Three decades of spacecraft exports 1991-2020

Briefing

May 2021

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Methodological notes

Data sources

- The data presented in this analysis is based on the Eurospace database of annual launch events (LEAT), compiled annually from public sources.
  - While the majority of launch events is usually well documented, in some cases (Military launches, Chinese launches etc.) some data is missing. In these cases the missing data points are inferred with caution to avoid data discontinuity.
- Spacecraft information included in the database focuses on a few key characteristics:
  - Spacecraft supplier (entity and country, identified at the level of the bus or prime contractor)
  - Spacecraft customer
  - Spacecraft mission
  - Spacecraft mass at launch
  - Spacecraft initial orbital parameters
- It does not provide any detailed information on the spacecraft payload and subsystems

Methodology

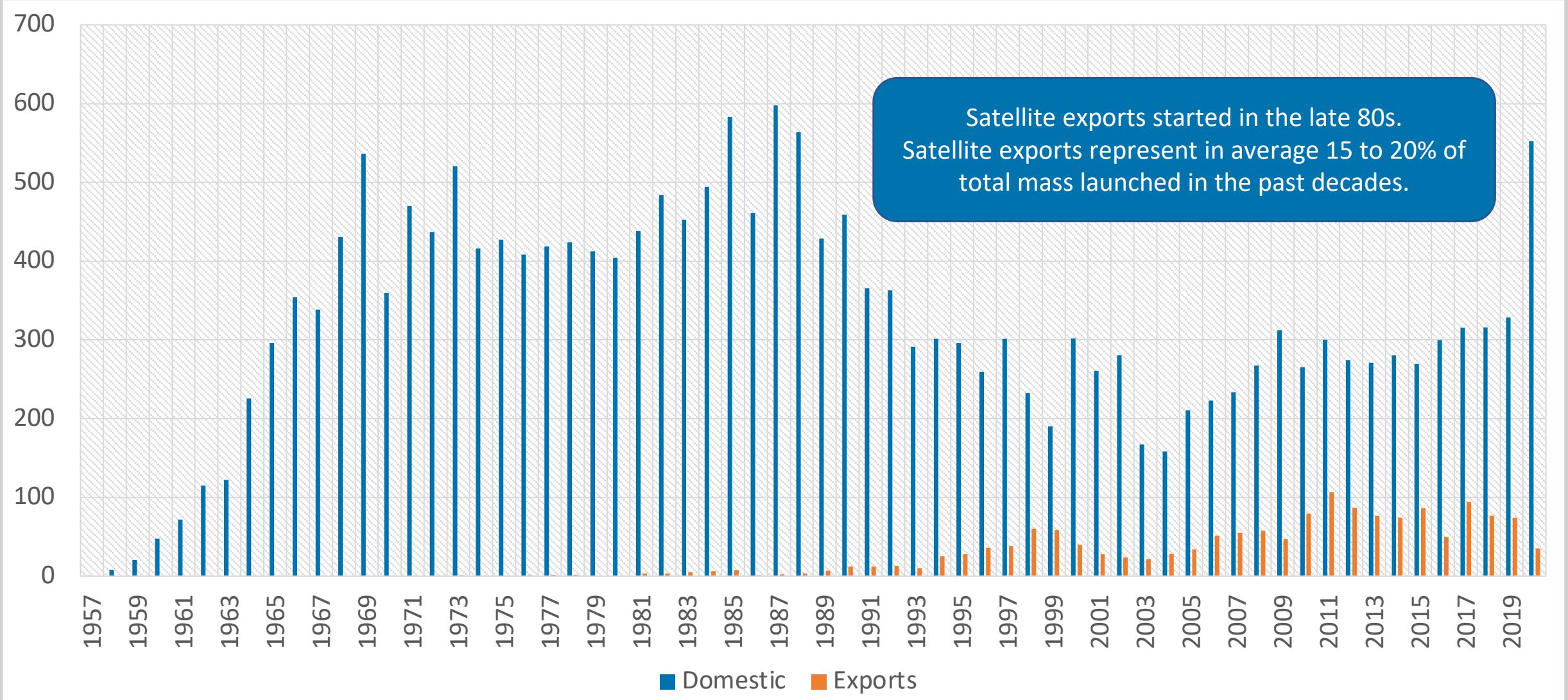
- We consider that a spacecraft is an export when the spacecraft supplier and the spacecraft customer are from two different countries
  - Except in Europe: only trade outside Europe is considered an export, all spacecraft trades within Europe are considered domestic
- We estimate satellite value based on satellite mass, mission and supplier, the point is to define ROM, not precise valuation
  - Considering that 90% of the spacecraft involved are commercial, the value is usually rather well documented
- Note that satellites are not 'physically' exported.

A note on spacecraft exports

- Spacecraft are specific goods that eventually all end up in space.
  - Spacecraft exports are not necessarily associated to the actual delivery of spacecraft and related goods to foreign territory.
- In practical terms satellites are moved from the place of production to the place of launch, this may entail cross-border movements, but they are not labelled as exports
  - E.g. when the European-built Cluster satellites are transported to Baikonour for launch by Soyuz they are not considered exports in this analysis. Despite the fact that the systems actually cross borders, we label them as 'domestic' (i.e. build in Europe for a European customer).
  - E.g. when NASA procures a Progress flight from Baikonour to fulfill its obligations towards cargo resupply of the ISS, we label this as a Russian export (i.e. built in Russia for a US customer), despite the fact that the spacecraft is built in Russia and launched from a Russian state-controlled launch site.

- Thus spacecraft exports are appreciated from the point of view of transfer of ownership and control of the spacecraft, as well as from the point of view of currency intake.
- This analysis considers **only the export of complete spacecraft systems**.
  - There is also a secondary market for the export of spacecraft parts, but it is difficult to track lacking appropriate information at global level
  - The Eurospace f&f survey measures export/import of satellite parts in Europe:
    - Imports of non European (mostly US) equipment & parts represented 3,1B€ of purchases in the past decade
    - Exports of European space systems equipment & parts represented 4,5B€ of sales in the past decade

Global chronology of satellite exports – total mass (ton)



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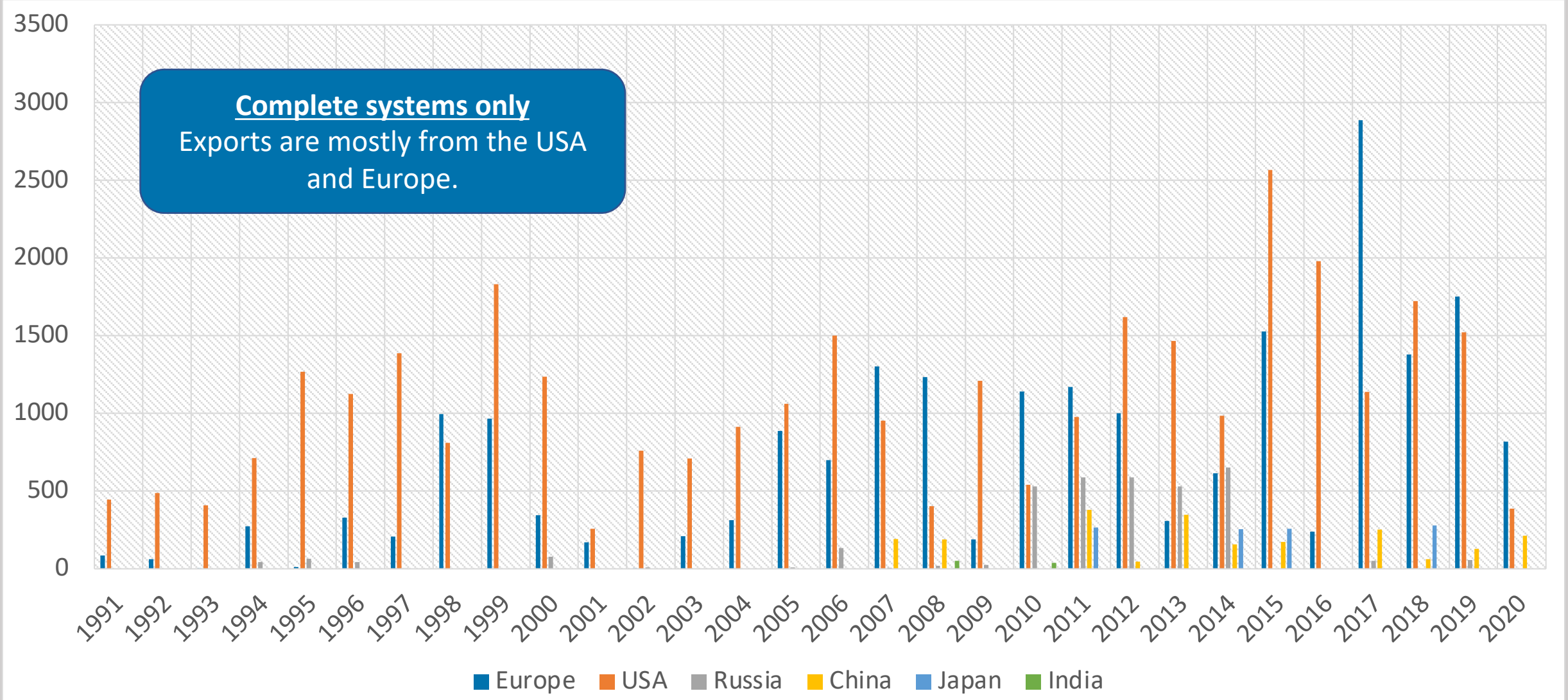
Value of spacecraft exports (M$) – by exporter region



