

# The Future of European Commercial Spacecraft Manufacturing

Cenan Al-Ekabi - ESPI Resident Fellow

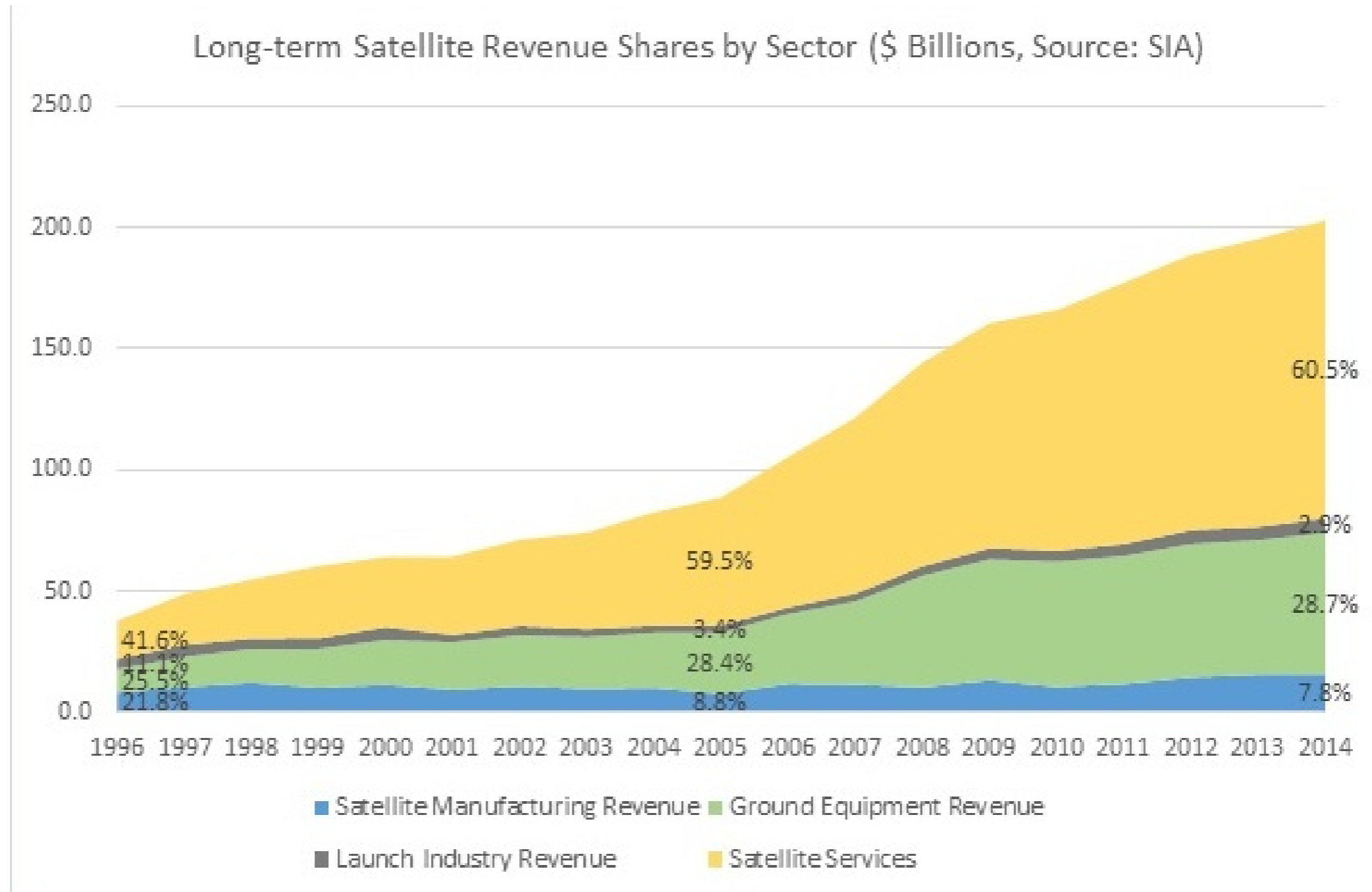
SIOI-ASI Master in Space Policy and Institutions Student  
Visit

