Ground Segment Enterprise Evolution – GMV Perspective

Leveraging New Space for Ground System Enterprise Evolution

GSAW 2024 – Working Group B

February 28th 2024

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gmv INNOVATING SOLUTIONS

Agenda

GMV Overview

Journey to Services

Gov & Comm Cooperation

GMV Overview

A global technology group

Multinational technology group

Headquarters in Spain (Madrid)

+3,000 employees

Roots tied to Space

CMMI level 5

CMMI DEV /5 SM

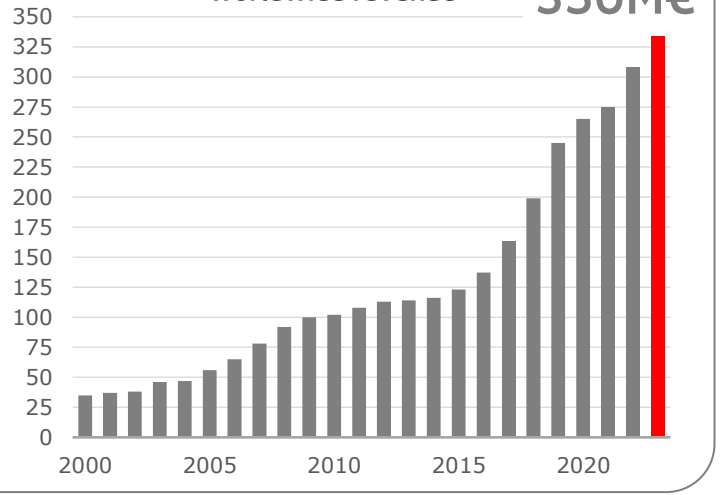
CMMI®V2.0 / Exp. 2022-09-30 / Appraisal #50091

Private capital

Founded in 1984

Companies in 12 countries

worldwide revenue 350M€



Space, Aeronautics, Defense & Security, Intelligent Transportation, Banking & Finances, ICT Industries

Space	Defense	IT	Transport
56%	11%	16%	17%

GMV in the World

Spain
Madrid – headquarters
Valladolid
Seville
Barcelona
Valencia
Zaragoza

Belgium
Colombia
France
Germany
Malaysia
Netherlands
USA
Portugal
Poland
Romania
United Kingdom

GMV in Space

6th European Space Industrial Group

900+ Spacecraft use GMV Technology

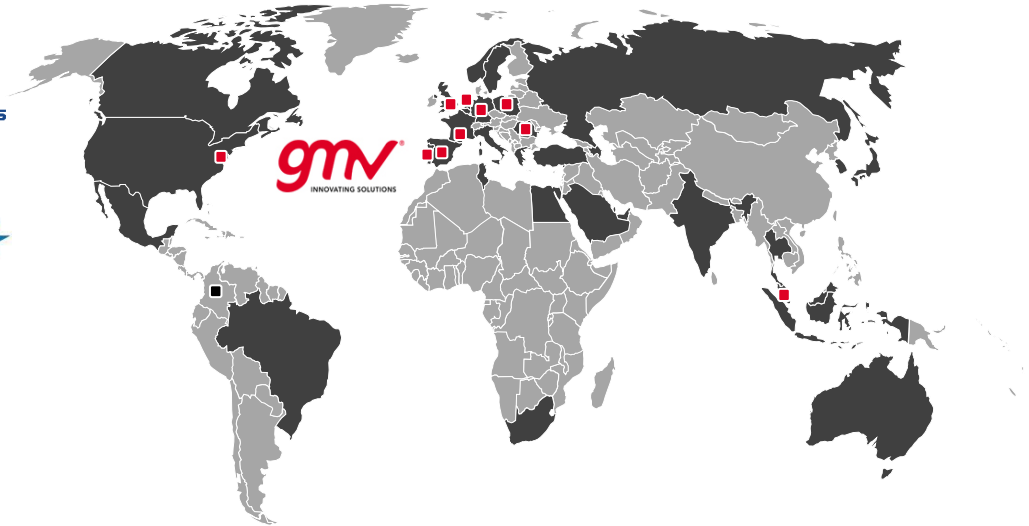
1,800 Space Engineers

- Satellite Navigation
- Ground Segment
- Data Processing & Applications
- Operations Engineering
- Space Safety SST/STM
- On-Board GNC, SW, electronics
- Robotics and OnBoard Autonomy
- Cyber security and AI