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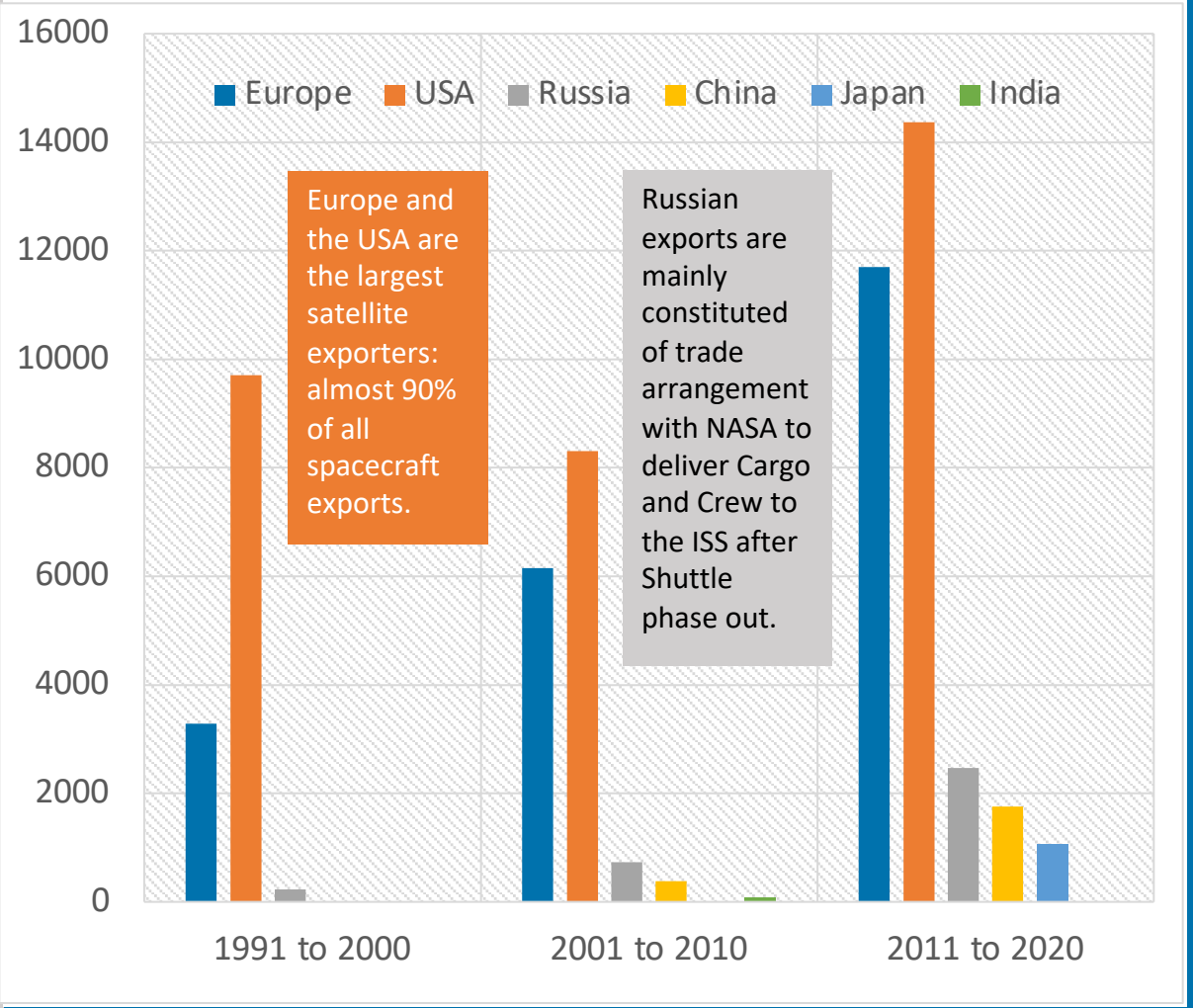
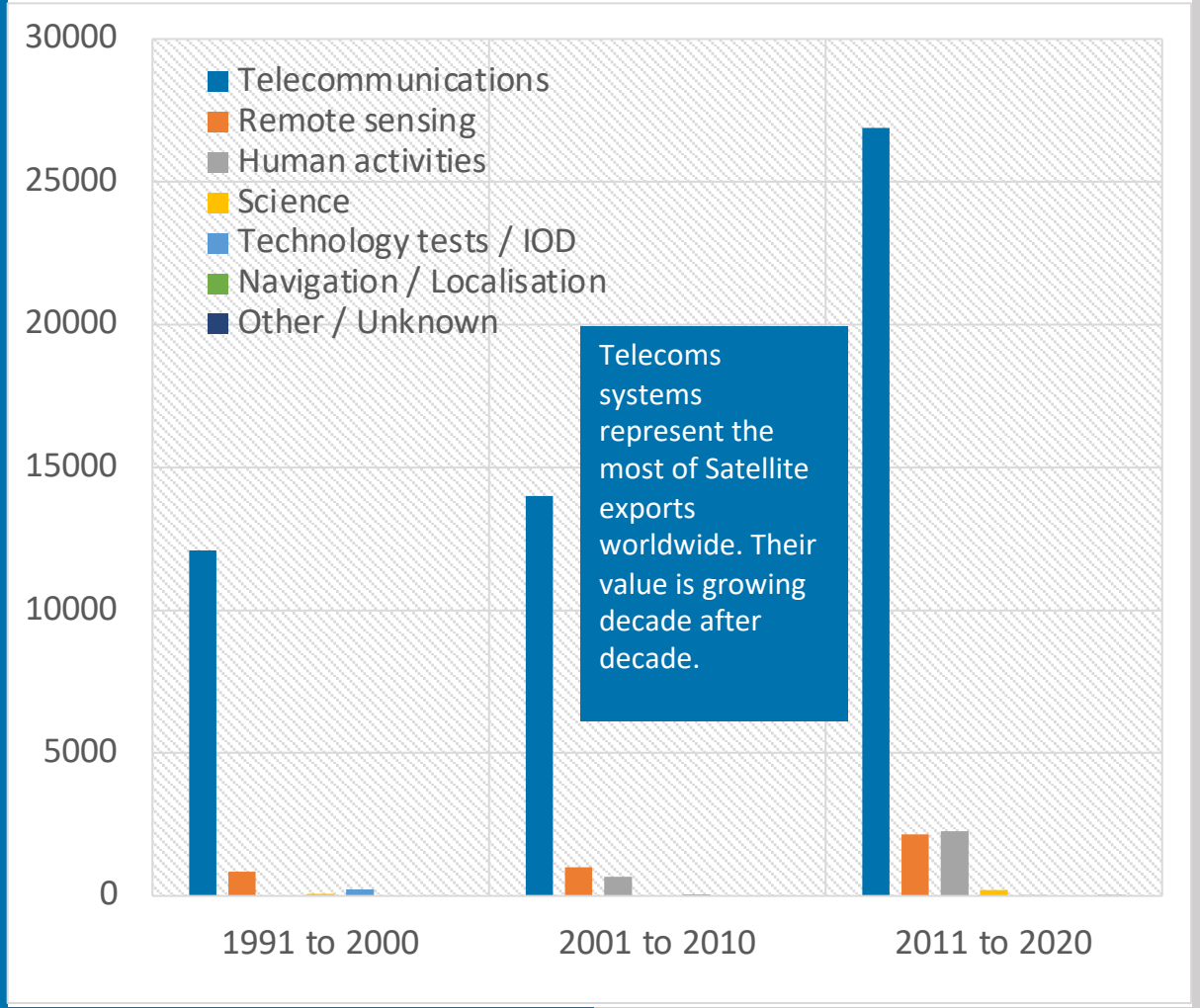
Value of spacecraft exports (M$) – complete systems only