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## Research Question

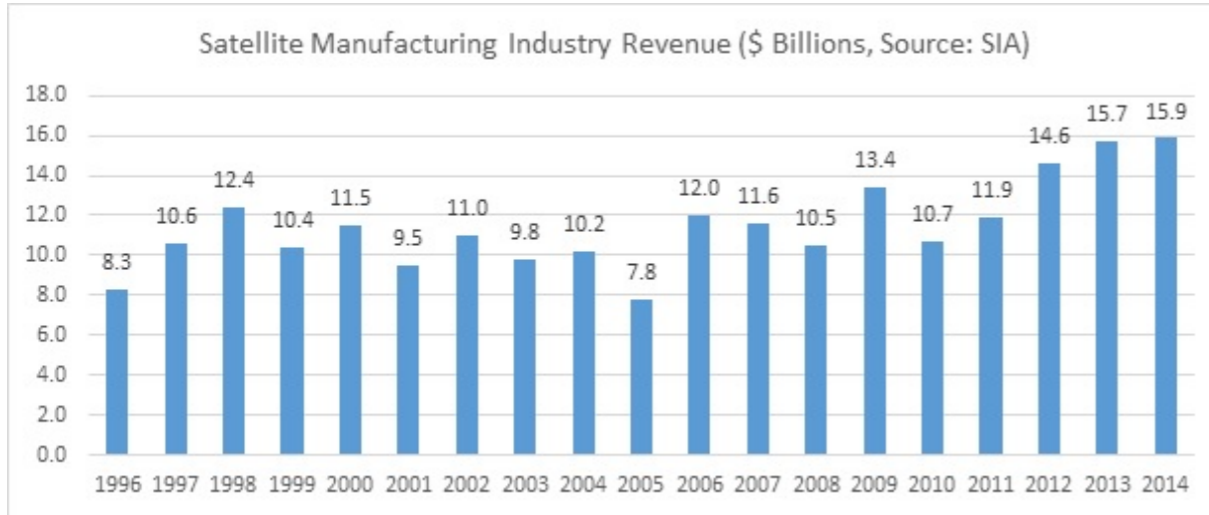
What is the future of European commercial spacecraft manufacturers and what steps should be considered in reaching that future?

