

Eurospace facts and figures, 2007 edition

The European space manufacturing industry in 2006

Approved for release on May 11th, 2007

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with the support of Eurospace SIM WG chaired by
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complete data sets available for download at www.eurospace.org

Introduction to the survey

- **What is ASD-Eurospace?**
 - ASD-Eurospace is a not for profit organisation established in 1962 as the Association of European space industry. ASD-Eurospace is also the Space Group of ASD.
 - Its members are European companies involved in the development and manufacturing of space systems, such as satellites and space launchers
- **What is Eurospace facts and figures?**
 - Eurospace facts and figures is a survey of European **space industrial manufacturing activities** undertaken by Eurospace since 1996
 - The survey reaches beyond Eurospace membership to embrace the whole space industrial sector in Europe
 - The survey focuses on industrial companies
 - » service companies - such as launch services providers, or satellite operators - are not included in the survey
 - Companies are identified at the level of **national legal entities and/or space business unit**
 - Companies are grouped in categories based on their main product line (satellites, launchers or ground segment) and on their position in the supply chain (from complete system integration down to equipment and services to industry).
 - » for the complete list of companies included in the survey please download the file *eurospace facts and figures 2007.xls* at www.eurospace.org/fandf.html
 - The survey consolidates results to eliminate intersectoral business
 - » for details on the consolidation process please download the file *why consolidate.xls* at www.eurospace.org/fandf.html
 - The survey identifies space industry revenues distributed by end customer (Space Agencies, satellite operators, Arianespace etc.) and by main activity line (satellite applications, launcher activities, scientific activities etc.)
 - The survey eliminates all non space revenues of industry (e.g. missile business)
 - The survey focuses on direct employment of the companies surveyed expressed in FTE (full time equivalents)
 - Additional staff, such as subcontracted workers and interim, are not included in the tables

2007 Survey overview

- **Consolidated turnover Europe: 4.98 billion € in 2006 (4.42 in 2005)**
- **Total employment: 28.896 in 2006 (27.884 in 2005)**
 - note 1: perimeter change for personnel - INSA (Spain) and RUAG (Switzerland) space personnel identified in 2006 (impact on total +550)
 - note 2: in 2007 Eurospace identified 2124 additional workers as 'external personnel working on site'.
 - » this figure is **not included** in the total above nor in the tables and data sets hereafter.
- **Rate of return, 2007 survey: 92%(based on turnover)**
 - 80 questionnaires returned with data on FY 2006
 - returned questionnaires represent 4.5 billion € consolidated turnover and 25797 direct employment (resp. 91.8% and 89.3% of the total)
 - 5 questionnaires have been returned from Luxembourg
 - » not implemented due to insufficient data, but Luxembourg should be included next year
 - 75 proxies (≈estimates) were created to complement the missing data points and populate the model
 - Proxies are built by applying evolution factors to previously collected data
 - 24 proxies built upon actual data collected in 2006
 - 47 proxies were built on actual data collected in 2005
 - 4 proxies were created using actual data collected earlier than 2005
 - Proxies weight in the model
 - 8.2% of total consolidated turnover
 - 10.7% of total employment in 2006
 - Total number of data points in the model for FY 2006: 150
 - Thanks to the consolidation process, the model used by Eurospace ensures good consistency and exhaustiveness of turnover information, since subsidiaries and controlled companies revenues are included whenever possible. Thus, with 150 data points the model is able to include the revenue of more than 200 European companies active in space.
 - Personnel count cannot be similarly exhaustive, mostly due to insufficient/incomplete information at company level.