Exporter region - Comparison by decade



By mission – comparison by decade



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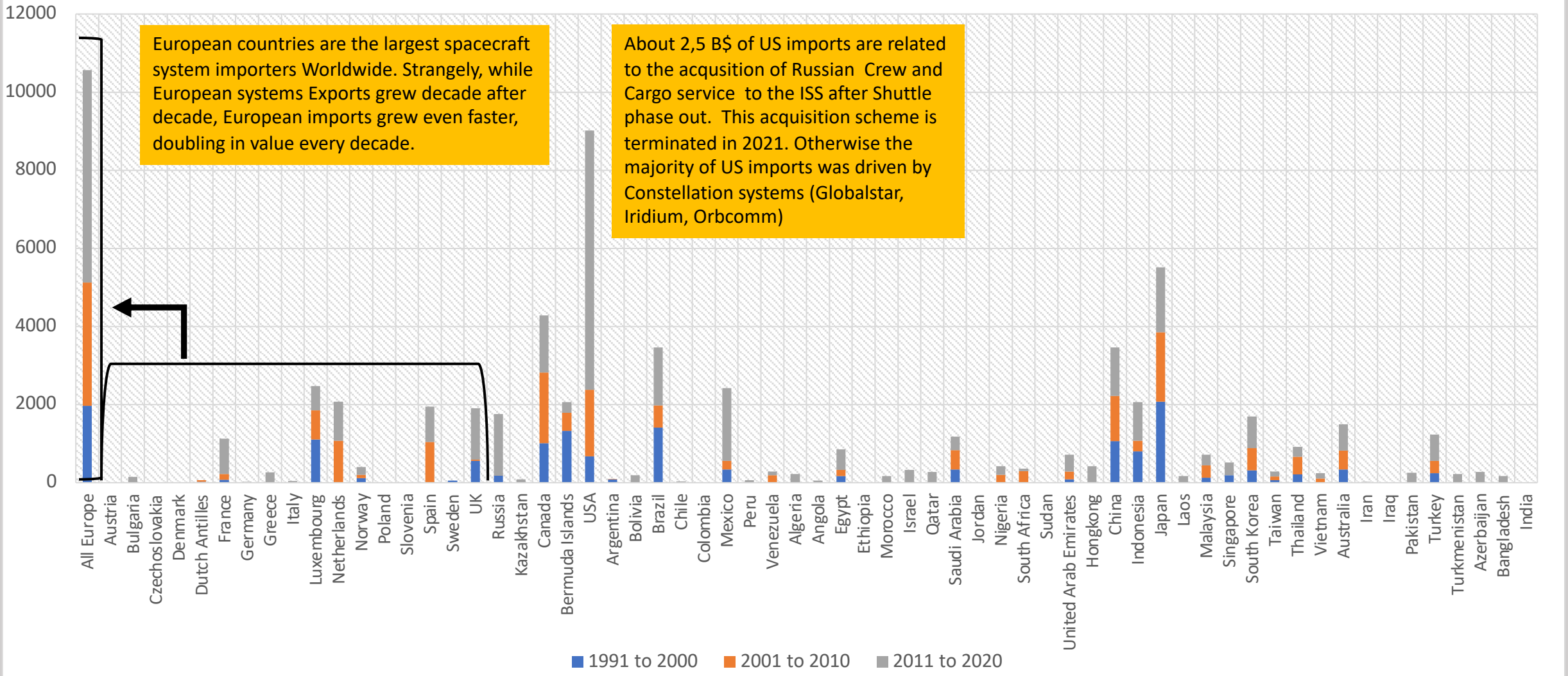
Value of spacecraft imports - by importer country – M$



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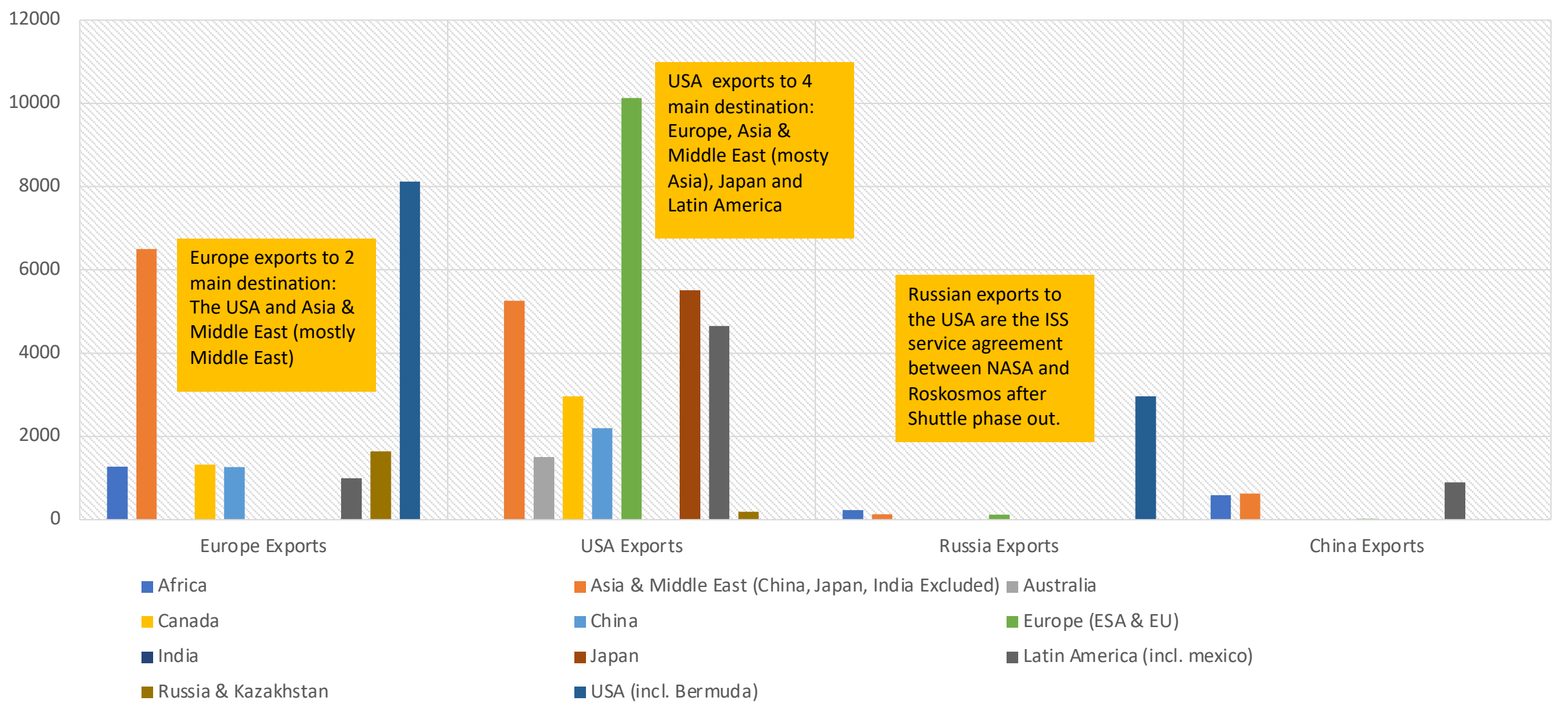
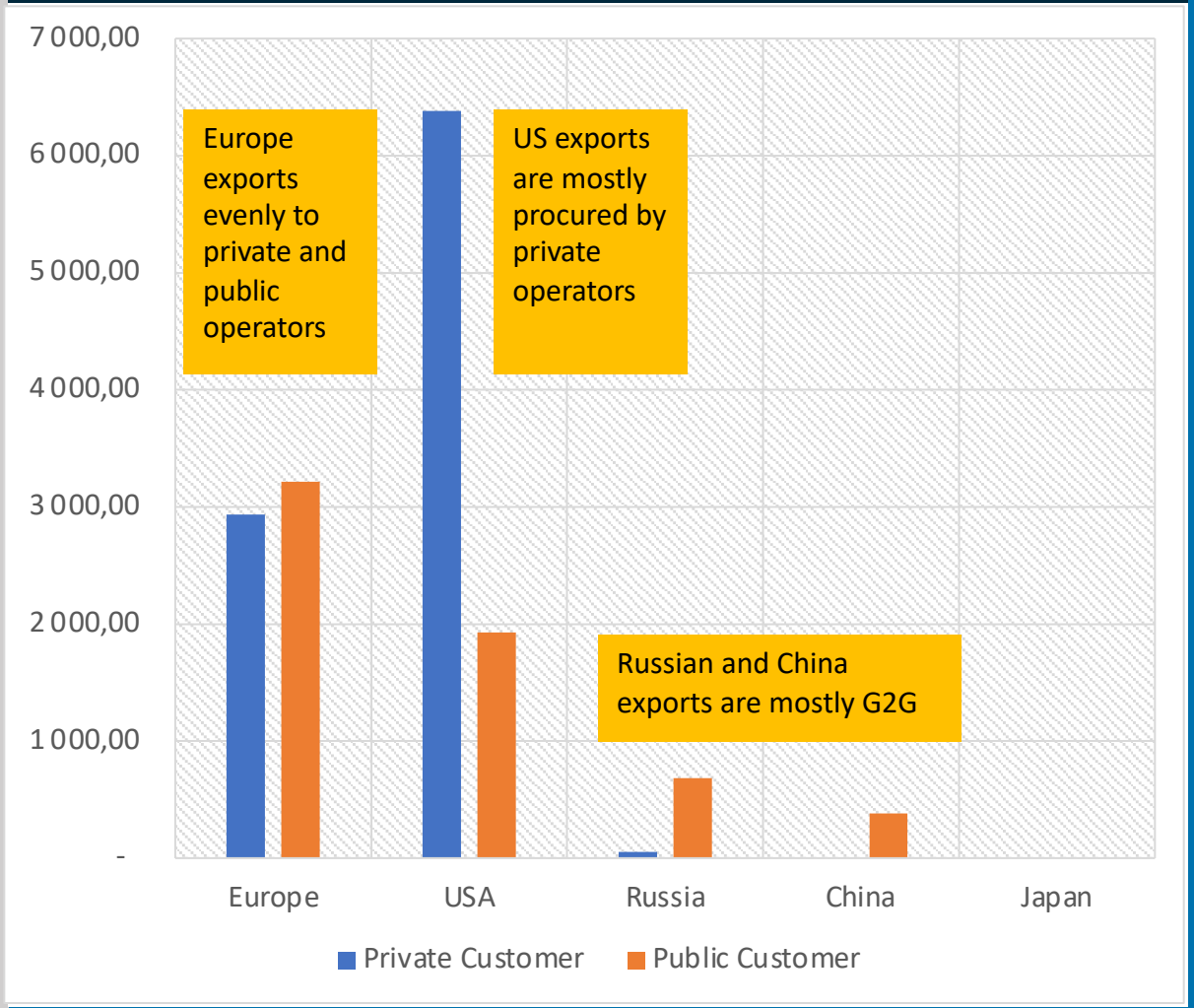
Spacecraft exports by importer region – 1991-2020

