

***Opportunities in Earth Observation Satellite Services:
Lessons of the Past for the Future***

Industry Symposium

49th Scientific & Technical Subcommittee COPUOS

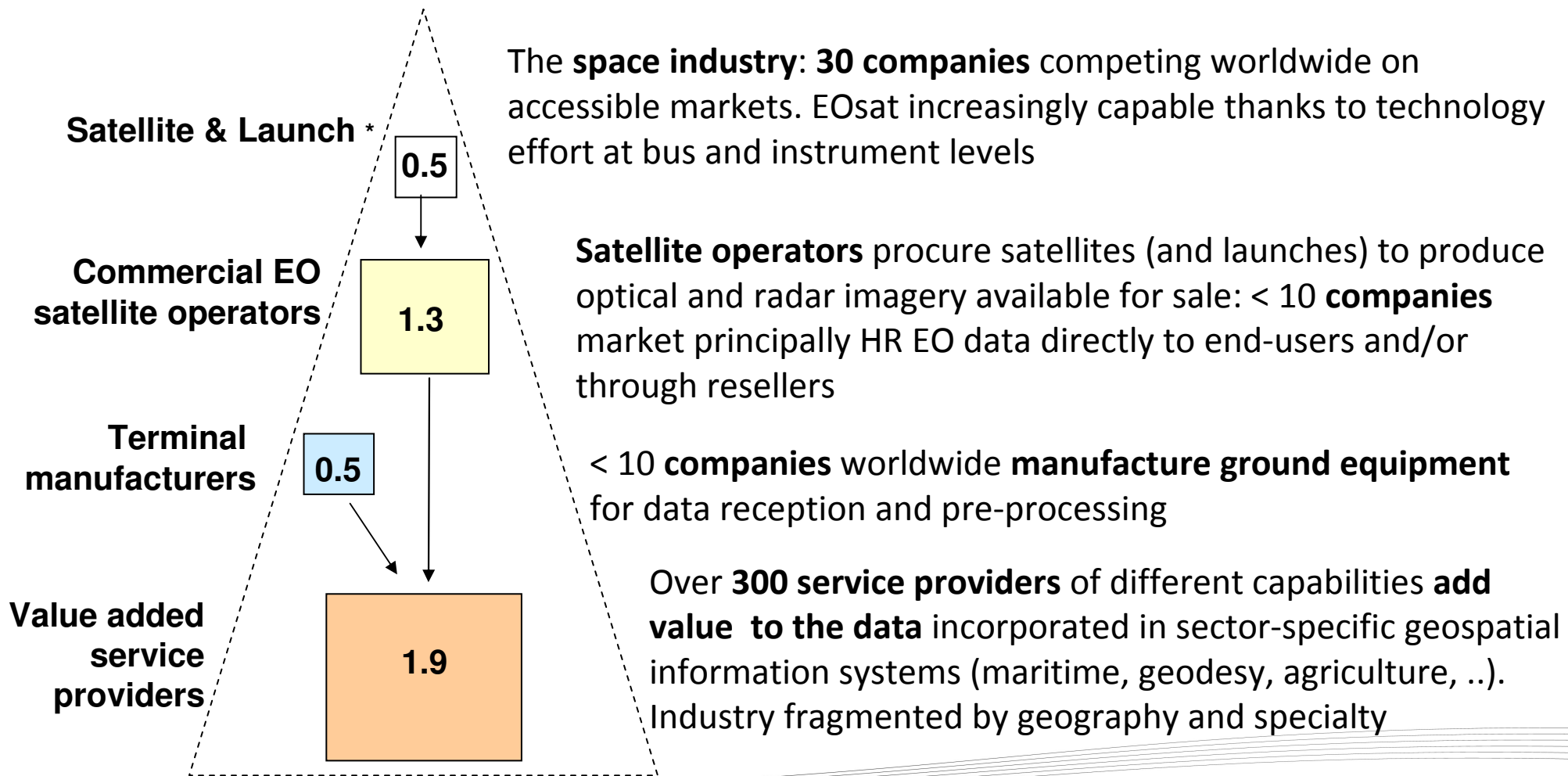
OSSA, Vienna, February 13, 2012



The value chain in commercial satellite Earth observation

EO is commercial mostly for data sales driven by government needs (defense & security) for HR imagery. Upstream & downstream also dominated by government demand

Service market at 1.5 time the data market (x 7.5 in comsat but not the same economic logic)