## Overview of the Satellite Industry



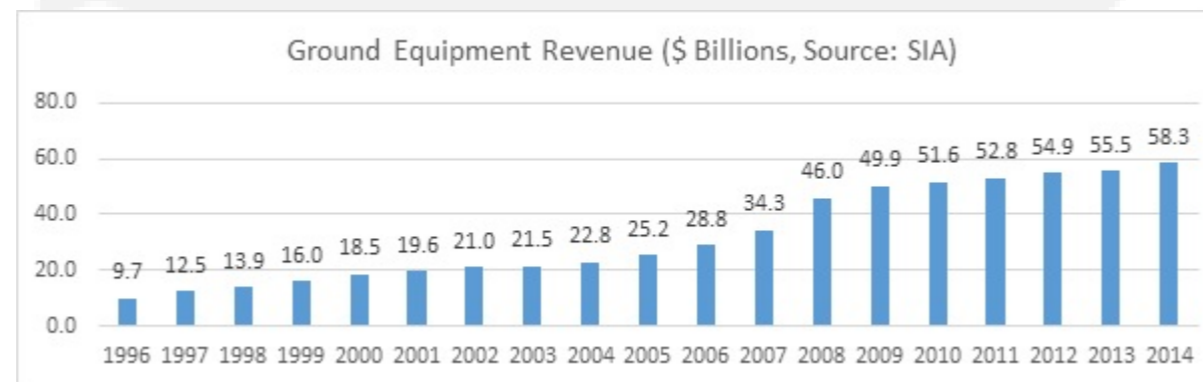
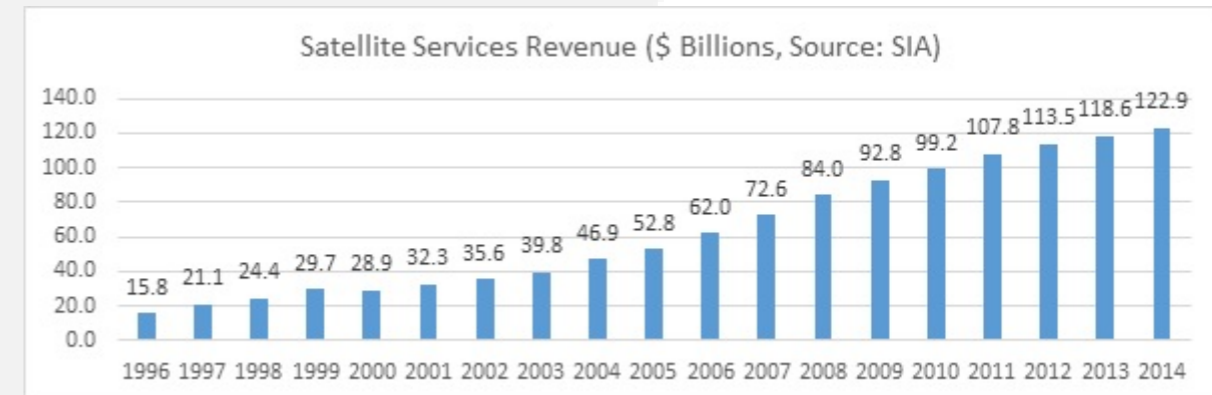
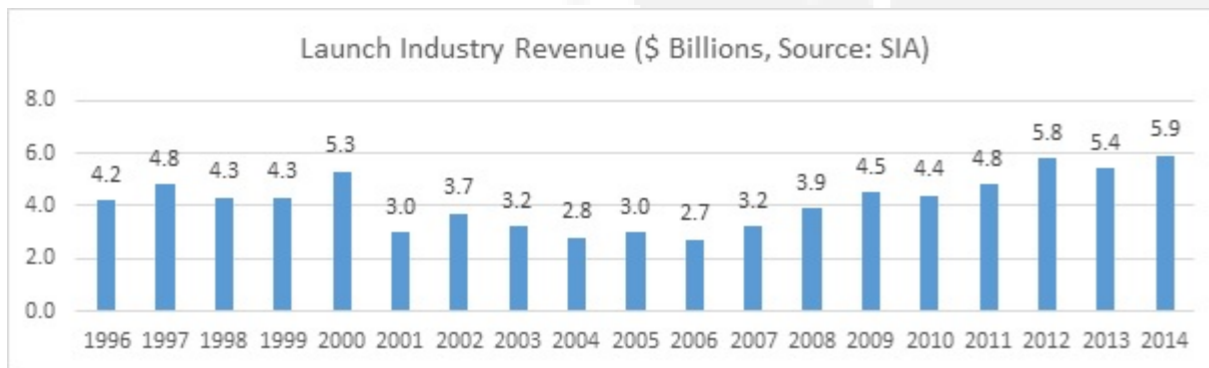
## Upstream and Downstream Segments

### Upstream Revenue



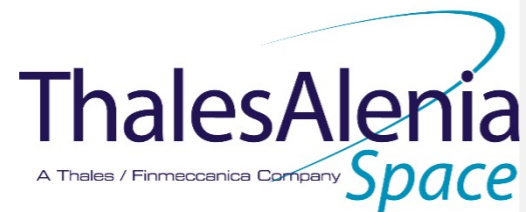
European Commercial Satellite Manufacturing Industry Revenue averages at around 48.8% of the total revenue generated over this period.

