

DLR-ESA Workshop on ARTES 11

Small GEO Market Analysis

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Market Analysis

The market analysis leveraged a broad set of sources to develop an independent perspective on the small GEO market

Goals of Market Analysis Phase

- Develop a more detailed understanding of the GEO market
 - Customers and requirements
 - Competition and industry trends
- Specify own market forecast
- Derive recommendations for
 - Business Model
 - Marketing approach
- Provide basis for business case

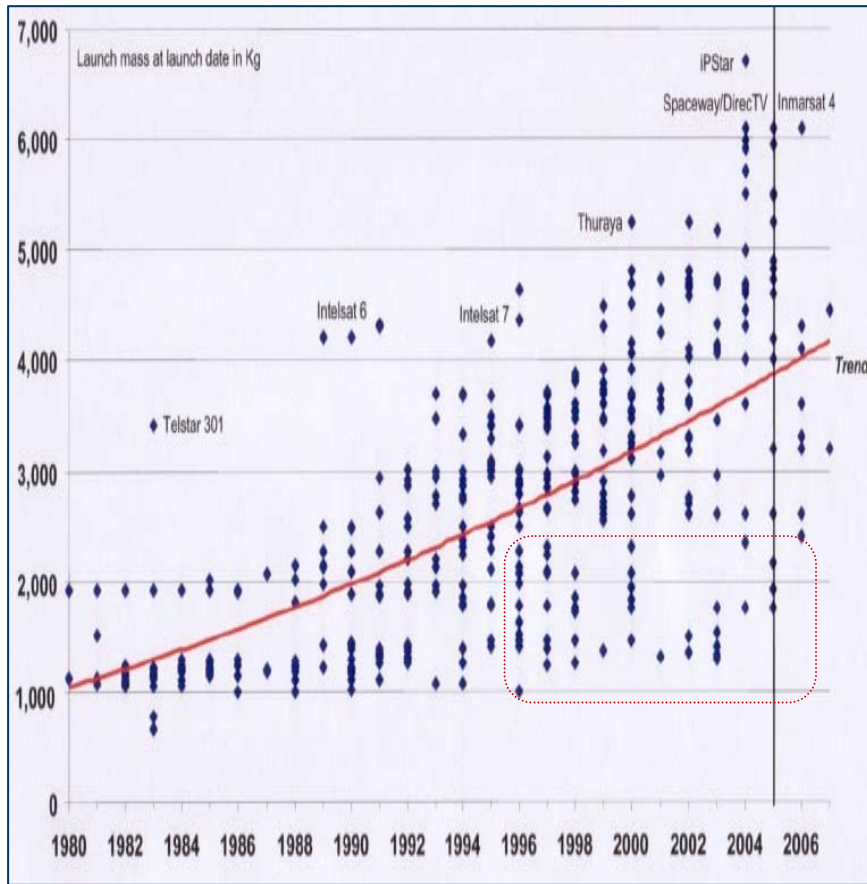
Approach

- In depth desktop research
 - Analyst reports and GEO market studies
 - Forecasts on satellite based services
 - Broker reports and company information
- Selective market interview
 - Representatives of satellite operators
 - Industry experts
- Baseline of commercial GEO Satellites
- Global Booz Allen Hamilton expert network

Market Analysis

The range of GEO satellite launch masses has increased over the last 25 years, promoting the development of 3 distinct platform categories

GEO Satellite Launch Mass Development



Platform Categories

Geo Satellites	Small		Medium		Large	
	typical	range	typical	range	typical	range
Launch Mass [kg]	2000	1k-2,5k	4000	2k - 5k	6000	4k - 8k
Payload Mass [kg]	300	100 - 500	650	300 - 800	1050	600 - 1200
Power [kW]	4	< 6	8	5 - 12	16	> 10
# of Transponders	24	10 - 48	50	28 - 72	80	48 - 100+
	<ul style="list-style-type: none"> ■ Orbital SC Star1 & Star 2 ■ Boeing BSS-376 ■ Yamal (2) ■ Insat-2k ■ DFH-3 ■ Alcatel Spacebus 2000 ■ EADS Eurostar 2000 ■ Amos 		<ul style="list-style-type: none"> ■ Boeing HS-601 ■ Insat-3k ■ EADS Eurostar 2k & 3k ■ Lockheed Martin A2100 ■ Alcatel Spacebus 3000 ■ SS/Loral LS 1300 ■ CAST DFH-4 		<ul style="list-style-type: none"> ■ EADS/Alcatel Alphabus ■ Boeing HS-702 ■ Alcatel Spacebus 4000 ■ SS/Loral LS 1300S 	