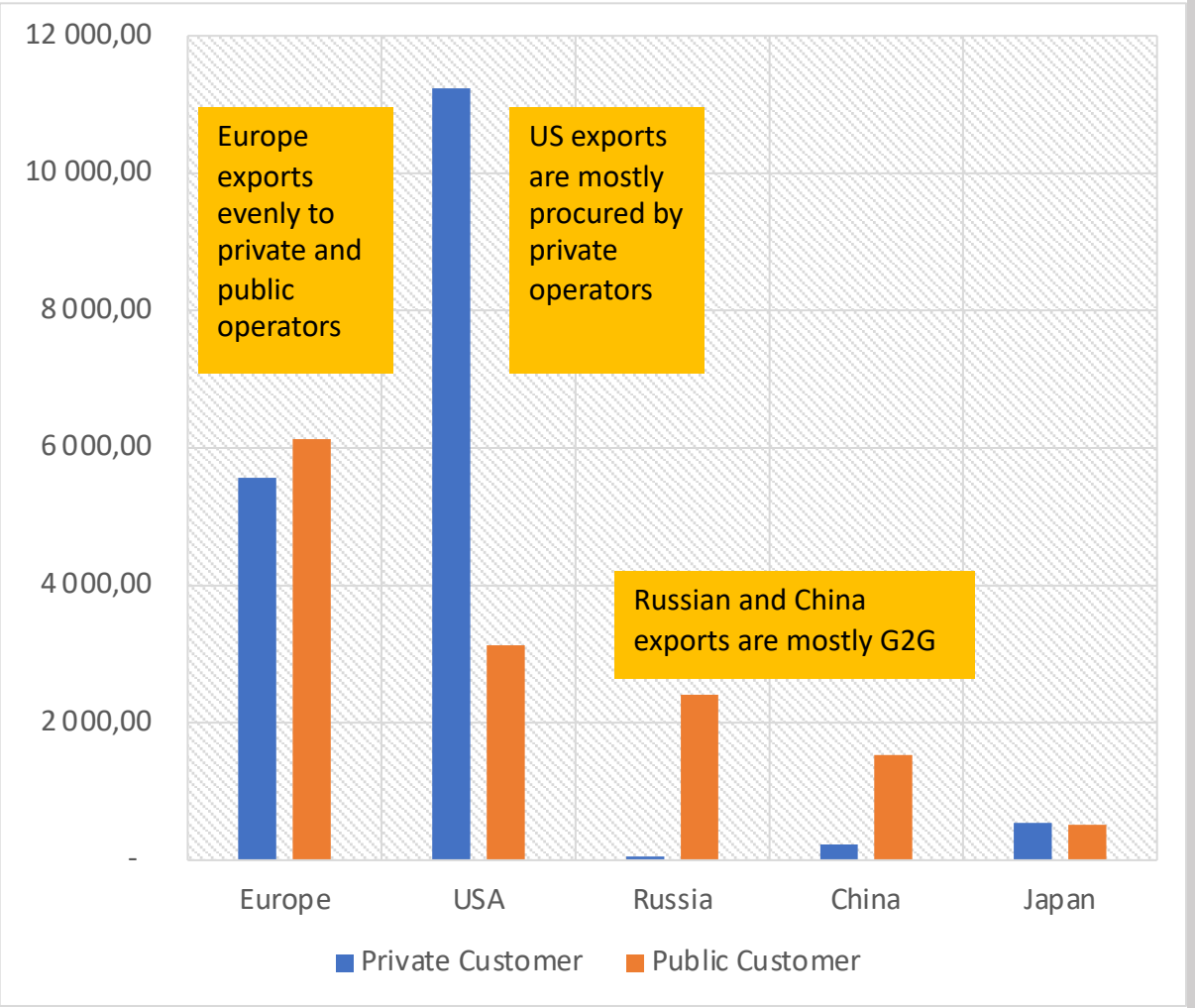


Spacecraft exports by importer type: public and private entities

2001-2010



2011-2020



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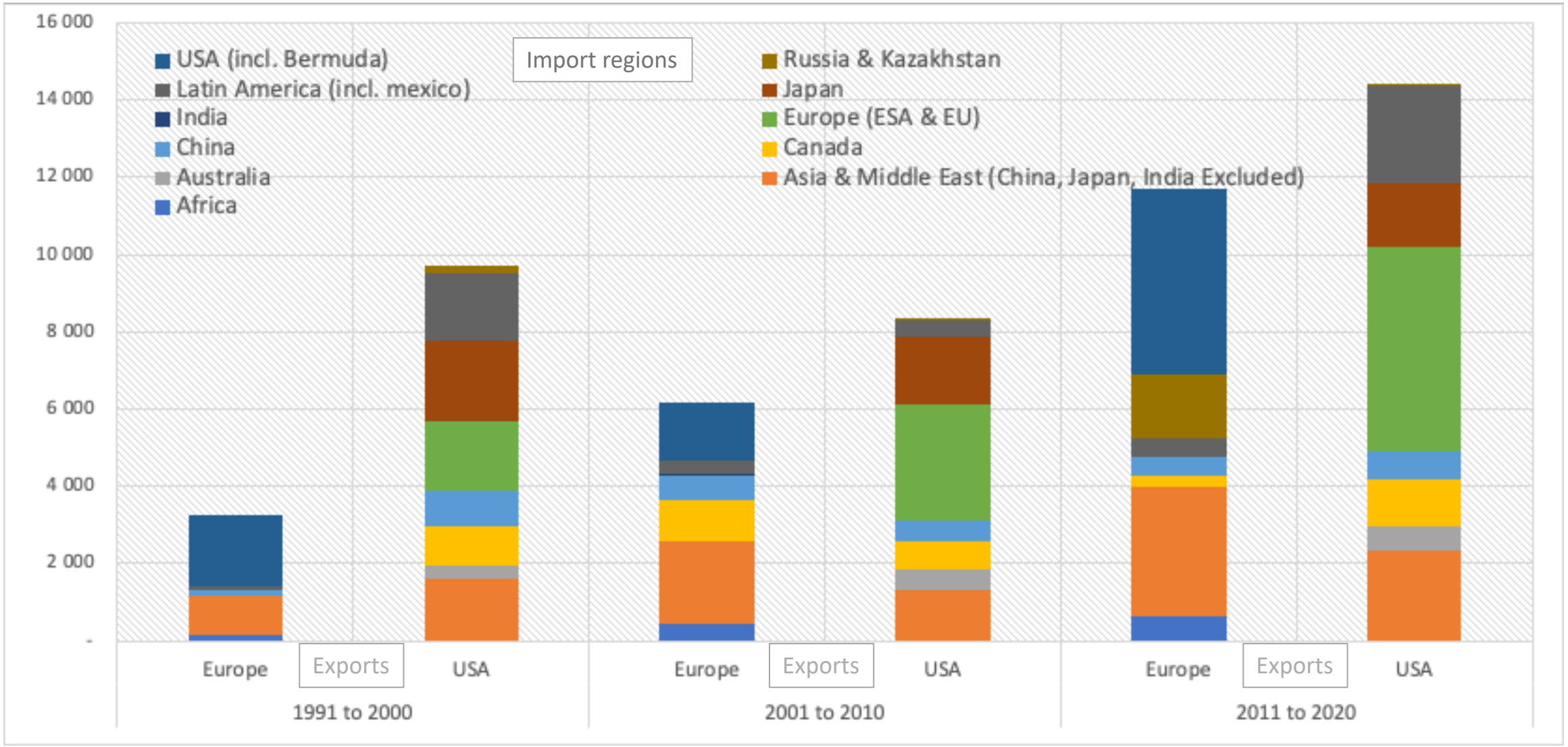
Side by side comparison US vs European exports

USA and Europe exports by importer region (M$)