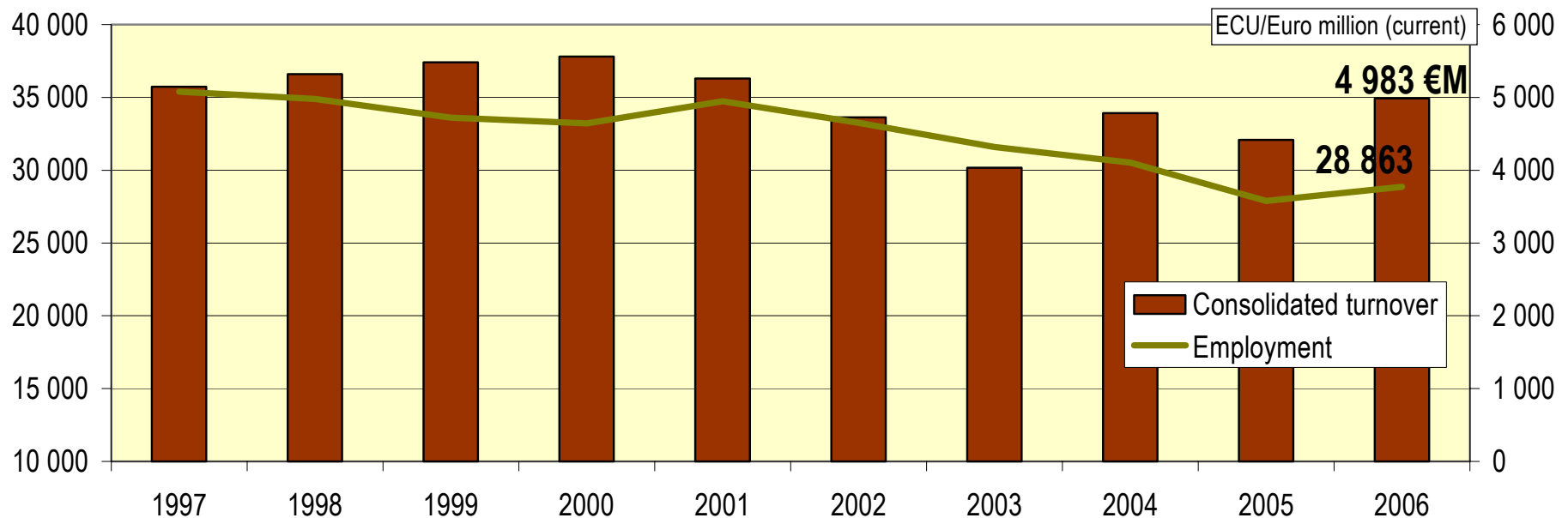
Sector overview 1997-2006

- **Employment**

- Direct industry employment in 2006: 28.863
- After 5 years of continuous employment decrease, in 2006 the figures are stabilising
 - Note that 55% of employment growth in 2006 is due to employment perimeter change

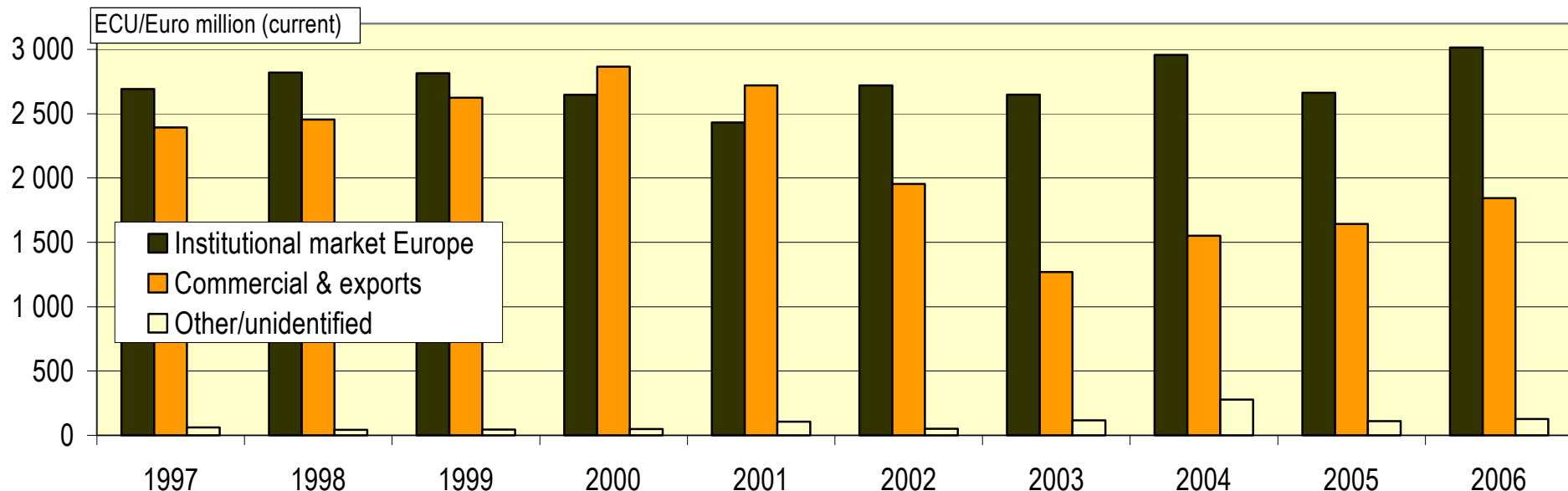
- **Sales**

- Consolidated industry turnover in 2006: 4.98 B€
- Industry revenues grew 11% in 2006
- Growth supported mainly by increased sales of military system and operational launcher systems
- Industry sales are detailed by customer, by activity and by country in the following pages



