Space sector

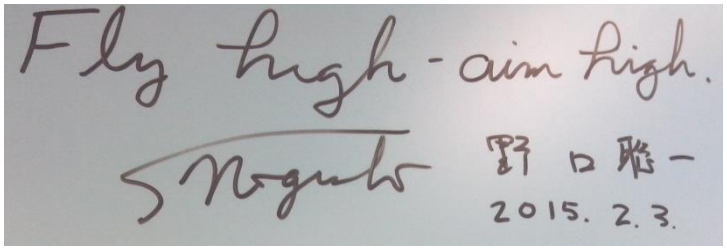
EU-Japan Business and Technology Cooperation Potential

Tokyo 2015

V. La Regina

Aim of the research

- Provision of a comprehensive overview of the European and Japanese Space ecosystems (*e. g.* policies, stakeholders, programs and technologies)
- Assessment of the willingness to cooperate between EU and Japan
- Identification of the technological fields for engaging further industrial cooperation between EU and Japan



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Outline of the report

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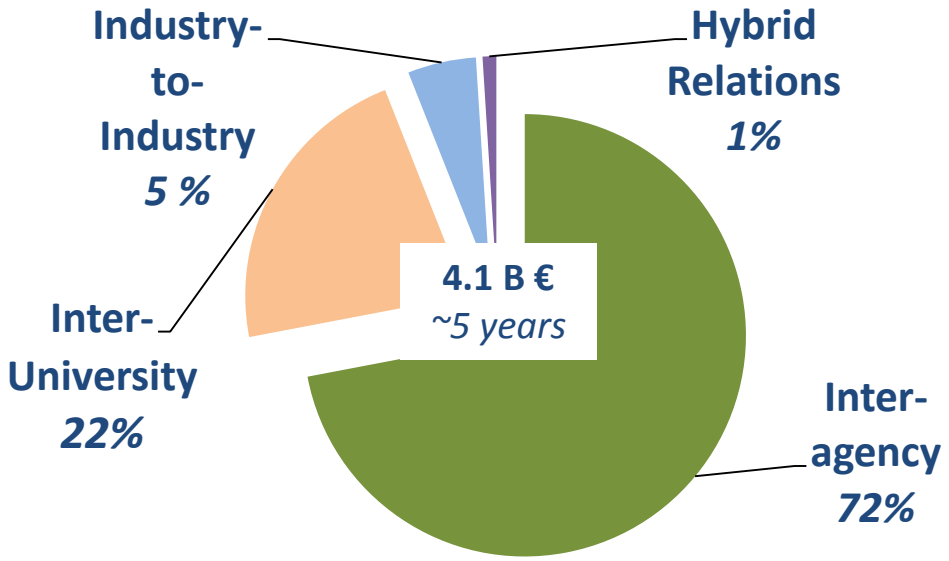
The *status quo*

- Relations between the EU and Japan are primarily at a bilateral levels and take a variety of different shapes, from government-to-government, to inter-agency, inter-university, industry-to-industry and hybrid relations



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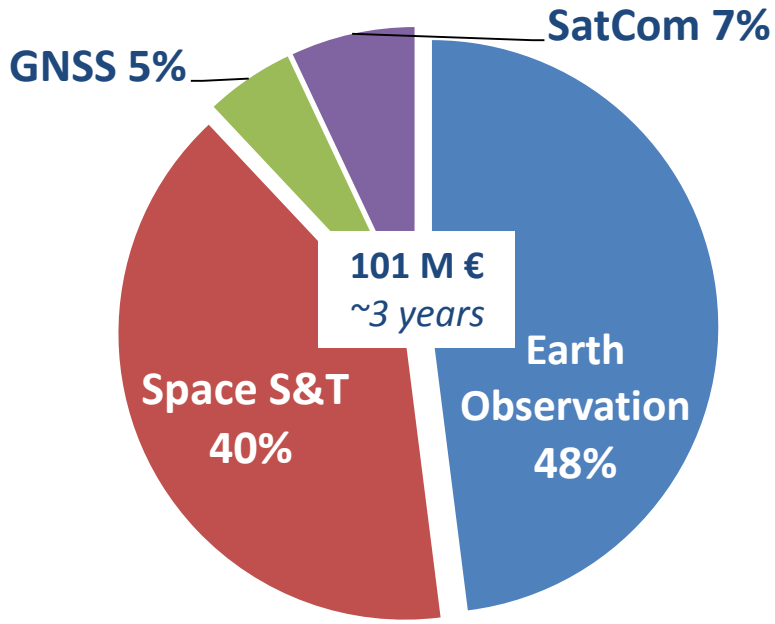
The *status quo*

- Aside from the bilateral relations, the multi-lateral relationships are through the European R&D funds. The former FP7 and currently Horizon 2020 have played a role in the relationship between Europe and Japan