Main GMV Space Customers

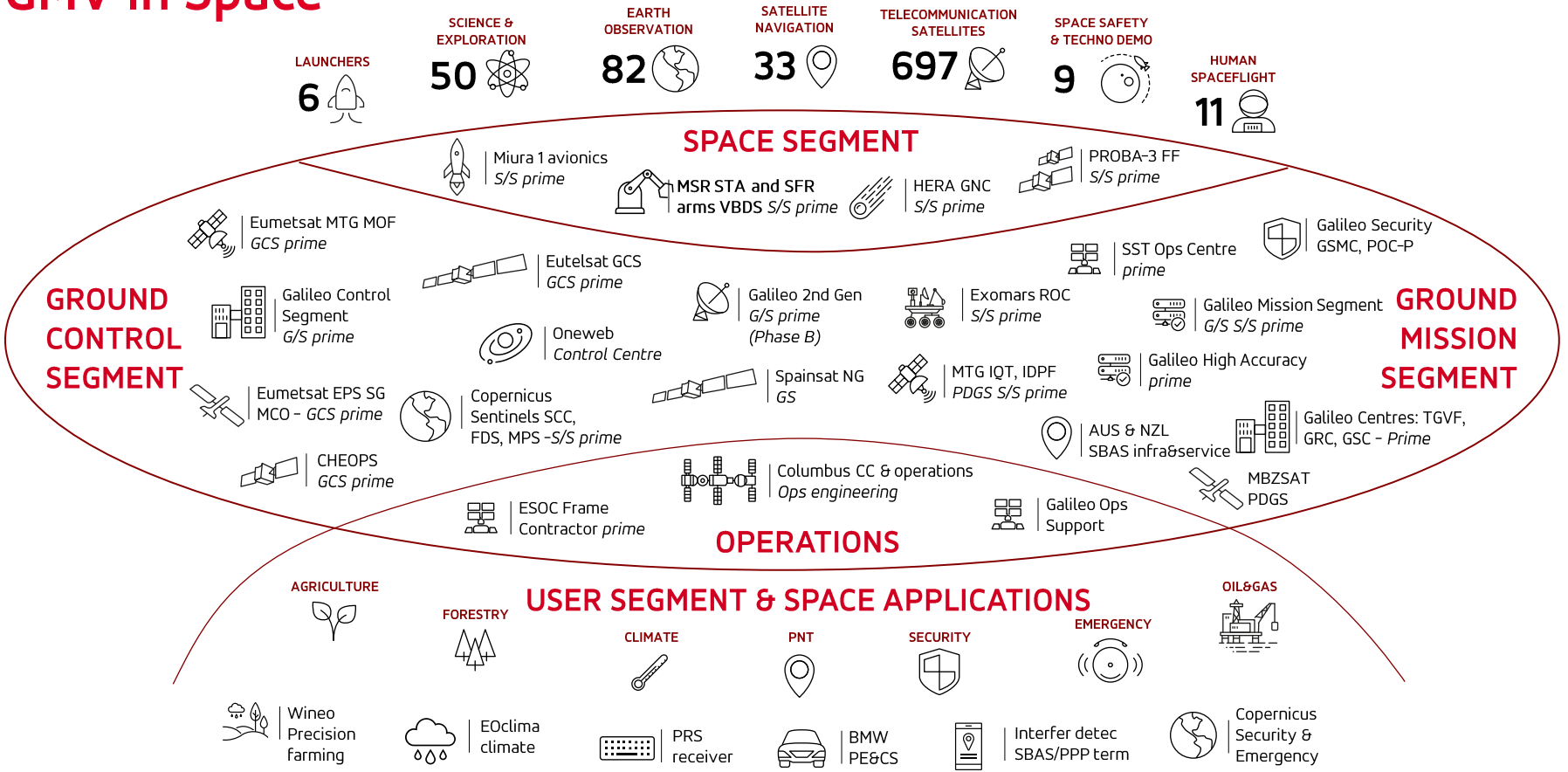
SPACE AGENCIES

TELECOM SATELLITE OPERATORS

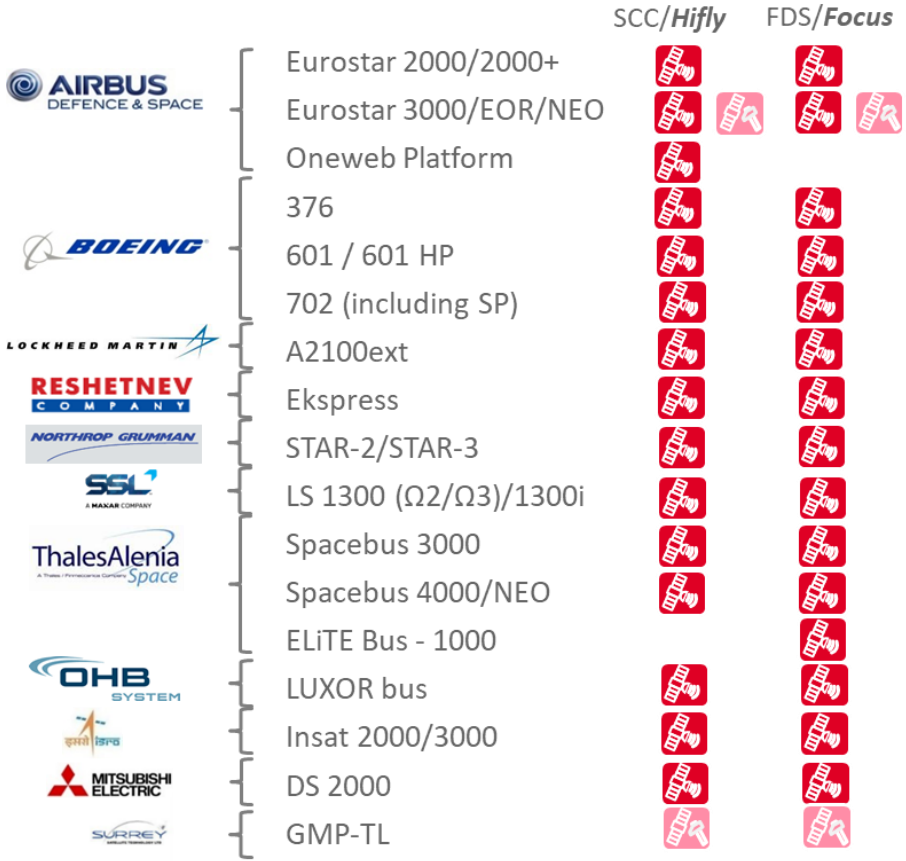


SATELLITE MANUFACT. / SYSTEM INTEGRATORS

GMV in Space



Supported GEO/LEO Commercial Buses



GMV Journey to Services

Problem Statement

Working Group B - Leveraging New Space for Ground System Enterprise Evolution

Discussion of the **evolution** of future ground systems.

Innovation in flight architectures through **innovation in ground enterprise**.

Reimagining of the **government/contractor relationship**, including the exploration of relevant technology and business services.

Strategic business issues such as the **acquisition, regulatory, and cultural** transformations to exploit commercial technology and services effectively, affordably and securely.

Key features of GMV ground system evolution

The evolution of GMV products and services has been based on the following features

Scalability from Single Satellites to Mega-constellations

Situational Awareness

Security

Automation

State-of-the-Art Technologies

Interoperability

Market Strategies

Based on Market maturity

1 **Capabilities development**

Founded by Internal R&D or institutional programs

2 **Technology development**

Application of capabilities to specific projects

3 **Product development**

Cost effective products for mature markets

4 **Service development**

Outsourcing of activities due to quality, cost or capability requirements.