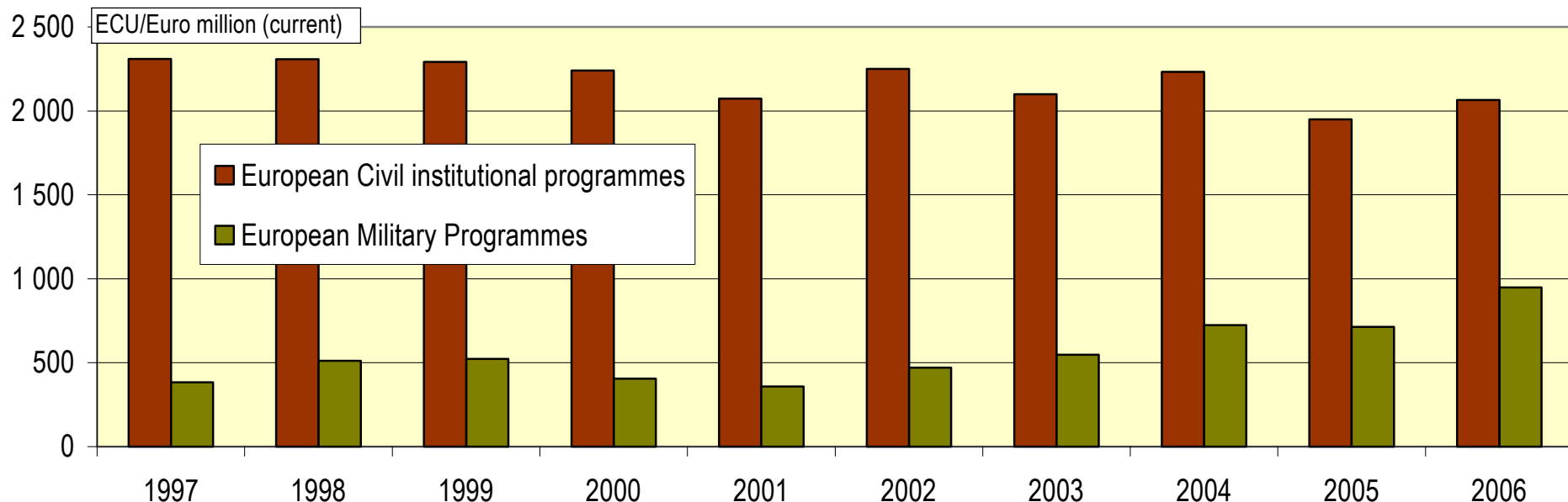
Institutional vs. commercial 1997-2006

- **End-customers of the European space industry are organised in two main categories, institutional (3 B€) and commercial (1.8 B€) customers**
 - Customers on the **Institutional market** are publicly funded institutions in Europe:
 - Space agencies in Europe such as ESA, CNES, DLR etc.
 - Eumetsat
 - European Commission
 - Defense procurement bodies in Europe
 - Sales to **Commercial customers & Exports** include:
 - Commercially operated satellite operators World-wide (e.g. SES Global, Chinasat...)
 - Satellite and launchers manufacturers outside Europe (e.g. MHI)
 - Space agencies outside Europe (e.g. NASA)
 - Defence procurement bodies outside Europe (e.g. US DoD)