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The comparison between EU and JP: space policies

- **EU Space Policy Approach**

- The EU space industrial policy aims to 5 objectives:

1. *Coherent and stable regulatory framework*
2. *Competitive, solid, efficient and balanced industrial base in Europe and support SME participation;*
3. *Global competitiveness of the EU space industry by encouraging the sector to become more cost-efficient along the value chain;*
4. *Development of markets for space applications and services;*
5. *Technological non-dependence and an independent access to space*

- **Japanese Space Policy**

- The Japanese Space Policy goals are:

1. *Ensuring national security*
   a. *Stable use of outer space*
   b. *Security capabilities using Space*
   c. *Japan-US alliance*
2. *Promoting use of space in civil area*
   a. *Utilization of space for global challenges*
   b. *Creation of new industries*
3. *Maintaining and stretching industrial and Science & technological basis*
   a. *Maintaining and strengthening space industrial basis*
   b. *Maintaining and strengthening science and technology basis for outcomes*

➢ *Build organic cycles among Science and Technology, Security and Industrial Promotion*

Sources: Japanese Basic Plan on Space Policy , 2015; EC, Communication on the EU Space Industrial Policy: Releasing the Potential for Growth in the Space Sector, 2013

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The comparison between EU and JP: space policies

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The comparison between EU and JP: space policies

- The overall budget of Europe for Space presents following breakdown:

Source of budget	2015 [Million €]	Note
EU	1.030,5	73% to ESA
ESA	3.241,1	Only ESA
EUMETSAT	343,9	23% to ESA
EDA	30	
Member States	2.200	Only National Programs
Total	**6.845,5**	

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The comparison between EU and JP: space policies

Level of deploying	Access to Space	SatCom	SatEO	SatNav	Space Situational Awareness	ELINT and Early Warming	Space Exploration (Human and Unhuman-)
National Programs (Member States)	National development of launching capabilities	Skyent 5 (UK) Satcom Bw (DE) Secomsat (ES) Syracuse 3 (FR) Sicral 1B (IT), Athena-fidus (IT, FR)	SPOT (FR) Helios 2 (FR) Pleiades (FR) COSMO-SkyMed (IT) TerraSAR-X, TanDEM-X (DE) SAR Lupe (DE)	Support for dowstream applications	National monitoring capabilities	National defence initiatives	Astronauts Scientific missions and ISS experiments
Cooperative Programs (ESA)	Ariane series VEGA	Alphabus/Alphasat SmallGEO NeoSat EDRS	ERS-Series, ENVISAT database SMOS CryoSat-2 Swarm ADM-Aeolus, MetOp-A and –B*	Technical development of the systems	Technical support to SST	Technology development & test demonstration	Astronauts Columbus ATV
European Programs (EU)	Policy support	Solaris (S-Band) initiative	Copernicus (Sentinels)	Galileo EGNOS	SST	EDA supports feasibility studies	R&D funds (FP7 and Horizon 20202)