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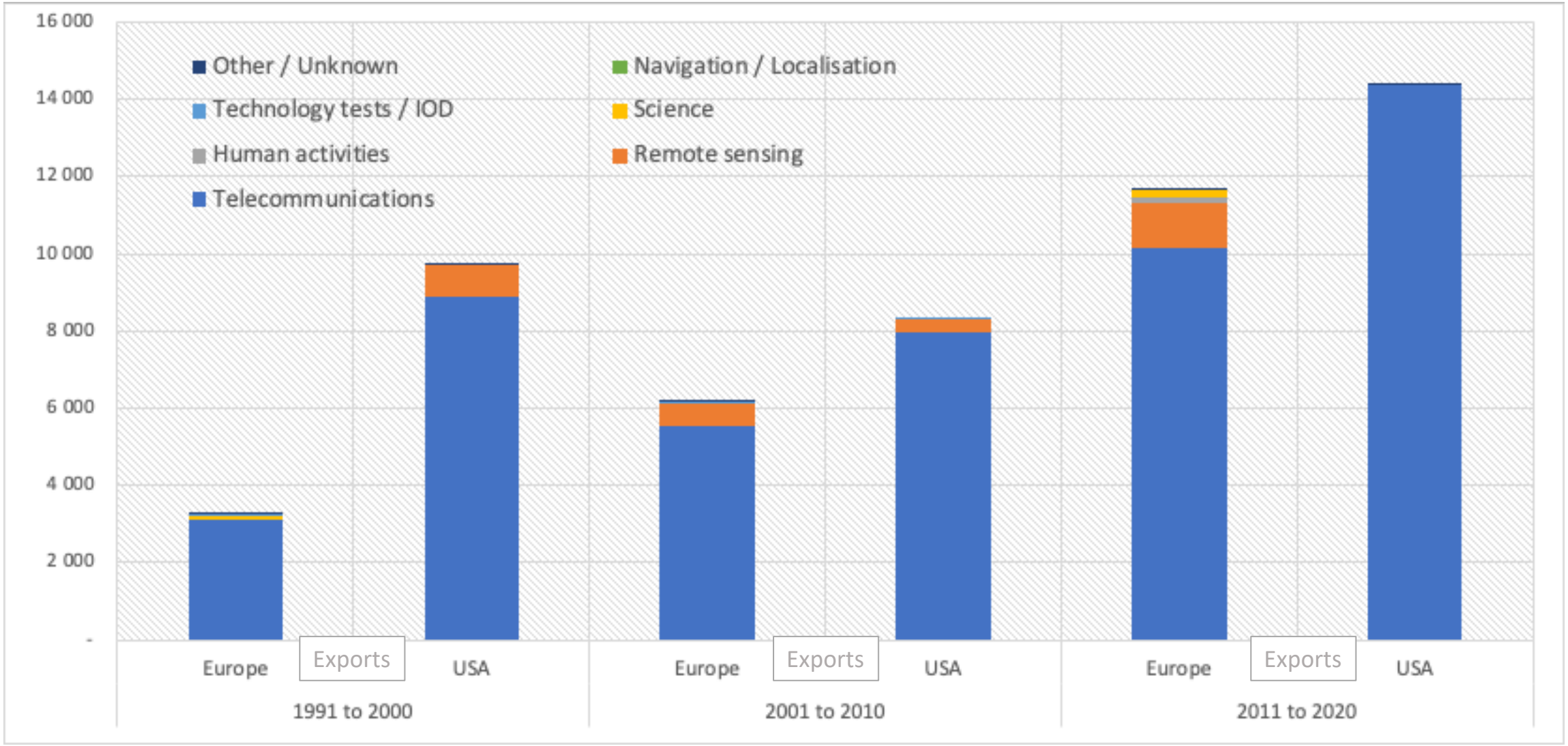
USA and Europe exports by Application type (M$)



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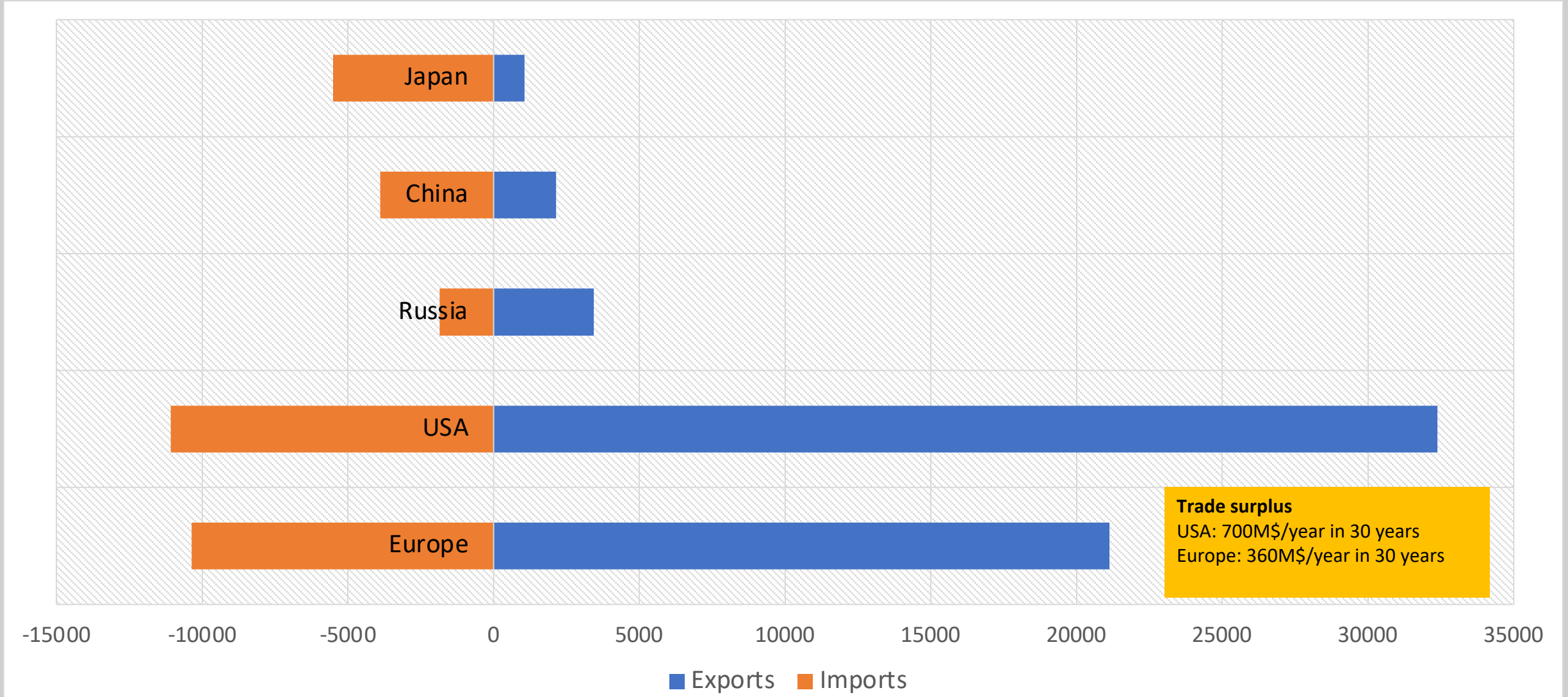
Complete Spacecraft trade balance – 1991-2020 - M$