Market Analysis

The market analysis confirmed the advantages of small GEOs and with this also the sustainability of this market segment

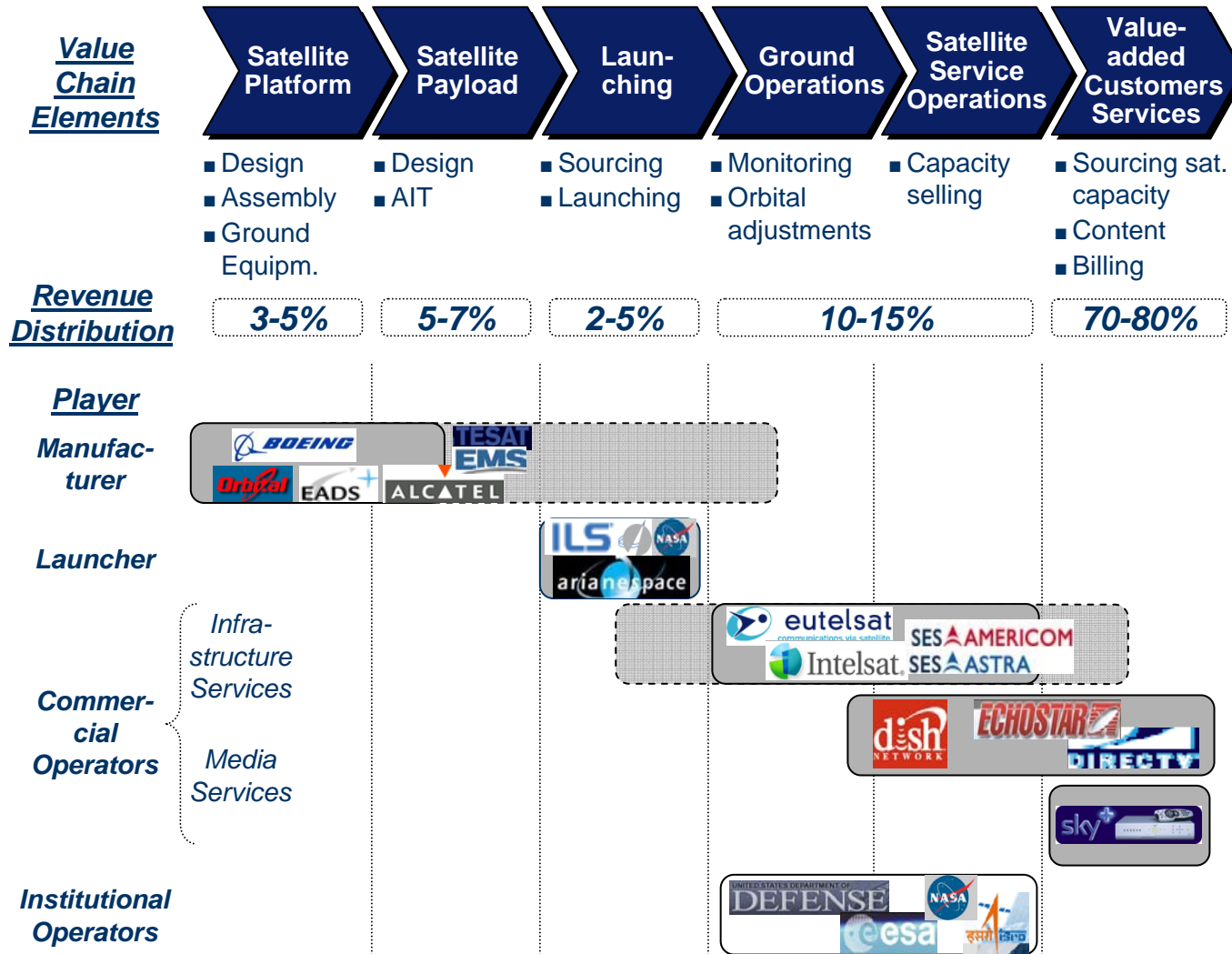
Advantages of small GEOs



Market Analysis

Looking at the satellite industry value chain indicates that small GEO manufacturers need to flexibly adapt their offering to customer requirements

Satellite Industry Value Chain



Required Flexibility

- Main revenues generated by consumer focused businesses
- Role of players not static - requiring increasing flexibility of all players
- Platform manufacturing captures only 40% of overall satellite value
- Consequently, role of mission prime required to
 - Capture a sustainable revenue share
 - Have the skills to offer required flexibility

Market Analysis

Commercial operators are the most suitable target segment for a new small GEO player due to size and accessibility

Criteria	Assessment of Commercial Segment
Market Accessibility	<ul style="list-style-type: none">■ Buying decisions primarily based on economic criteria,■ Not politically or regionally influenced decisions
Economic Risk	<ul style="list-style-type: none">■ Mainly economically powerful customers■ However, start-up companies with reduced economic strength
Market Size	<ul style="list-style-type: none">■ 4 to 7 small GEOs accessible to European manufacturer■ Only 1 to 3 GEOs accessible in institutional market
Scalability/ Standardization	<ul style="list-style-type: none">■ High, with commercial demand supporting flexible but standardized platform solution
Opportunity for Segment Extension	<ul style="list-style-type: none">■ Successful commercial platform can be marketed for institutional use■ Institutional missions can provide heritage only for components

