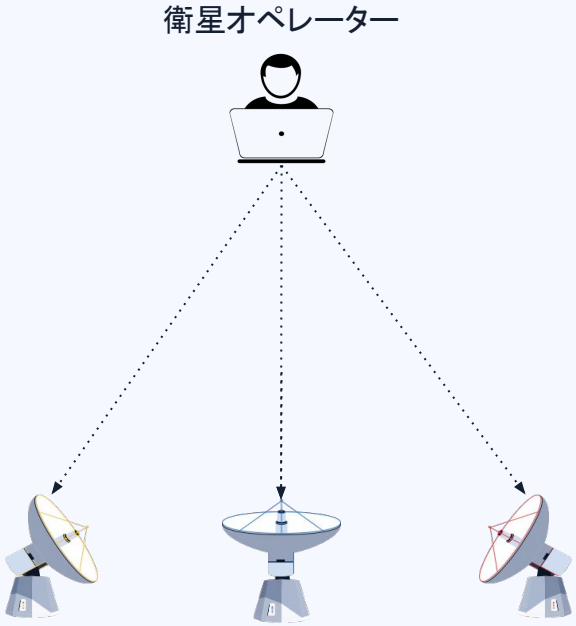
AIRBUS VENTURES
WERU Investment
FreakOut Holdings
500
Sony Innovation Fund
Daiwa Energy & Infrastructure
MUFG Mitsubishi UFJ Capital
MUFG Mitsubishi UFJ Lease & Finance

累計資金調達額　JPY 1,241,420,000 (About 11.9M USD)

15 - 20 Sites?


INUVIK
STOCKHOLM
DUBLIN
HAPPY-VALLEY
OREGON
OHIO
QOBUSTAN
JEJU
GIFU
OKINAWA
BAHRAIN
PONGARA
NANGETTY
SYDNEY
SANTIAGO
CAPETOWN
PUNTA-ARENAS
60
30
0
-30
-60
0
30
60
90
120
150
180
-150
-120
-90
-60
-30

衛星との通信に不可欠な**地上局の準備が煩雑**



- 衛星通信のための地上局が**標準化されていない**
- 国毎に**異なる規制**への対応や**国際周波数調整**が必要
- ミッションに**最適な場所に地上局がない**

都度都度のシステム設計により、**互換性や拡張性がない**

Operations:
Mission Control System

KRATOS READY FOR WHAT'S NEXT
EPOCH IPS®
KUBOS
bright ascension
gmv INSYEN
TELESPAZIO a LEONARDO and THALES company
SOLENIX
NASA openMCT
Spaceit

Satellite Operator's In-House Systems

X

GS Software:

SAFRAN AEROSPACE·DEFENCE·SECURITY
gmv INSYEN
COMTECH EF DATA
KRATOS READY FOR WHAT'S NEXT
CPI Communications & Power Industries
Orbital Systems
Viasat