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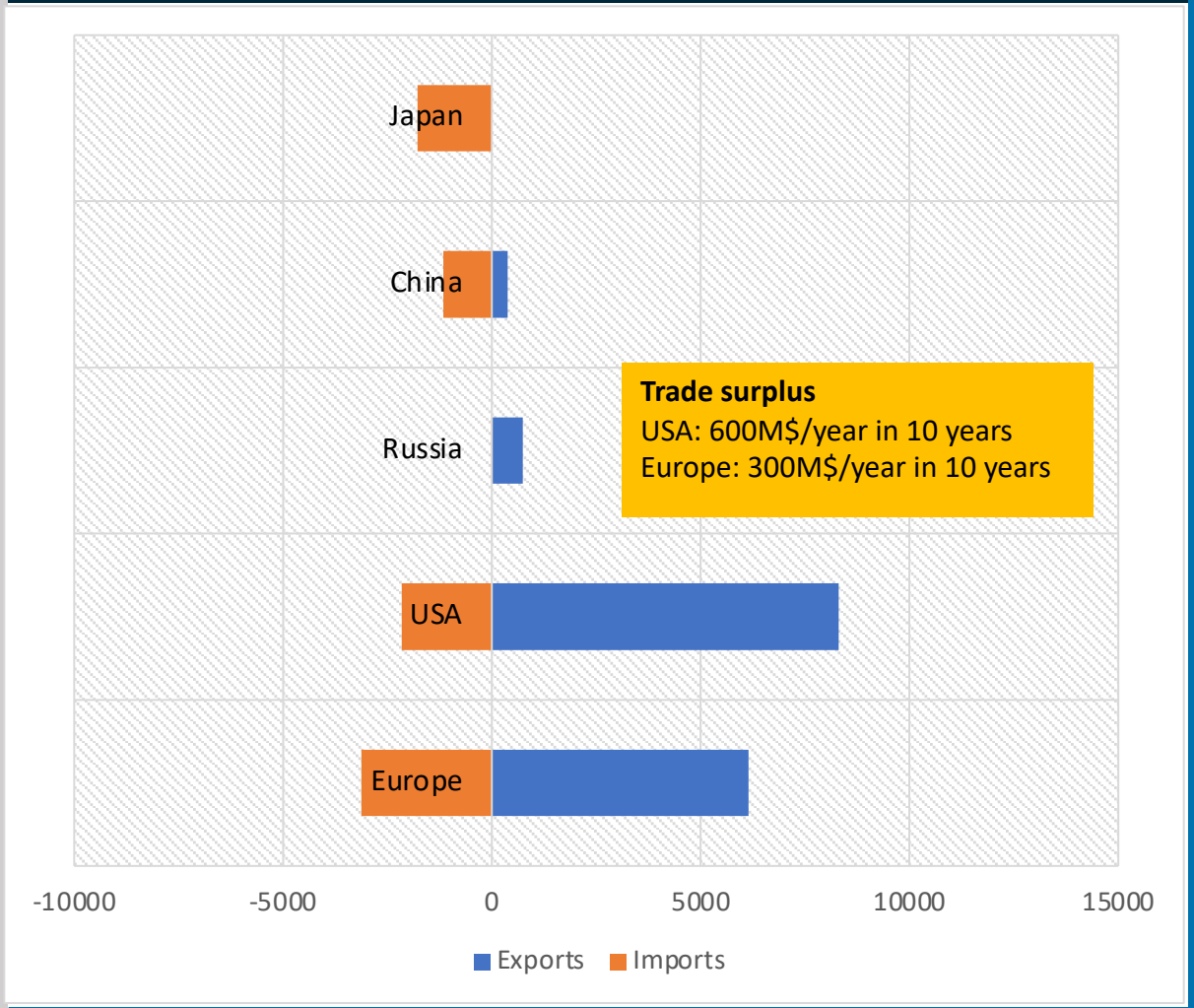
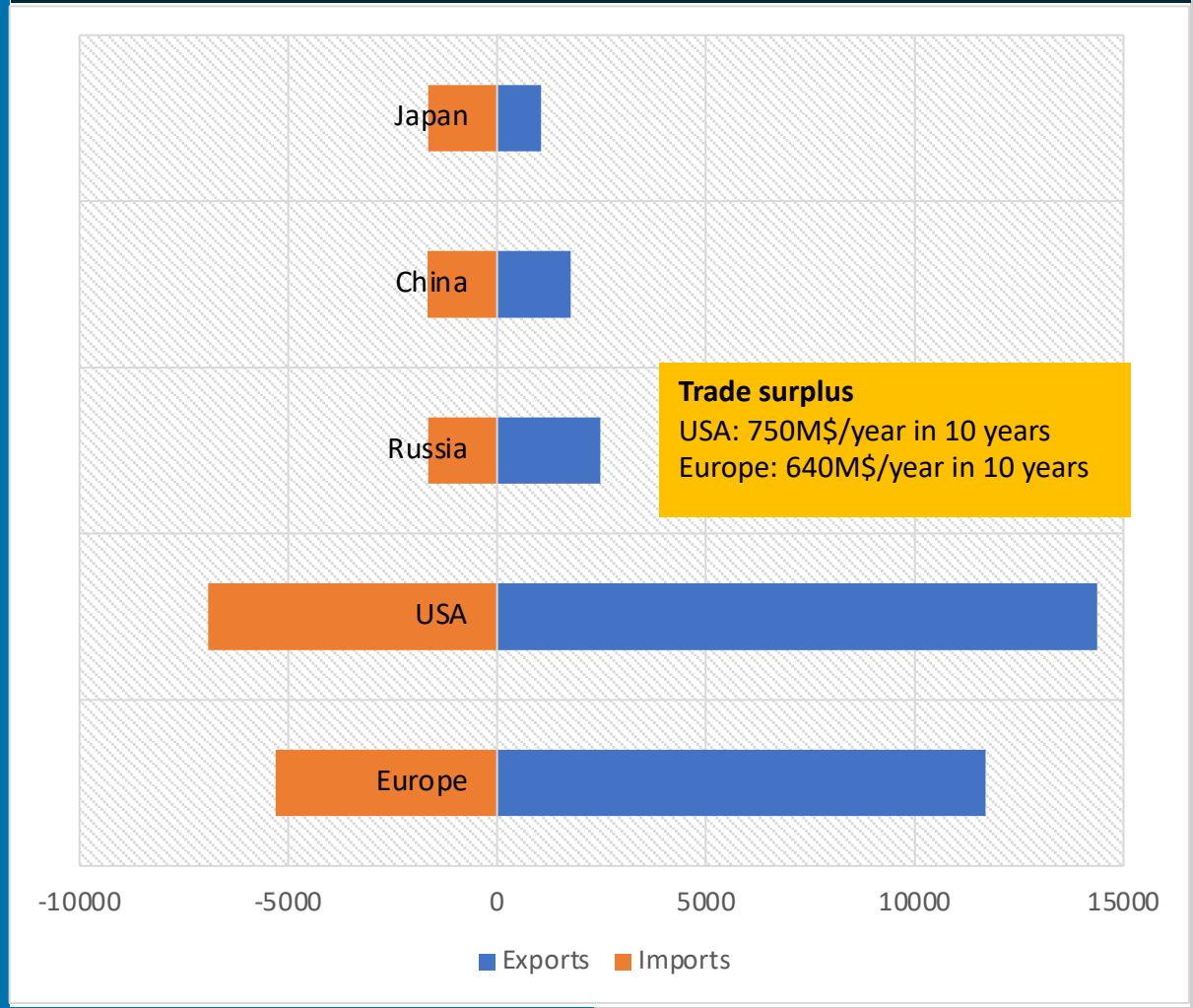
Complete Spacecraft trade balance – last two decades – M$

2001-2010



2011-2020



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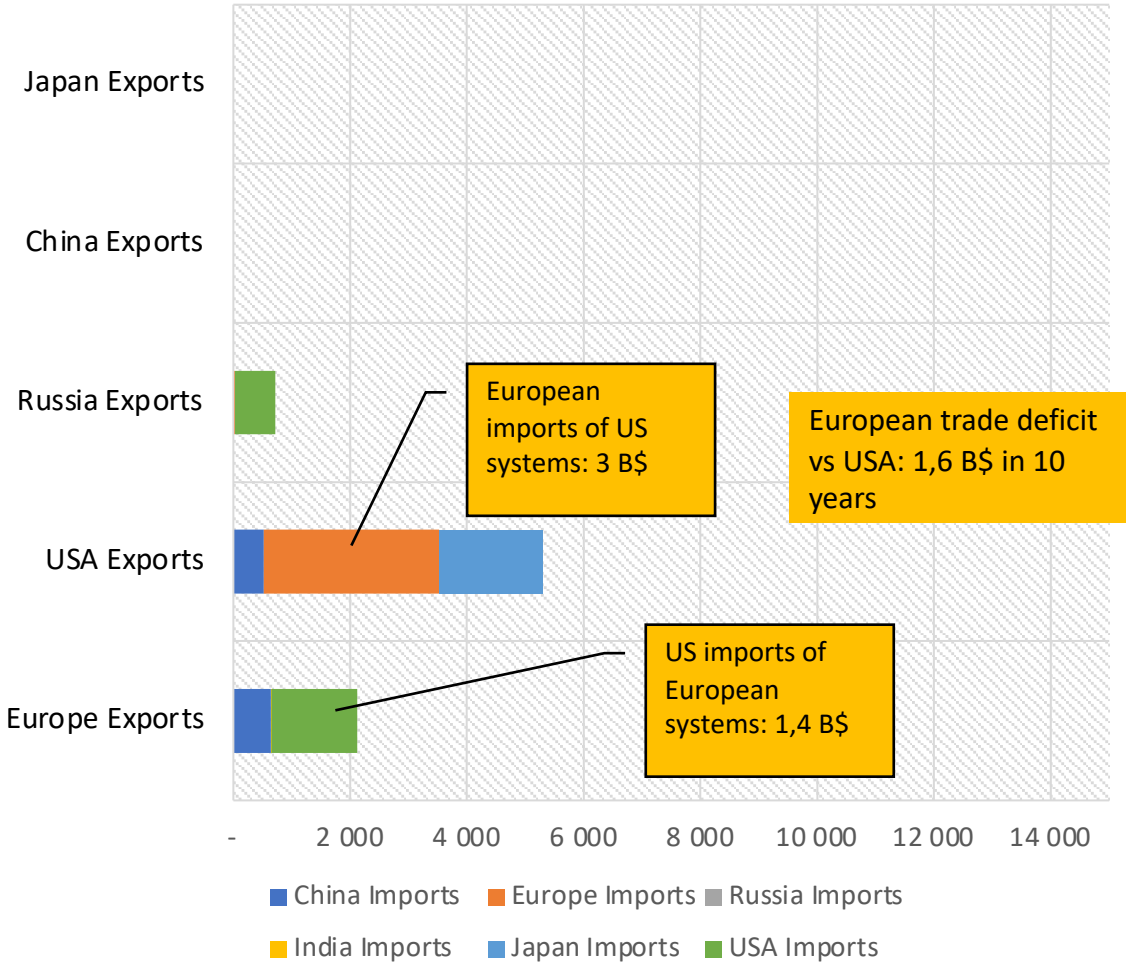
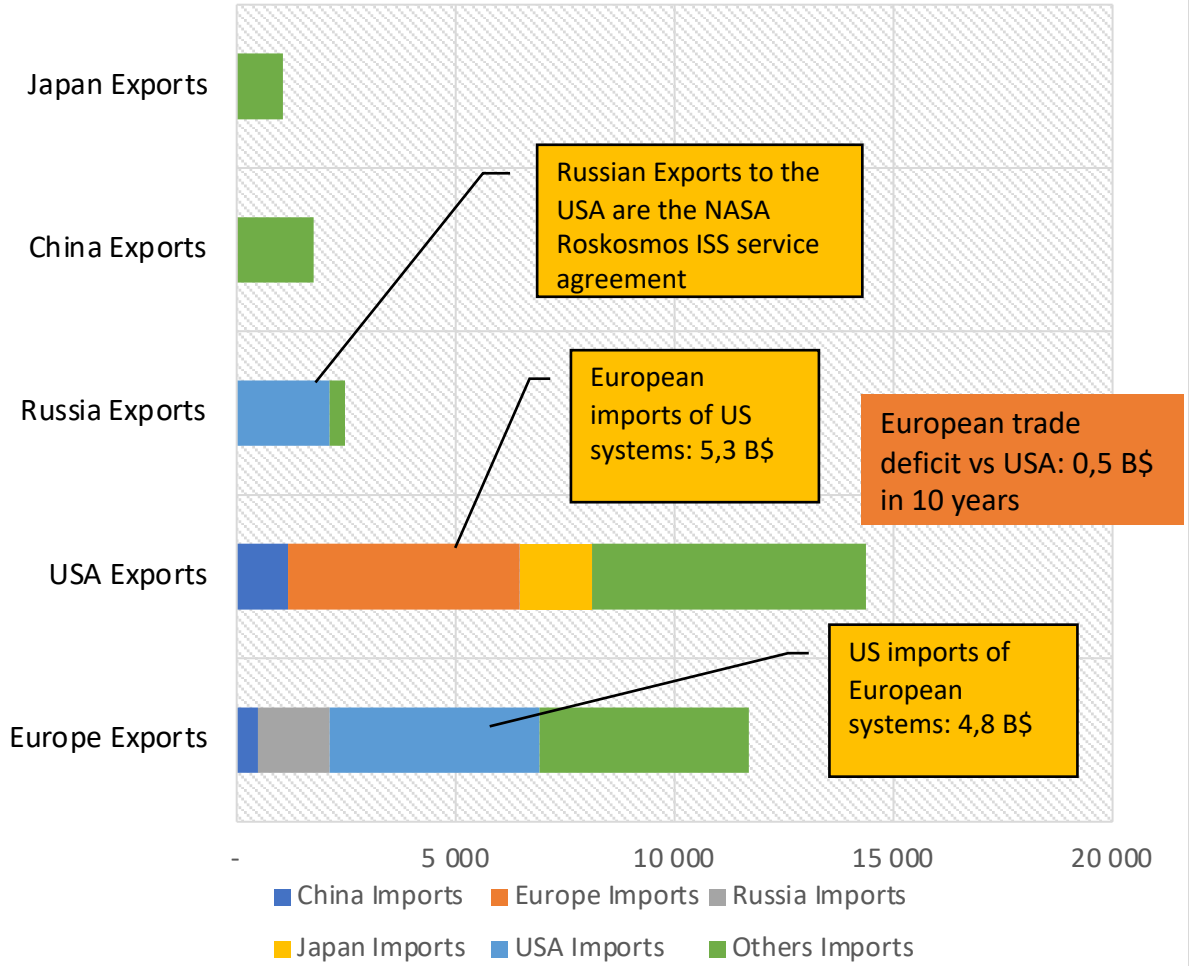
Complete Spacecraft Export/Import synthesis – last two decades – M$