Market Analysis

Despite the consolidation of operators, the commercial market will continue demanding small GEO platforms

Small GEO Share of large and small Commercial Operators (Status 2005)

Satellite Operator	Market Share	# of GEOs	Small GEOs
Intelsat (US) & PanAmSat (US)	27%	60	12%
SES Global (LUX) & New Skies (NL)	25%	42	29%
Eutelsat (FRA)	13%	21	26%
Inmarsat (UK)	5%	12	75%
Total	70%	135	25%

Rationale for small GEOs

- Quick reaction to market needs
- Short-term replacement (malfunctions)
- Careful testing of new markets

Satellite Operator	# of GEOs	Small GEOs	Satellite Operator	# of GEOs	Small GEOs
Russian Satellite Communication Co	11	71%	B-Sat (JP)	6	100%
JSAT Corp (Japan)	9	12%	APT Satellite Holdings (HK)	5	40%
EchoStar (US)	9	0%	Space Communications (RU)	5	0%
Telesat (CND)	6	0%	Optus / Singtel (AUS)	5	60%

- Capacity of larger satellite not required
- Minimization of financial and operational risk
- Tailored to individual business
- Avoidance of hybrid solutions

Market Analysis

Competition in the small GEO market segment is dominated by market leader Orbital but will be effected by new entrants in the near future

Small GEO Manufacturer Comparison

Criteria	Orbital Science: Star Bus (USA)	SSL & Energiya: Yamal	Astrium & ISRO: Insat-2k	CAST (Alcatel): DFH-3
Launch Mass	up to 2500 kg	1360 kg (in orbit)	1950 kg	2200 kg
Payload Mass	up to 500 kg	250 kg – 300 kg	270 kg	170 kg
Payload Power	up to 5.0 kW	Up to 2.2 kW	1.64 kW	N/A
Station Keeping	Chemical	Electrical	Chemical	Chemical
Launch Scenario	GTO injection	Direct injection	GTO injection	GTO injection
GEO transfer	Integrated apogee motor	By launcher	Integrated apogee motor	Integrated apogee motor