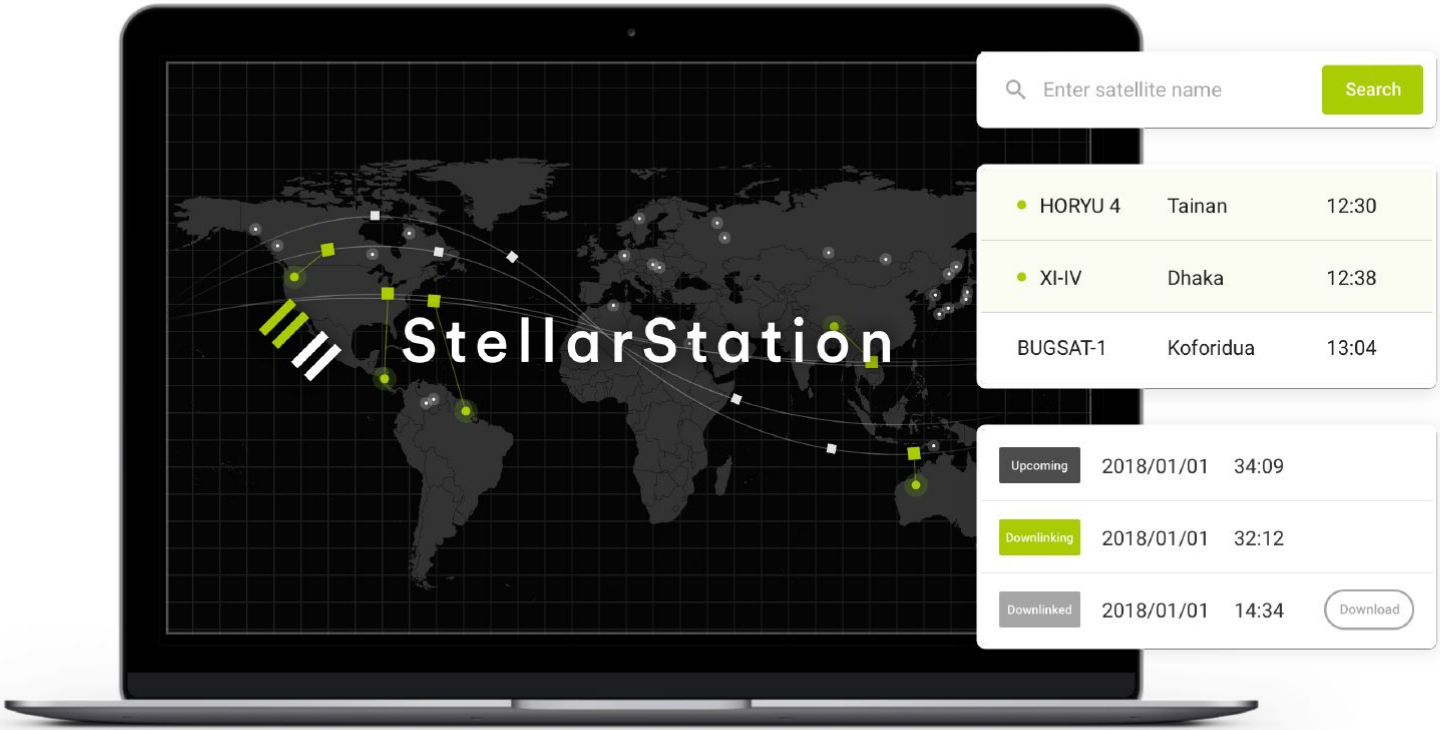
Customized Software

X

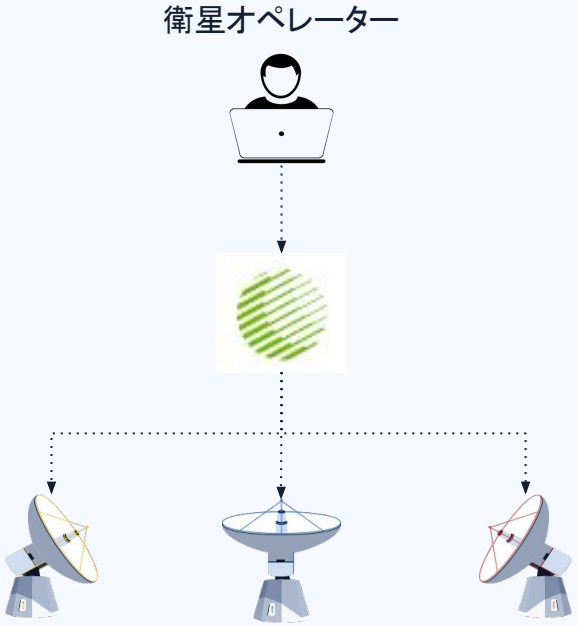
GS Hardware:

SAFRAN AEROSPACE·DEFENCE·SECURITY
CPI Communications & Power Industries
Viasat
TELEDYNE TECHNOLOGIES INCORPORATED
DATUM SYSTEMS
KRATOS READY FOR WHAT'S NEXT
SPACEBRIDGE ALL THINGS CONNECTED
COMTECH EF DATA
Orbital Systems
RT LOGIC technology that connects
Newtec