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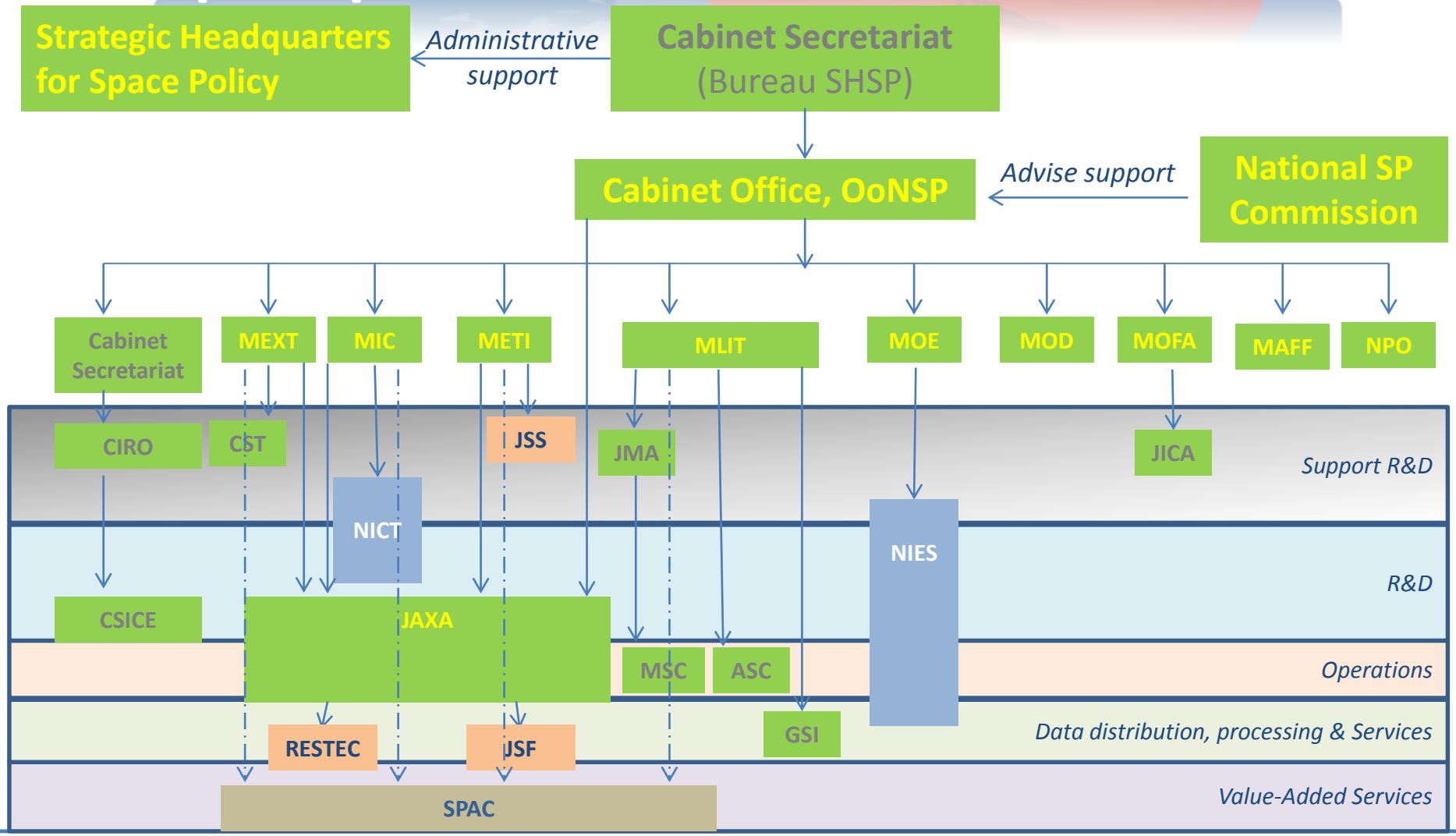
The comparison between EU and JP: space policies



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The comparison between EU and JP: space policies

	Space Budget 2015 (B¥)	
Ministry of Education, Culture, Sports, Science & Technology	182.4 ⇩	56.1%
Ministry of Land, Infrastructure, Transportation and Tourism	9.6 ⇩	2.9%
Ministry of Economy, Trade and Industry	2.9	0.8%
Ministry of Environment	4.4	1.3%
Ministry of Defence	29.8	9.1%
Cabinet Secretariat	69.7	21.4%
Cabinet Office	22.3	6.8%
Ministry of Internal Affairs and Communication	2.4 ⇩	0.7%
Ministry of Foreign Affairs	0.2 ⇩	0.065%
National Police Agency	0.9	0.2%
Ministry of Agriculture, Forestry and Fishery	0.1 ⇩	0.035%
TOTAL	324.7	100%

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The comparison between EU and JP: space policies

Actions	Ensuring national security	Civil space utilizations	S&T and industry's basis	Remarks
QZSS	*	§		*: Japan – US Cooperation in GNSS § : Downstream applications
SSA				Japan – US Cooperation in SSA
Space Clean up technologies				
X-Band SatCom				PPP through a Vehicle-Company
IGS				
Small-sized ORS				Japan – US Cooperation in Maritime Domain Awareness
Advanced Optical and Radar Satellite				Big-data management
Data Relay Satellite				
New type of rocket				
Engineering Test Satellite				

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The comparison between EU and JP: space industries

Market Segment	Players (EU)	Typical EBIT Margin	Players (JP)	Typical EBIT Margin	EU Market Share	JP Market Share	Global Market
System Manufacture	Airbus, SSTL, TAS ,OHB, INDRA	2 – 8 %	MELCO, NEC, Fujitsu, Mitsubishi Prc, Tamagawa S., Meisei	5%	20%	7%	15 B€
Launcher	Arianespace, Safran, Avio, Eurocomposite	minus - 6%	MHI, IHI & IHI, Aerospace, KHI, FHI, NOF	3.4%	56%	1.5%	5 B €
Satellite Operators	Eutelsat, SES, Avanti, Hispasat, Hellasat, Inmarsat, Solaris, O3B, e-geos, Airbus, BlackBridge	40 – 70 % 5 – 15 %	SKY-Perfect JSAT, BSAT, Pasco	20 – 30% (3 - 7%)	48%	15%	16.3 B€ (FSS) 2.6 B€ (MSS) 2.5 B€ (EO)
Terminal Equipment Manufacturer	Thrane & Thrane CMS Electronics Cobham	5 – 10%	Hitachi, MELCO, Fujitsu Siemens, Panasonic, etc...	7-12 %	15%	35%	54 B€
Services Providers	Telespazio ND Satcom *Several SMEs*	minus – 15%	KK, Asia Air Survey, Aeroasahi, RESTEC, NTT…	5%	20%	15%	97 B€