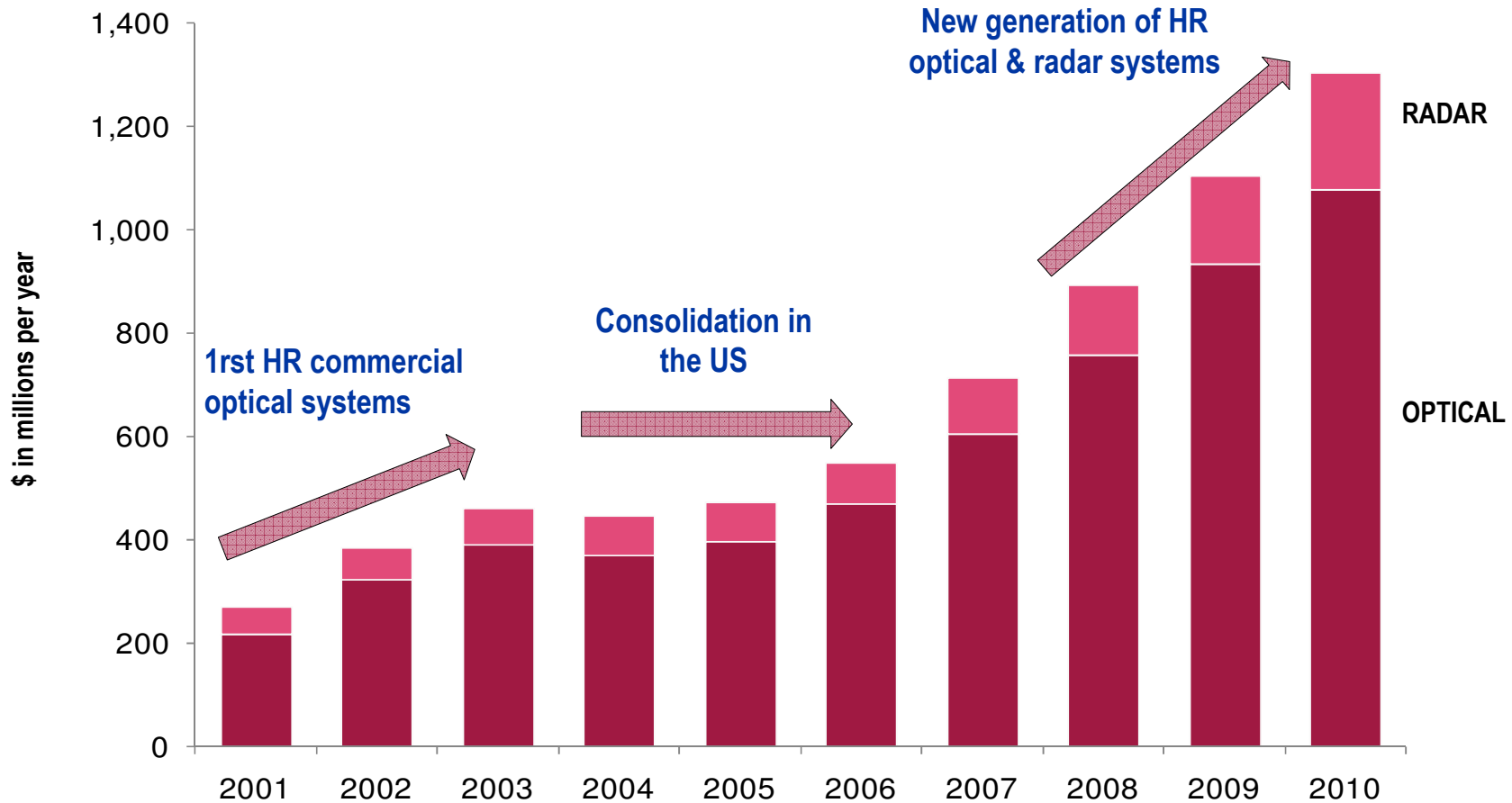
*excluding government-funded satellites

Satellite role for geo-information based decision-making

- **\$1.3 billion after 10 years of data sales**, the result of more capable satellites, better ground systems & networks and more users' education & incentive
- **Defense & Security dominates in data sale** (66%) while enterprise applications (6 domains for civilian governments, including research, and the private sector) larger in data volume
- **Satellites become more specialized** for both science/research & operational purposes (maritime, oceanography,...)