### Downstream Revenue



## Six Largest Prime Contractors

European



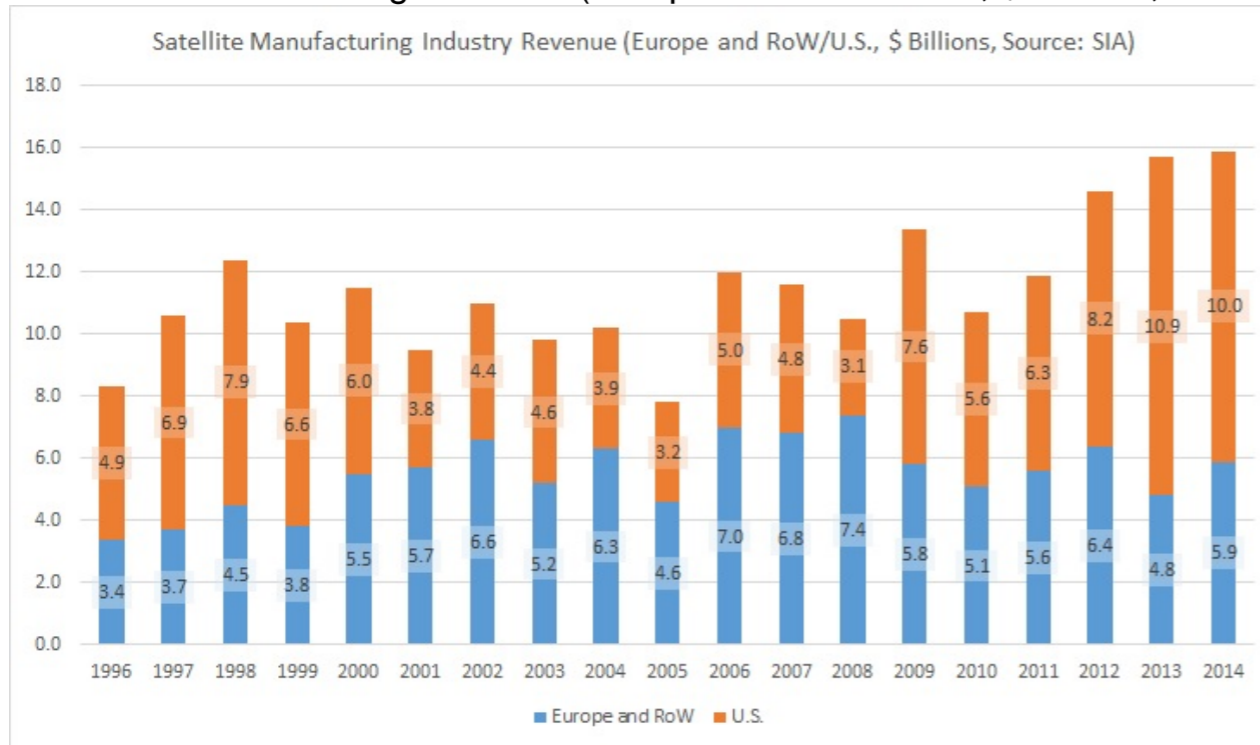