Technical benchmark

- Market leader
- Flexible as key offering
 - Technical design
 - Business model
- Delivery speed

Cost Benchmark

- New entrants as potential price leader
- Competitive price required (Design-to-cost)
- Proof for increasing intercontinental cooperation and competition

Demand and supply side trends in the GEO market require a leading edge and modular technical layout

Commercial Operators' Requirements for small GEOs

Demand Side Requirements

- Purchasing decisions very project-specific
- Key requirements prioritized accordingly
 - Design flexibility
 - Reliability
 - Cost effectiveness
 - Delivery speed and schedule confidence
 - Business model flexibility

Supply Side Trends

- New technologies increase flexibility
 - Increasing of launch masses per platform
 - Electric propulsion
 - Direct Injection
 - Flexibility of payloads
- Intercontinental co-operations of platform and payload vendors

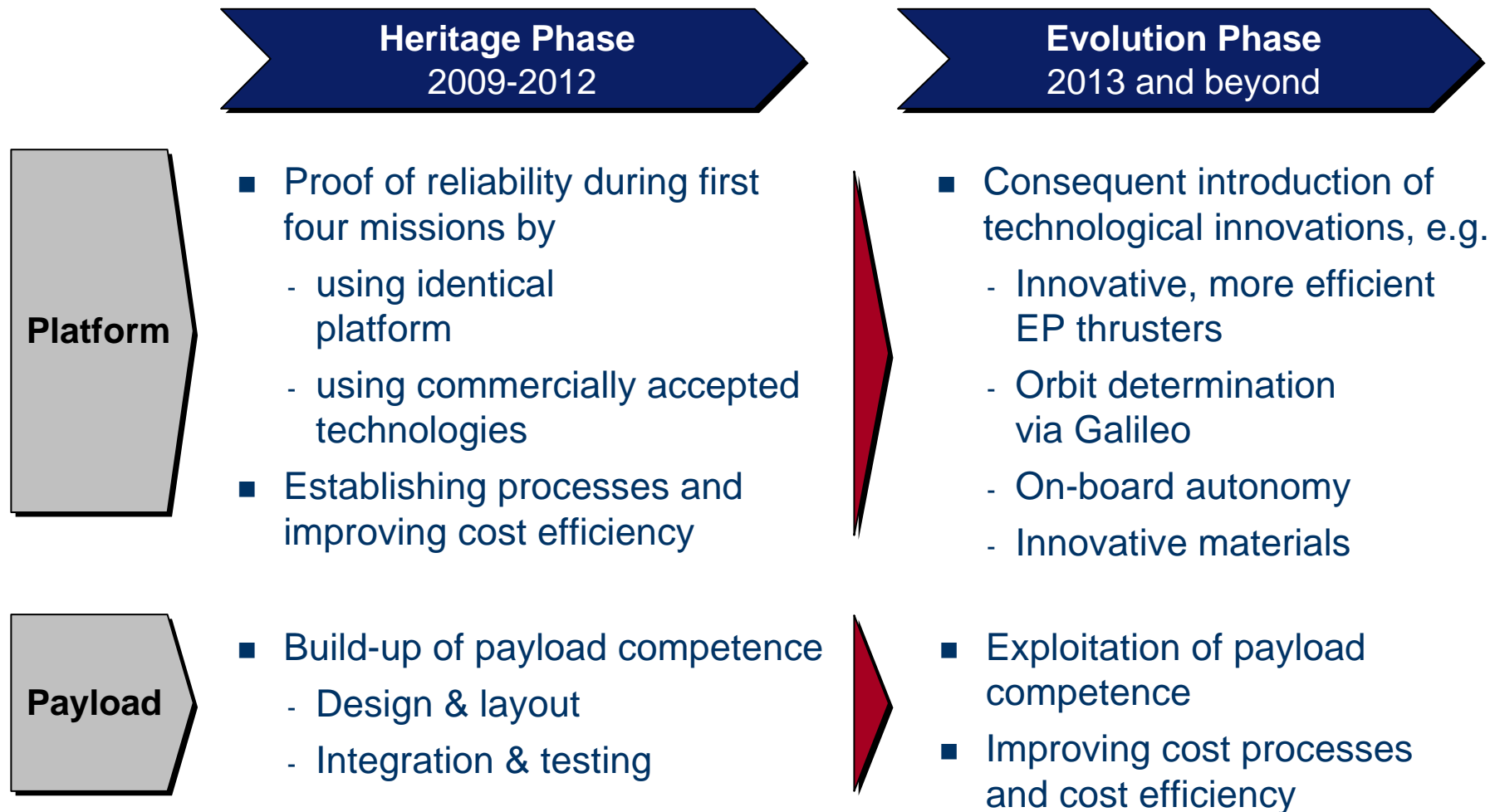
Satellite platform needs to:

- Be highly modular to accommodate:
 - Varying types of payload
 - Cooperation partners
 - Varying technologies
- Apply new technologies for excellent payload-to-mass ratio to
 - handle heavier payloads
 - provide launcher flexibility
 - maintain benefits of small GEO platform

Market Analysis

However, a phased introduction of innovative technologies is advisable to meet the requirements of the commercial market

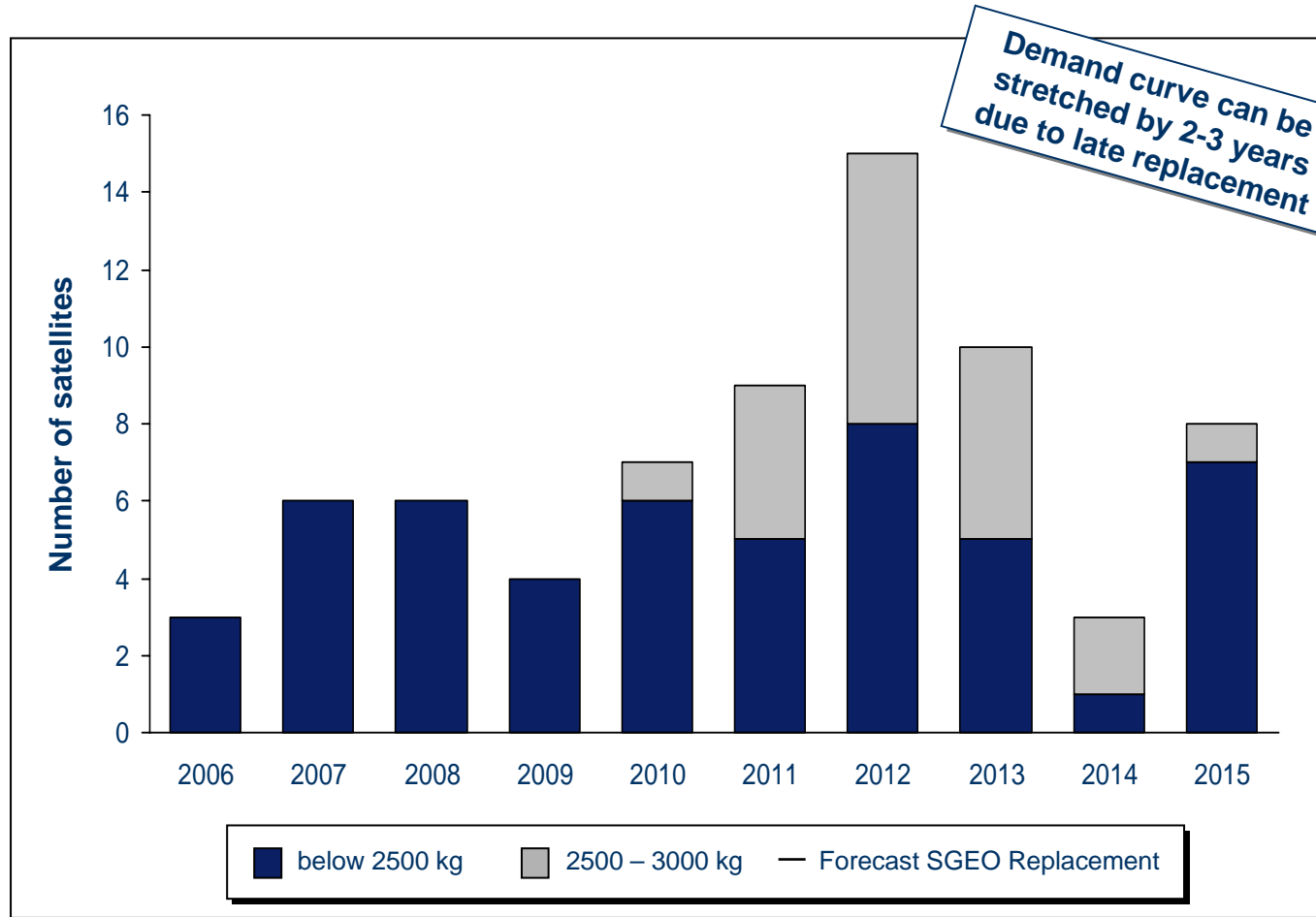
Technology Introduction



Market Analysis

The majority of small GEOs to be launched within the next 10 years will originate from replacement weave demand peaking around 2012 ...

Commercial Demand for Small GEOs – Replacement



- Average small GEO replacement demand estimated at 4-5
- Existing satellites at 2500-3000 kg partly addressable, due to technological progress
- Replacement weave around 2012/ 2013 - offering most promising market entry opportunity

Market Analysis

... considering additional future transponder demand we see a realistic forecast of 7 small GEOs accessible to a European manufacturer p.a.

Commercial Demand for Small GEOs – NEW

	Voice & data Communication	Internet/ IP Communication	Video Broadcasting	Video Contribution
North America	–	++	+	–
Latin America	+	++	+	+
Europe	–	+	+	–
Middle East & Africa	+	+	+	+
Southern Asia	–	+	+	+
Asia Pacific	–	++	++	+

Source: Booz Allen Hamilton analysis, Euroconsult 2004, Frost & Sullivan 2005

- Transponder capacity growth mainly driven by
 - IP communication in America and Asia Pacific
 - Video Broadcasting in Asia Pacific
- Assuming constant market share of platform types
1-2 additional small GEOs per year will be launched

Small GEO demand p.a.	Scenarios		
	Low	Base	High
Commercial market	4	5	7
Institutional market	1	2	3
Total market	5	7	10

Market Analysis