Smaller Antenna and Modem Vendors


StellarStation
Enter satellite name
Search
HORYU 4
Tainan
12:30
XI-IV
Dhaka
12:38
BUGSAT-1
Koforidua
13:04
Upcoming
2018/01/01
34:09
Downlinking
2018/01/01
32:12
Downlinked
2018/01/01
14:34
Download

地上局セグメントの**トータルサービス**を提供



- 地上局NWミドルウェア提供による**接続の簡便化**
- ライセンス取得や国際周波数調整などの**規制対応**
- 地上システムの設計や世界各国の**地上局設置サポート**

提供するサービスの全体像

Ground Segment as a Service Providerとして衛星運用に必要な地上サービスを**フルサポート**

地上局ネットワーク

- 自社開発のミドルウェア
  = StellarStation
- クラウドベースの
  地上局プラットフォーム
  - 低コスト
  - 容易な拡張性
  - 迅速に運用開始可能
  - 新規&既存の地上局と接続可能

Technical Services

- 地上システム（ネットワーク）の
  設計
- 世界各地での地上局設置サポート
- ライセンス取得や周波数調整などの
  規制対応
- 運用開始までのテストを含めた
  サポート

StellarStation Ground Station Network

The following is integrated & ready to use

Antenna System

- PASCO and Azercosmos ground stations are ready to use
- Capricorn Space and C-Core ground stations will be ready to use by the end of August 2020

Infostellar Standard Modem

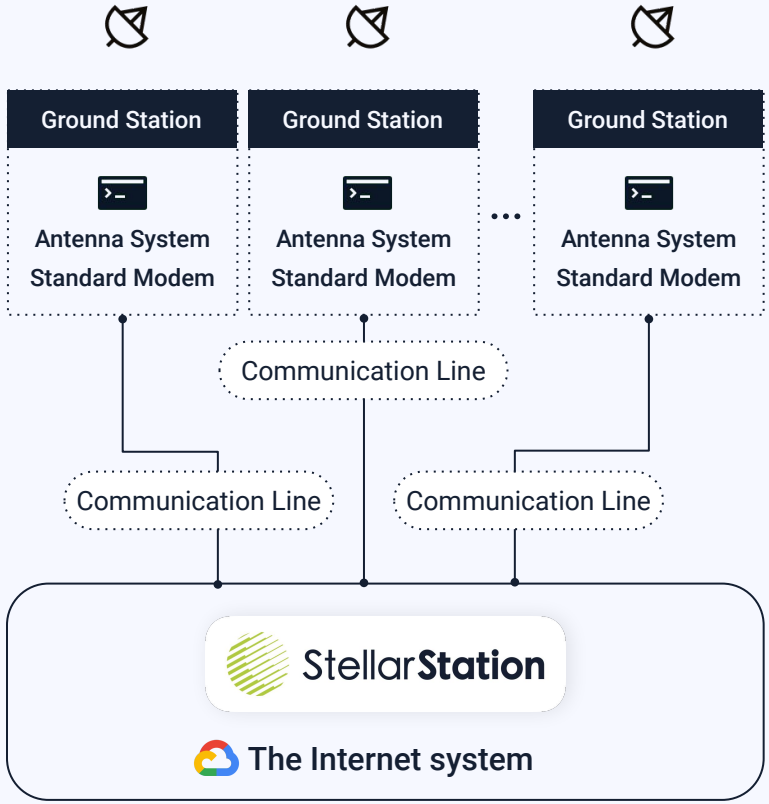
- ZODIAC cortex series modem
- Kratos modem (To be supported)

Communication line between the ground station and StellarStation

- Network speed and security level is defined separately

StellarStation interface

- Pass scheduling
- Data streaming/file transfer
- GS monitor & control



Pre-integrated System

	PASCO, Okinawa (Japan)	Capricorn Space, (Australia)	Azercosmos, (Azerbaijan)	C-Core, Inuvik (Canada)	C-Core, Happy Valley Goose Bay (Canada)
Antenna System	ZODIAC, 7.3m	Comtech, 5.0m	Zodiac, 5.5m	Comtech, 3.4m	Comtech, 5.0m
Modem	ZODIAC, CORTEX CRT, HDR	Kratos, qRadio, qMR	Zodiac, CRT, HDR	-	Zodiac, Satcore
Communication line	Public, 300Mbps (TBC)	Public, 200Mbps	Public, 20Mbps	Public, 10Mbps	Public, 100Mbps