	Defense & Security	Environment monitoring	Energy	Natural resources monitoring	Maritime	Disaster management	Location-based services
Optical data needs	HR data	Instruments diversity for atmospheric study, land-sea interact, ozone...	HR (infrastructure, logistics) & MR (geological maps)	MR (20-30m) in IR for wide agriculture; HR in precision agri. & forest	MR/LR for algae. Fisheries & costal zones	HR for logistics and crisis mapping	HR high accuracy
Radar data needs	HR data with night imaging and no cloud	Ocean currents model, tidal info from MR	HR/MR (offshore seepage) + optical for geology maps. InSAR for subsidence	Surface texture/water content for land (geology, agriculture)	HR/MR for sea ice. HR for ship track, transport	HR in flood mapping	Few needs
Revisit needs	Max. for 1m is 1 day	Depend on scope of the study, incl. real time meteo, archive & continuity	Recent & NRT. Archive good for geological map	Low for monitoring (agriculture, forest)	Low for ship track	HR for responsiveness (before & after mapping)	Recent archive for most of needs
Data sources	Proprietary systems + HR commercial	Scientific + low cost MR	Low cost MR/HR + HR commercial	Low cost MR + HR	Low cost MR + HR commercial	HR commercial + Charter on Space	HR commercial

Growth in commercial EO data sales



- Operators consolidation in the US and in Europe in 2006 and 2010 and new data producers
- Strong sale growth in the past 4 years driven by government demand, especially the US
- Growth supported by a growing supply of HR optical and radar imagery
- Growing number of companies looking to tap into the commercial data market

EOSat demand dynamics by client

All types of missions considered (excepted blacklisted), the number of EOSat should double in the decade at 300 units

Over 2/3 of future EOSat demand will remain concentrated in the top 6 space powers (USA, Russia, Europe, China, Japan, and India)

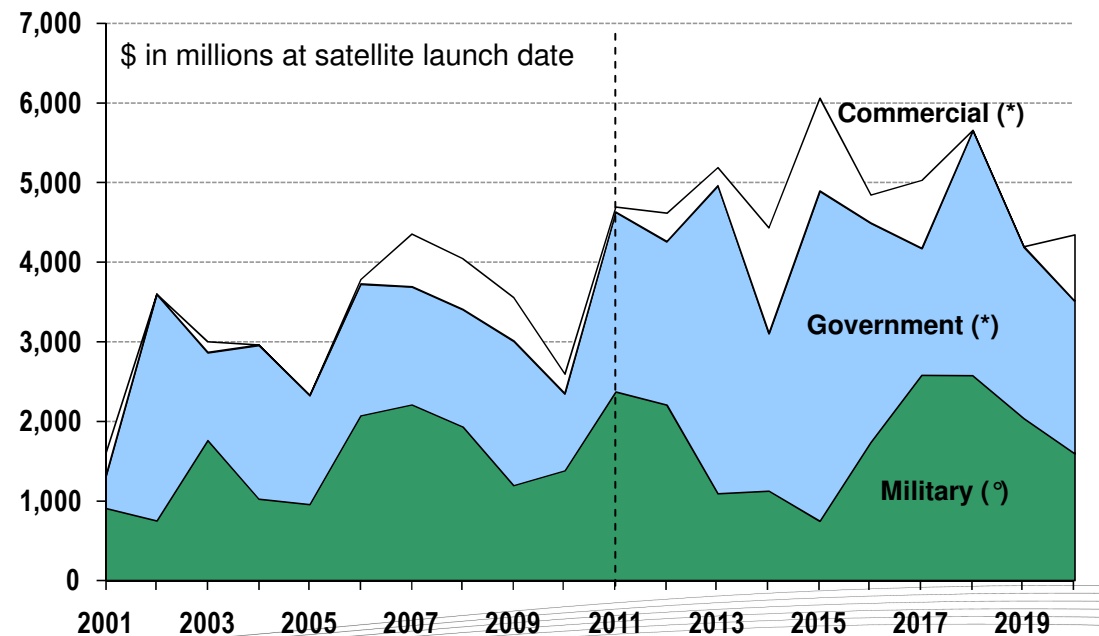
Still about 100 satellites of different capabilities in countries with no space industry, opening export opportunities for satellite manufacturers and instrument suppliers

Future EOSat demand continues to be dominated by governments that represent 90% of the expected industry revenues of \$50 billion over the decade