2001-2010



2011-2020



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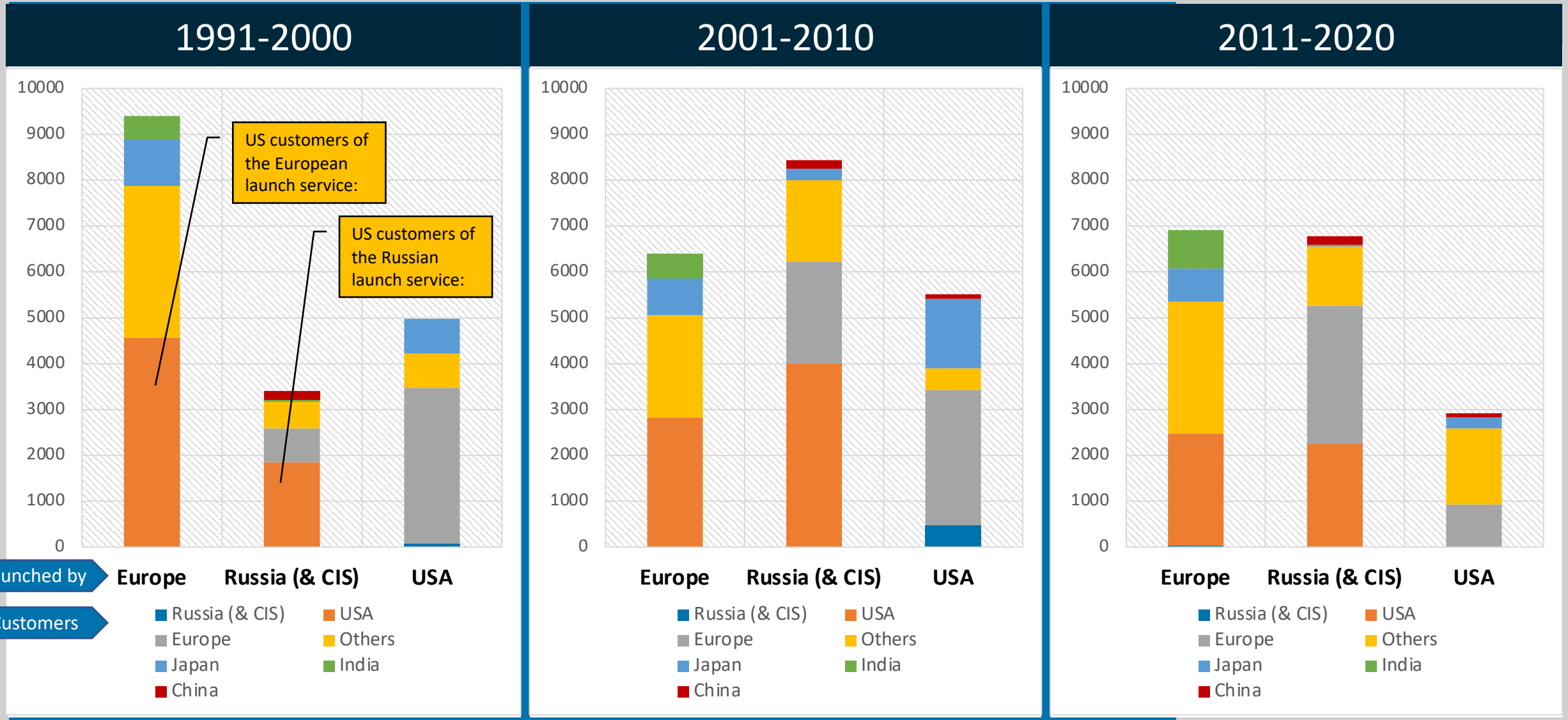
Key takeaways

- Satellite exports represent 15 to 20% of global space activity (in mass)
  - The vast majority (76%) of exported spacecraft are Telecommunications systems
    - only 6% of TLC exports are LEO systems, the rest is GEO
- Two space powers - Europe and the USA - contributed 90% of the value of spacecraft exports in the past 30 years
  - Chinese competition is emerging
  - Russia, Japan, India are not major competitors
- The USA and Europe are also the largest spacecraft importers: 35% of global satellite imports
- The global value of satellite exports is growing
  - 13 B$ between 1991 and 2000
  - 15 B$ between 2001 and 2010
  - 31 B$ between 2011 and 2020
- The growth was supported by:
  - more trade between the USA and Europe (x3 in 30 years)
  - more demand from other regions/countries (x2 in 30 years)
  - higher value of satellite systems

- The **European spacecraft industry is a net contributor to the European trade balance**
  - It contributes >**840 M$/year of trade surplus**
    - 640 M$/year on complete systems
    - >200 M$/year on spacecraft equipment
- In the past decade the European industry has secured 6,9 B$ of export for complete systems, while the US secured 9 B$.
  - In the same period US customers acquired 4,8 B$ worth of European systems and European customers worth 5,3 B$ worth of US systems.
  - Despite a globally positive trade surplus on complete spacecraft, Europe exhibits a trade deficit with the USA (50 M$/year) on complete systems
    - In addition Europe imports an average 250-290 M$/year worth of US components and equipment
  - The total European satellite technology **trade deficit** with the USA is between **300 and 350 M$/year**
- The European satellite industry is leading the segment of EO systems export
  - This segment represents between 150 and 200 M$/year
  - US competition is almost absent from this segment

Launch services export/import details – by decade (M$)