PASCO, Okinawa, Japan

About PASCO

PASCO is taking innovative measures toward becoming the world's top geospatial information provider. PASCO operates two 7.3m antenna with radome in the Northern and Southern parts of Japan including Telemetry, Tracking, and Command (TT&C) and direct reception for the Earth Observation satellites. Our Antenna Systems can cover the entire Japan and Far East region.

	S-band	X-band
Size	7.3 m dish	
Rx Frequency	2,200 - 2,300 MHz	7,985 - 8,500 MHz
Tx Frequency	2,025 - 2,120 MHz	N/A
Polarisation	RHCP/LHCP simultaneous	RHCP
EIRP (dBW)	55	N/A
G/T (dB/K)	18	32
Modulation/ Demodulation	BPSK, QPSK, OQPSK, PSK8, QAM16, PCM-PSKPM	BPSK, QPSK, OQPSK, PSK8, QAM16
CCSDS Decoding	CCSDS standard	CCSDS standard

Capricorn Space, Australia

About Capricorn Space

Capricorn Space provides Ground Segment as a Service to the satellite industry. Our goal is to provide high-quality high-availability services from our two Australian based sites: Australian Ground Network – West (near Geraldton, Western Australia) and Australian Ground Network – East (near Ouyen, Victoria). Our first site, AGN-W will be operational in August 2019 and ideally suited for servicing LEO, MEO and GEO missions. AGN-E will be operational in late 2020.

	S-band	X-band
Latitude/Longitude	S 29.0104 / E 115.3417	
Size	5.5 m dish	
Rx Frequency	2,200 - 2,300 MHz	8025 - 8400 MHz
Tx Frequency	2,025 - 2,120 MHz	N/A
Polarisation	RHCP/LHCP	RHCP/LHCP
EIRP (dBW)	54	N/A
G/T (dB/K)	15.5	29.5
Modulation/ Demodulation	BPSK, QPSK, OQPSK, PSK8, QAM16, PCM-PSKPM	**BPSK**, QPSK, 8PSK, GMSK, **16APSK**, 16QAM, 32/64APSK
CCSDS Decoding	CCSDS standard	CCSDS standard

Azercosmos, Azerbaijan

About Azercosmos

Azercosmos' Ground Station (AGS) is ideally positioned at the unique location between Europe and Asia. The Station consists of a 5.5m S/X-Band antenna system and a network infrastructure that makes it compact and versatile. IP connection to 2 backbone optical lines provides network resilience and redundancy. Moreover, AGS has the ability to be agile in terms of system configuration and modulation, based on the technical requirements of the customers.

	S-band	X-band
Latitude/Longitude	N 40.2757 / E 49.2917	
Size	5.5 m dish	
Rx Frequency	2,200 - 2,300 MHz	7,985 - 8,500 MHz
Tx Frequency	2,025 - 2,120 MHz	N/A
Polarisation	RHCP/LHCP	RHCP/LHCP
EIRP (dBW)	54	N/A
G/T (dB/K)	15	30
Modulation/ Demodulation	BPSK, QPSK, OQPSK, PSK8, QAM16, PCM-PSKPM	**BPSK**, QPSK, 8PSK, GMSK, **16APSK**, 16QAM, 32/64APSK
CCSDS Decoding	CCSDS standard	CCSDS standard

StellarStation Ground Station Network 2021

S/X/(Ka) bands, 8 countries, 12 Ground Stations

日本
- 沖縄
- 岐阜
- 北海道

カナダ
- Happy Valley Goose Bay
- Inuvik

アゼルバイジャン
オーストラリア
イギリス
米国
ガーナ
ニュージーランド

Thank you!

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https://stellarstation.com