North American



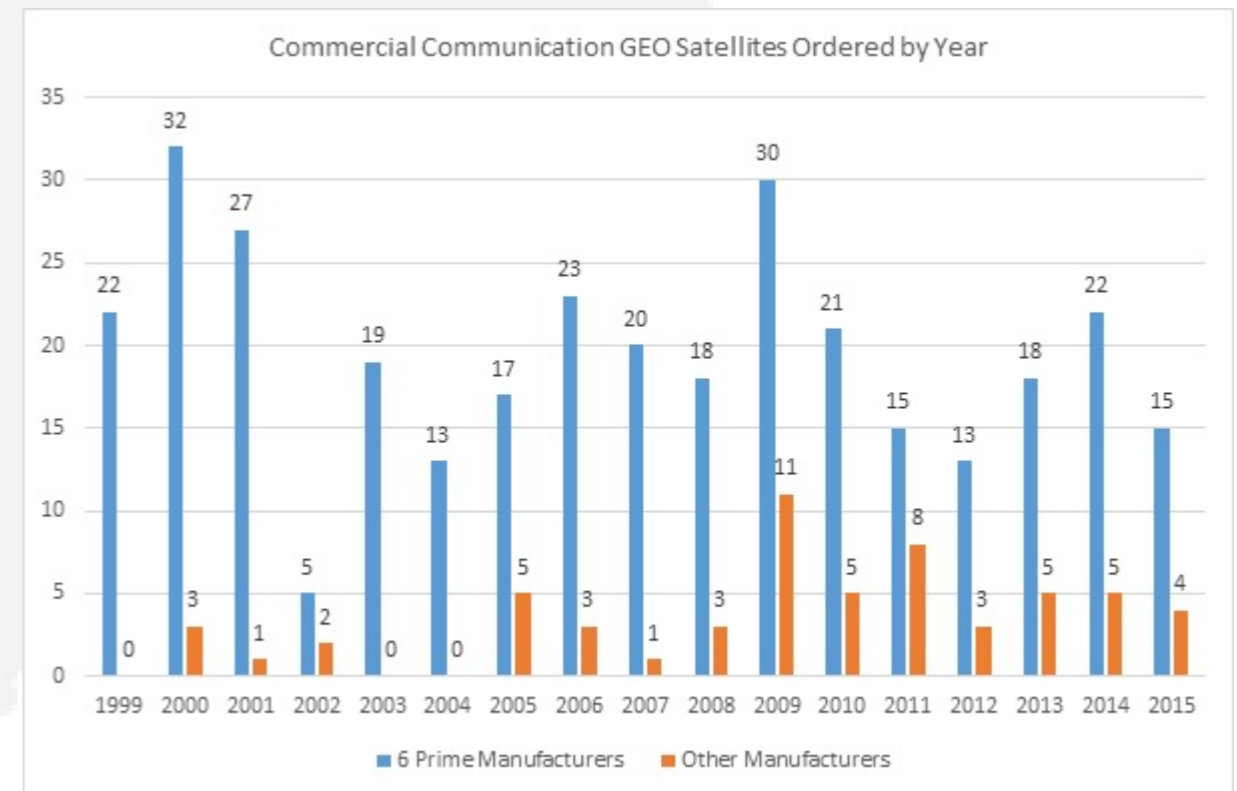
## Emerging Low-cost Prime Contractors in the Commercial Market