Commercial approaches

Commercial product/services that can contribute to the Enterprise in different ways

Turn-key solutions leveraging commercial knowledge and previous experience

- New development with reuse of component or lessons learnt.

Turn-key solutions leveraging commercial products

- Reuse of flight proven products customized or improved for a specific mission

Ground Segment as a Service

- Provision of a Software as a Service solution to be use and/or administer by the client

Ground Operations as a Service

- Provision of Operations as a Service providing to the customer just the operations service or even the complete mission.

New space companies are typically focus on one of these options

Features of New Space and commercial services

New space and commercial services may have very different approaches to the market

Some new space companies are focus on a very specific solution that may be a good solution, but the user need to take it as it is, with a low level of flexibility.

Other commercial companies, like GMV, base their approach to commercial services based on keeping the flexibility required to support different markets and clients in the most efficient way in each case:

- Products evolved to be compatible with different scenarios like physical hardware deployment, virtualization environment or cloud deployment.
- Rather than "------- as a Service" it would be "-------- **also** as a Service"

GMV examples of commercial success cases

Turn-key solutions based on knowledge

Galileo Ground Control Segment, based on 40 years of GMV experience in ground control segments (ESA, EUMETSAT, EUTELSAT, HISPASAT, etc..) and cybersecurity.

Turn-key solutions based on products

Space Norway (USSF EPS payloads) ground control segment provided through Northrop Grumman.

Ground Segment as a Service

AZCubesat, a Flight Dynamics deployed on GMV premises as a Service (FDSaaS) based on the FDS product portfolio.

MBZSat, AWS deployed Data processing as a Service, based on ***Prodigy*** & ***Flexplan*** product.

Ground Operations as a Service

Southpan, Australia & New Zealand SBAS, or BMW positioning service.

SentinelPOD, precise orbit determination service for Sentinel constellation.

Focusoc, collision assessment services for LEO/MEO/GEO operators

Governments & Commercial Cooperation

Main drivers to improve cooperation

A strategy to improve current support of Enterprise by commercial entities will require:

Higher level of standardization:

- Adoption of formal standards (CCSDS, ISO, etc…)
- Standardization of naming convention, definitions, CONOPS, etc…

_There is a big number of silos in institutional markets and the better conversion with industry will increase cooperation chances. -> Not enough with using the same dictionary, we need to talk the same language.

- "Standardization" of products/services.

Clear approach to consume commercial services. Different scenarios:

- Full operations/mission outsourcing
- Partial outsourcing of mission components
- Ground Segment as a Service

Challenges

There are different challenges that the agencies will have in the process

Which is the right approach to services:

- Use of a pool of provider for same services, providing the capability to select depending on technical or performance criteria.
- Use of redundant services to improve reliability. Not always possible. Only one system can command the satellite.

How to handle an underperforming supplier without jeopardizing the mission?

How legal and regulatory requirements are shared/handled with the industry partners?

What Industry needs?

To be successful, industry needs:

A publicly know strategy where the agencies provide enough visibility to create a feasible business plan.

- Long term planning and funding.
- Contractual framework balancing opportunities for new companies with mid-term investment by incumbents.
- Clear product/service definitions.

Enough opportunities to compete for business. A more mature market will imply a higher level of commodization.

Opportunities for newcomers to access the agencies to understand their plans, expectation and requirements.

Government/Commercial forums to help industry to understand government needs, to show capabilities to government, and to share information in both directions.

International Cooperation

International cooperation can be understood in different ways

DoD paradigm “Allied by design” -> Allied countries and allied industry shall work together to guarantee interoperability.

International agencies already cooperate at scientific level in multiple missions, but that cooperation can be extended to support the development of services compatible with their needs.

Involvement of international suppliers typically phases different challenges:

- “Overclassification” or other kind of security constraint.
- Export Control

Thank you

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