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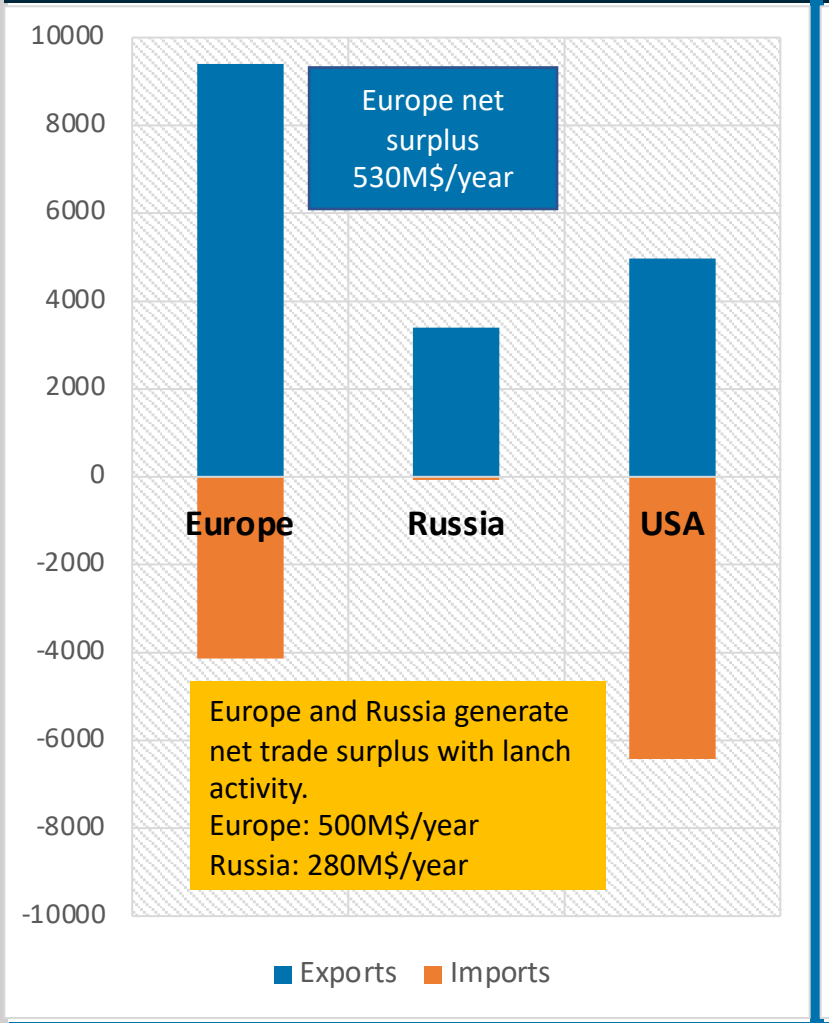
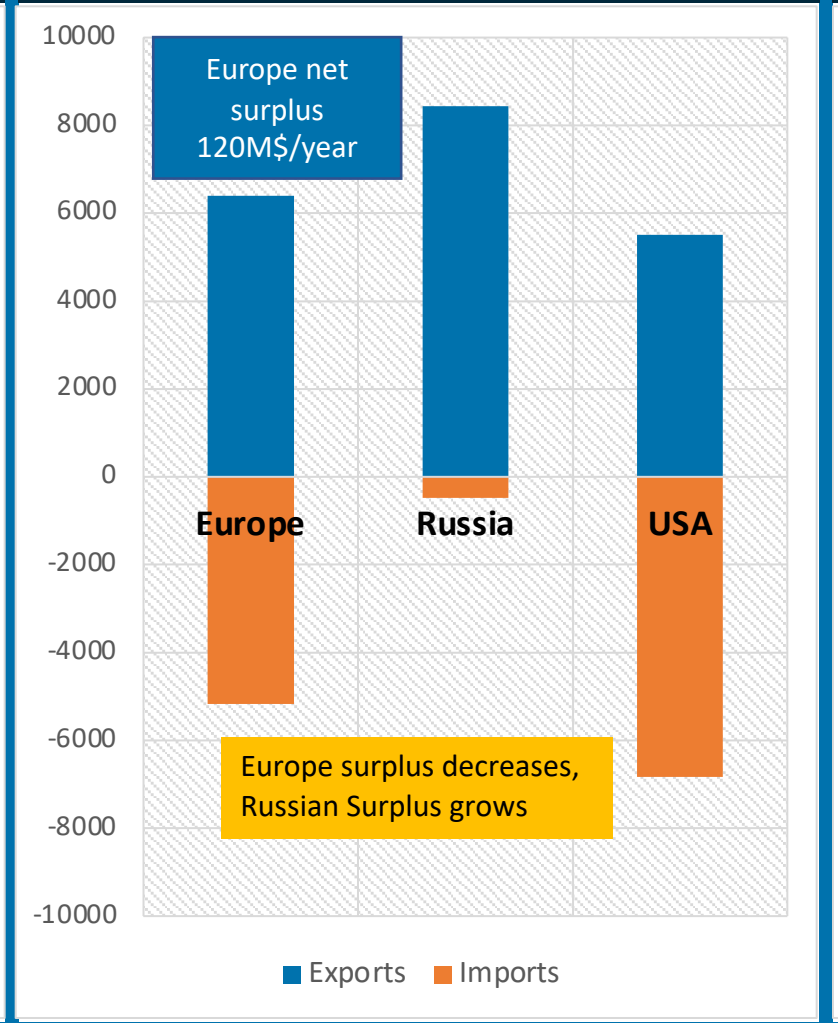
Launch services trade balance – by decade (M$)

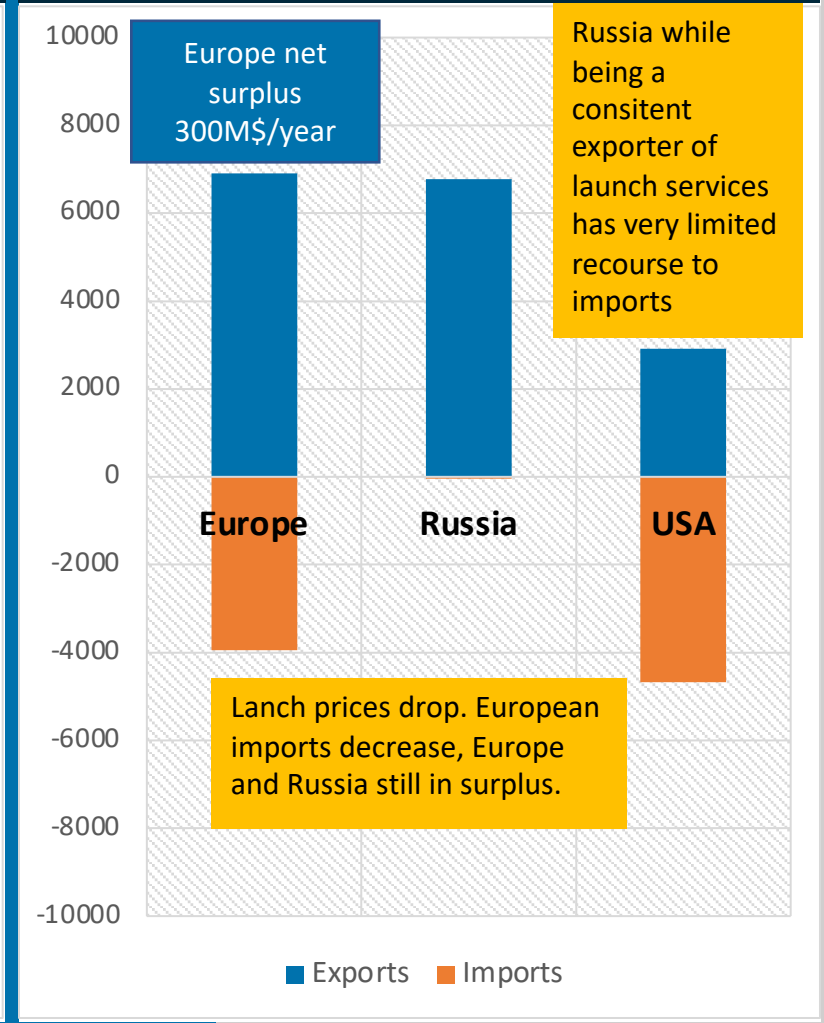
1991-2000



2001-2010



2011-2020



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Takeaways on launch services exports

- Europe (with Arianespace) **has pioneered the launch services exports** market 4 decades ago
  - Lauch services exports are a subset of the Commercial satellite market.
- European launchers have led the export market almost permanently in the past 3 decades
  - The main challengers to Europe in the period are:
    - Russia with Proton (GEO launch) and Soyuz (LEO launch)
    - USA with Atlas and Falcon 9 (in the past 5 years only)
- Competititive pressure and technical evolutions have driven launch prices down, which has had an impact on market values

- European launch exports have contributed **a total of 9,5B$ of net trade surplus in three decades**.
  - **That is an average 317M$/year** for an industry of 7000 employees.
- If European customers had more consistently used European launchers, the net surplus could have been higher by 60 to 70%
  - The recourse to non European launchers by European institutional programmes has improved in time.
- Launch exports support European economic diplomacy
  - They should complement more systematically the European satellite exports.

Conclusions on European Space Exports 2011-2020

- European space exports represented **23,1B$ in the past decade.**
- **The space manufacturing sector is a net positive contributor to the European trade balance**
- The European space industry contributed **an average net surplus of 1,1b$/year to the European trade balance**
  - Complete satellite systems: 640M$/year
  - Launch services: 300m$/year
  - Equipment and subsystems: 150M$/year
- There is a potential **for improving even more the space systems trade surplus** by:
  - **Reducing** imports:
    - European customers are the largest importers of space systems and launch services worldwide, worth **12,3B$ in the past decade**
  - **Promoting** exports:
    - Space systems and launh services exports as a tool for economic diplomacy
    - Export regulations
    - Competitiveness improvement