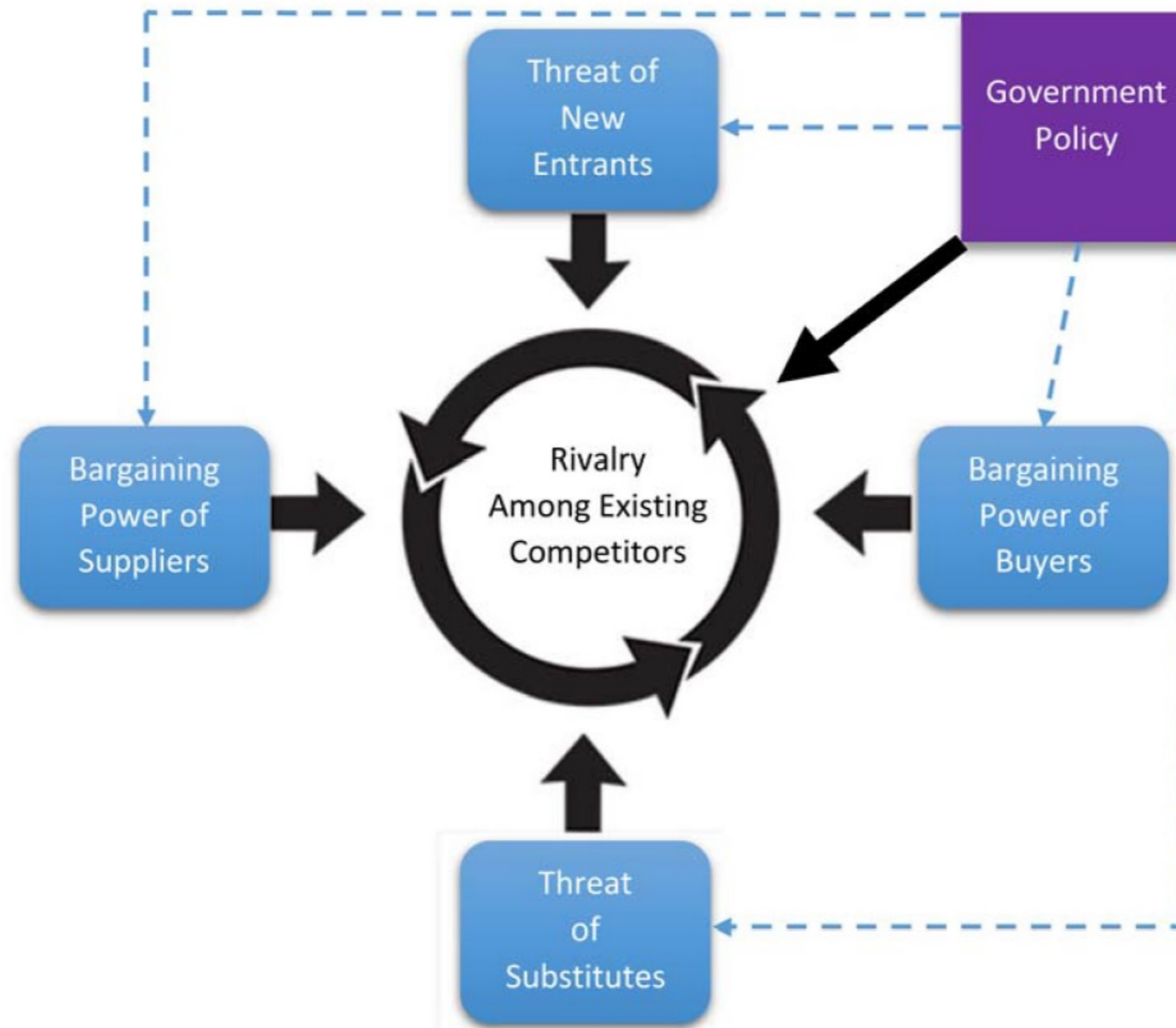
Satellite Manufacturing Revenue (Europe and RoW / U.S., \$ Billions, Source: SIA)