Based on the market forecast a first customer segmentation and prioritization could be derived

Top-level Customer Segments

- Large Commercial Operators**
 - Short recurring time important
 - Design flexibility required
 - Global coverage but regional management structures
- Small Commercial Operators**
 - Likely to need support: financing, operations, design requirements,...
 - Regional focus of operations
- European Institutional Customers**
 - Support of local industry for non ESA missions requires cooperation
 - Support use of new technologies
- Non-European Institutional Customers**
 - Cooperation with local industry required to access markets (e.g. US)
 - ITAR free potentially required
 - Strong support for emerging countries

Customer Prioritization

Activity based

- Operator working in growth regions or offering growth services
 - IP communication in America and Asia Pacific:
PamAmSat, Eutelsat, Telesat, Loral
 - Video Broadcasting in Asia Pacific:
B-Sat, APT, Asiasat, Korea Telecom,...

Replacement need based

- One-to-one replacement for small GEOs in 2009 to 2012:
 - *Eutelsat:* 5 units
 - *Inmarsat:* 5 units
 - *SES Americom:* 3 units

Market Analysis

Summarizing, the small GEO market is an attractive opportunity for an European manufacturer but requiring a swift and decisive move

Key Findings

- **Market demand for small GEO satellites is sustainable**
- **Commercial operator segment is most attractive for a new market entrant**
- **Addressable market for European manufacturer is on average 7 small GEOs**
- **Replacement wave in 2012/13 offers favourable conditions for market entry**
- **To be successful, small GEO manufacturer needs to be flexible with respect to**
 - **Product design (modularity) and features**
 - **Business model and ability to cooperate**