# of satellites	2001-2010	2011-2020
Commercial *	15	40
Government*	85	195
Military ^o	50	70
Total	150	305

(*) including multiple satellite constellations

(^o) excluding blacklisted satellites





Different demand drivers for optical and radar observations

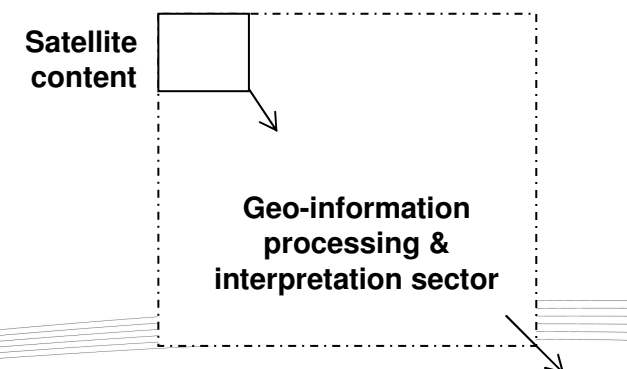
- Emerging EOSat countries have the objective of acquiring satellite technical know-how domestically & autonomous observation capability
- Satellites of newcomer countries are not equal in terms of performance as operational needs are not the same: only one submetric to date (Gokturk)
- Imagery of national systems (e.g. India, China, Brazil) provided to other countries commercially or in-kind

	Thailand	Chile	UAE	Algeria	Vietnam	Nigeria	Kazakstan	Turkey
Satellite in-orbit	Theos	SSOT	Dubaisat	Alsat-2a		NigeriaSat-2 NigeriaSat-X		
Satellite TBL				Alsat-2b	VNREDSat-1a VNREDSat-1b		HRES MRES	Göktürk-1
Client	GISTDA	Chilean AF	EIAST	ASAL	NRSC	NASRDA	Kazcosmos	Turkish AF

- HR radar imagery recently available commercially from 2 European-financed systems to complement pioneer Radarsat: allow applications development and demonstration of operational systems

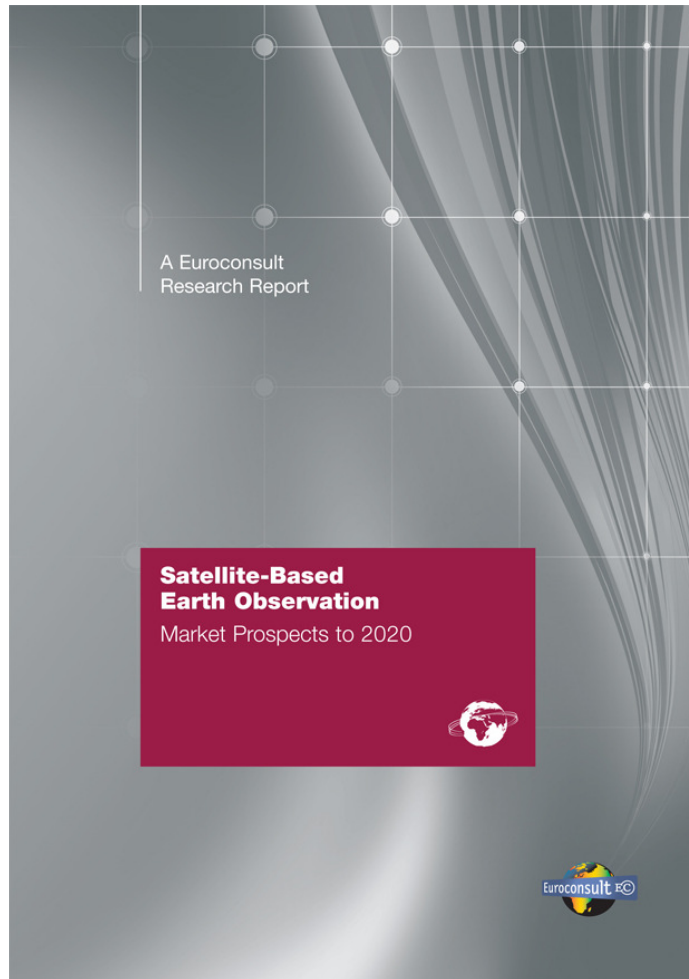
	Cosmo-SkyMed	Radarsat	TerraSAR/TanDEM-X
Financing	Government funded (Italy)	Government funded (Canada)	PPP with Astrium (Germany)
System	4 X-band satellites	1 C-band satellite	2 X-band satellites (in tandem)
Distributor	e-GEOS (Telespazio + ASI)	MDA Geospatial Service	Astrium Services
GSD	1m	10m & 3m	1m

- **The commercial provision of value-added services associated to EOsat data has not experienced the same growth as data sales**
 - Outsourcing of value-added services by governments remain constrained by operational conditions
 - Service companies are cost sensitive, lower cost data solutions preferred where available
 - Accessibility to commercial data is an issue in case of preferred clients for the data producers
- **But the service sector is stimulated by the economic and policy changes impacting the value chain**
 - Emergence of regional one stop geo-information solution providers
 - Growth in low-cost/free operational data
 - Mechanisms for services development such as GMES
 - Service providers with better access to local markets





Thank you



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Data source:
« Satellite-based Earth observation » report
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