Commercial GEOCOM Satellites Ordered by Year



## Maintaining a Competitive Advantage



## Strengths

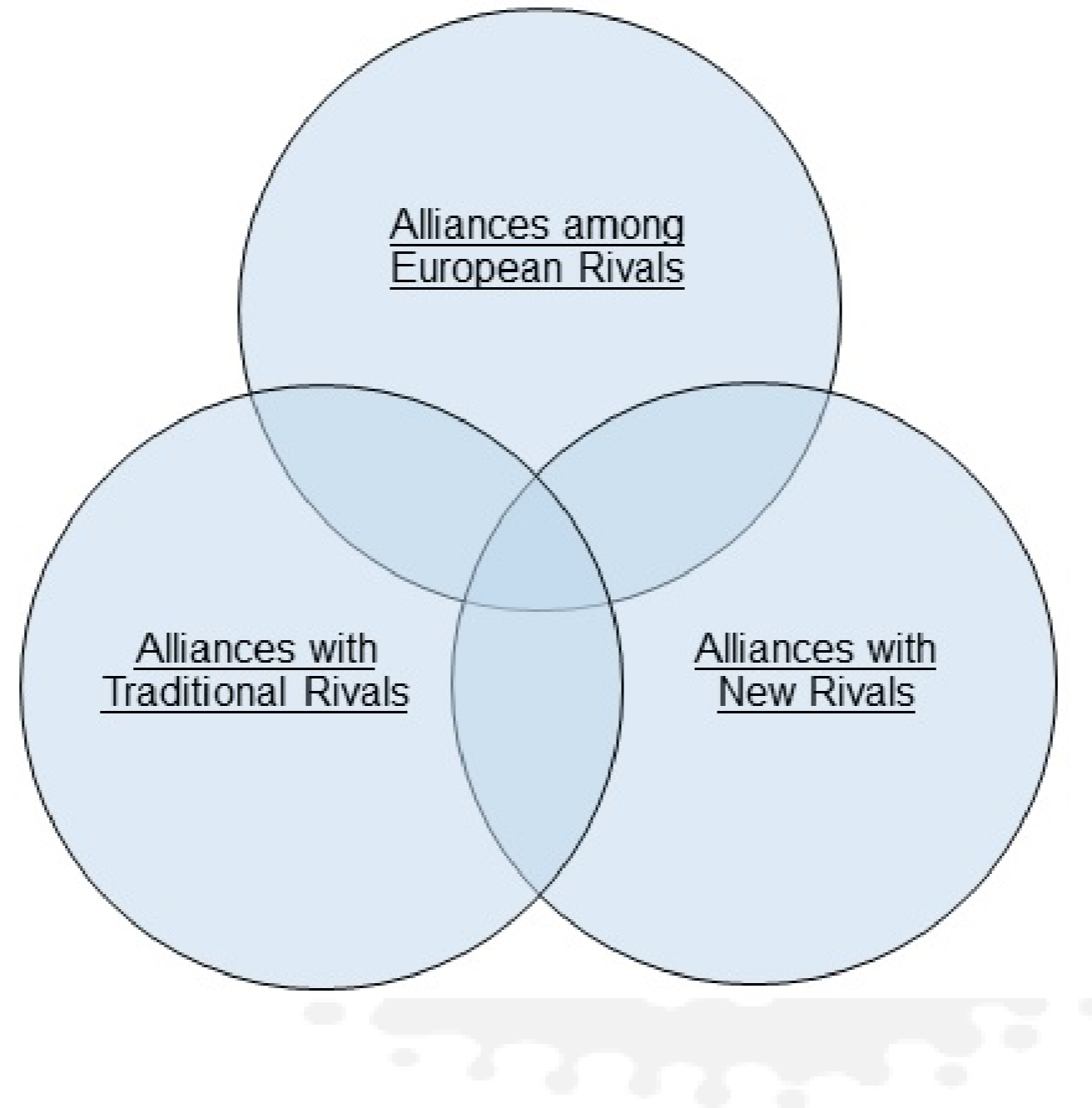
- Market leaders in commercial satellite manufacturing
- Long-established robustness of customer/provider relationships for some commercial space systems
- Substantial existing space infrastructure
- High-technological capability
- Wide assortment of proven differentiated technologies on the market
- Less restrictive European export regulations
- Highly skilled labour and access to low cost labour in Central and European Countries (CEE)
- Large industry labour force
- Strong interest and political support by European Member States for commercial market

## Weaknesses

- Limited resources which lead to a shared weakening of the industry (i.e. public funding available to support competitiveness must be spread between European competitors, which might be insufficient)
- Limited domestic markets
- Low profitability limiting the capacity of self-investment of companies
- High level of reliance on commercial markets
- Large dependency on U.S. components
- Potentially high labour wages
- General high cost of large satellites brought on by the low profitability and high risk of satellite industry, and the need for greater European willingness to support the export of satellites on a political level