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Industry-to-Industry

Field	Items	Stakeholders	Remarks
R&D Activities	- ISS Modules' exploitation	JAXA & ESA University-2-University	Supporting the UNOOSA initiative in favor of the emerging space faring nations
	- Space Science Missions	JAXA & ESA	The coordination of the bilateral relations
Launching system	-Reusable launching vehicle	Industry-2-Industry with support of JAXA and ESA	Co- ownership of IPR
	-Synergies for new conceptual technology	Industry-2-Industry	WG under joint coordination of ESA & JAXA
	-New Launch sites	Support of Governments	

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Industry-to-Industry

Field	Items	Stakeholders	Remarks
Space-based system	-Electrical propulsion	Industry-2-Industry under coordination of ERC, ESA and JSS/JAXA	Market -oriented approach
	- High Throughput Satellite	Industry-2-Industry supported by EU (Digital Agenda) and Japan	High Throughput is the data-rate for the end-use
	- MilSatCom	NATO and GoJ	GoJ is Major Non-NATO Ally and Individual Partnership and Cooperation Programme
	- ICoC	Industry-2-Industry under coordination of EU supported by ESA and MOFA supported by JAXA	Space clean up technologies

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Industry-to-Industry

Field	Items	Stakeholders	Remarks
Space-based Components	-ITAR free products	Industry consultation upon a joint action of ESA, EDA and METI, MOFA and MOD	ESA – JAXA have a WG for this purpose
	- 3D Printer	EU – Japan Industrial clusters	Long term vision
Downstream Applications	- Integrated Application or synergetic use of space assets	They depend on the market segment	• Switch towards B2C approach • ESA IAPs • G-Space × (times) ICT
Spin-offs	- Joint ISS Experiments	JAXA & ESA	IPR Strategy
Future Challenges	- Okinawa Space Port	Investors, Tourist operators, Education managers and Technology demonstrators	Cash flow ‘s risks

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External Scenario

- The European Space Policy Dialogues are:

Case	Summit	Space Dialogue	Approach
Africa	2000	2000	Promoting downstream
Brazil	2007	2010	Promoting downstream
China	1998	2006	Coordination
Japan	1991	2014	?
Russia	1998	2006	Coordination
South-Africa	2008	2009	Promoting downstream
USA	1995	2009	Coordination

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External Scenario

- The Japanese Case:

International entity	Initial	Footprint	Approach
APRSAF	1993	~ 25 States	Promoting Space utilization (MEXT & JAXA)
ASEAN	1967	10 States	Supporting Space capacity (MOFA)

- The Asia area presents also other international entities pursuing Space Affairs:
  - Asia-Pacific Space Cooperation Organization (APSCO) with 8 Member States led by China
  - South Asian Association for Regional Cooperation (SAARC) with 8 Member States led by India

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Conclusions and Recommendations

- Industrial cooperation is the most promising way to bridge and enhance the European and Japanese Space competitiveness
- Space is a catalyst of different technological areas serving a diversify set of policies, *e. g.* transport, energy, climate change, safety and security
- Strategical dimension of Space comes also from the international relations and the related volume of trades

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Conclusions and Recommendations

Recommendations	Actions
1. Make the EU-Japan Space industrial cooperation the best tool to grow existing and new space businesses that promotes enterprise and investment	• Secure practicable measures to facilitate the exchange of expertise for the downstream applications introducing unambiguous, flexible and achievable criteria for companies (mainly SMEs and start-ups) interested in entering the two areas • Harmonize the export control regimes between the two areas • Establish the "Space" session under the BRT with joint participation of EU supported by ESA and METI supported by JAXA • Promote the trans-disciplinary dimension of Space under the scope of the EU-Japan Centre for Industrial Cooperation
2. Increase the economic returns from Space public expenditures by continuing to pursue the new technological challenges and securing greater influence in the global market	• Facilitate the Industry-to-Industry relations in the field of the space launching systems under a joint task of ESA and JAXA • Create an EU – Japan Engagement plan for the technological assets and facilities on board of the ISS for spin-offs' fertilization • Develop a cost-effective space value chain jointly affording innovative production procedures (e. g. 3-D printer)
3. Stimulate a vibrant space sector by improving the professional skills to be internationally oriented	• Propose the space sector to students, researchers and young professionals under the existing mobility programs (e. g. Vulcanus, JST, EURAXESS, etc…) • Motivate people to enhance the 3Is dimension of their professional profile with experiences as e. g. ISU or the coming Okinawa School

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