## Risks and Opportunities for European Manufacturers



## Opportunities

- Growing international commercial markets
- New potential customers in emerging countries
- Access to non-European institutional markets through alliance building
- Enhance competitiveness by generating economies of scale
- Increase high technological capability and differentiated technology
- Enhance competitiveness by lowering labour costs through outsourcing or offshoring
- Circumvent/avoid potential export restrictions
- Small satellite constellations and the changing technological landscape

## Threats

- New commercial rivals China, India, and Russia
- Low-cost satellites
- Alliances among external rivals
- Unidirectional technology transfer
- Increased dependency on non-European sources
- Possible assembly-line production by current rivals in the U.S. for large satellites
- Unfair price competition through national subsidies and price dumping
- Uncertain export controls (Possible extraterritorial coercive measures on European industry)
- Rival low-cost small satellite constellations
- Strong relationships established by U.S. competitors increase difficulty in capturing new customers

## Tradeoffs on Alternative Options

### On Alliances

Commercial Factors	EU Rivals	Traditional Rivals	New Rivals
Develop Economies of Scale	✓	✓	✓
Reciprocal Technology Transfer	✓	✓	
Lower Labour Costs			✓
High Skilled Labour (Increased Productivity)	✓	✓	
Access to New Markets		✓	✓
Fewer Export Restrictions	✓		✓
Increased Differentiated Technologies	✓	✓	
Significantly Lower Cost Satellites			✓
Complementarity between International Strategies	✓	✓	
Enduring Benefit of Maintaining Alliance	✓	✓	
Similar Organizational Styles	✓		
	8	7	5

### On Outsourcing/Offshoring

Outsourcing/Offshoring	CEE Countries	Asia
Lower Cost Components	✓	✓
Component Reliability	✓	
Established Infrastructure		✓
Lower Labour Costs	✓	✓
Fewer Export Restrictions	✓	✓
Intellectual Property Protection	✓	
Reinforce the Europe's Industrial Base	✓	
Fewer Procurement and Geo-Return Requirements		✓
Technology Integrity (Cyber Security)	✓	
Enhance Europe's Non-Dependence Strategy	✓	✓
	8	6

## Recommendations For European Competitors

### On Alliance Building

- decide whether to form alliances to reap benefits from respective economies of scale, technology transfer, the spreading of risk among partners, and shaping the nature of competition in the industry.
- consider forming limited alliances with European competitors to collectively enhance European bargaining power, enable specialization and standardized manufacturing processes, and reduce geo-return requirement interference with competition
- monitor when an alliance arrangement becomes competitively disadvantageous, i.e. when the costs disproportionately offset the benefits of the alliance.
- aim to maintain an entire vertical supply chain within Europe, to ensure that external alliance investments can be reversed.

### On Outsourcing/Offshoring Subsystems, Equipment, and Components to Low-cost Manufacturers

- place focus on the more critical European capabilities, by outsourcing/offshoring non-essential technologies CEE countries ( to maintain the European industrial base), or to low cost non-European countries (which will provide more immediate factor cost advantages)
- Note: outsourcing/offshoring development of non-essential technologies to CEE countries, in addition to offering low-cost labour and retaining technological knowhow, would also have significant political support from European countries.
- Note: outsourcing/offshoring production will not eliminate Europe's dependence on foreign suppliers and locations, and this could be critical, unless multiple sourcing strategies are pursued.

### On Unrestricted Access to State of Art Technologies for European Manufacturers in all Manufacturing Domains

- continue to indigenously develop key EEE components under the ECI, along with ESA's ARTES programme and the EU's Horizon 2020 space research and development programme.
- expect to sacrifice some short-term returns of today for larger payoffs in the future.
- seek to acquire technology from other leading competitors, and hire highly skilled labour trained outside of Europe to develop new synergies.
- more institutional spending is needed to lower costs and bring Europe's industry closer to an equal footing with U.S. and low-cost competitors.
- seek to adopt a similar approach when marketing satellites to emerging countries.



Thank You

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'The Future of European Commercial Spacecraft Manufacturing' on ESPI's website at <http://www.espi.or.at/>

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