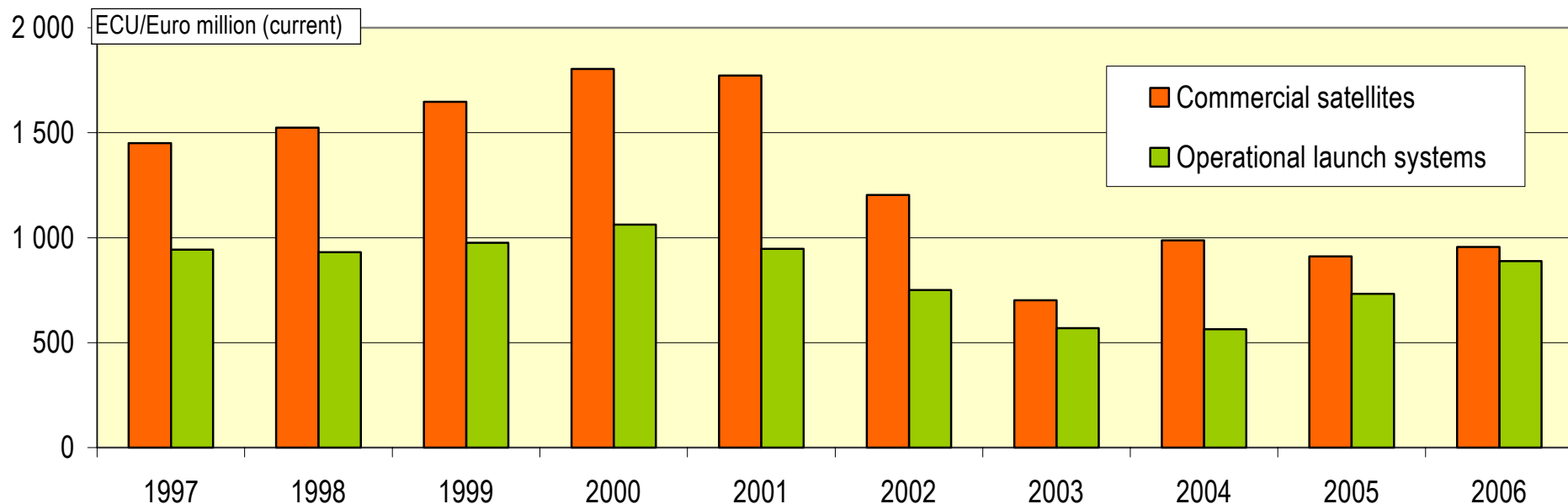
Institutional: civil vs. mil. 1997-2006

- **Sales on the European institutional market are composed of two main segments**
 - Sales of **civil systems** (2 B€), including
 - Participation to ESA, EC and national space agencies programmes
 - Operational satellite systems for Eumetsat
 - Sales of **military systems** (950 M€), including
 - Dedicated communications satellite systems (e.g. Syracuse, Skynet-5)
 - Dedicated observation satellite systems (e.g. SAR-Lupe, Helios)
- **Market drivers**
 - Both segments are strongly driven by policy
 - The civilian segment shows a slightly receding trend starting in the mid 90s
 - The military segment has grown very significantly in recent years



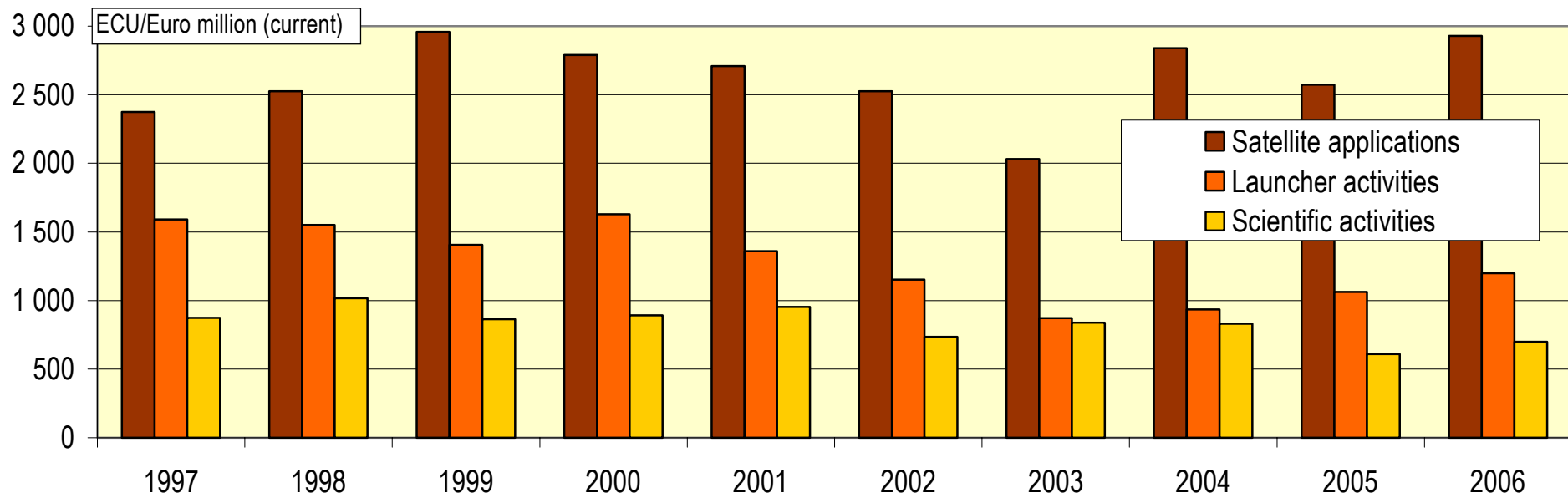
Commercial: sat. vs. launcher 1997-2006

- **Sales on the commercial market are composed of two main segments**
 - **Satellite sales** (960 M€), including
 - Complete systems sold to commercially-operated satellite operators (90%)
 - Satellite subsystems, equipment and parts sold to non-European satellite integrators (10%)
 - **Launcher sales** (890 M€), including
 - Complete systems (and associated activities) sold to Arianespace (97%)
 - Launcher subsystems, equipment and parts sold to non-European launcher integrators (3%)
- **Market drivers**
 - Both segments are strongly driven by the evolution of the geostationary satellite operators markets and structures.



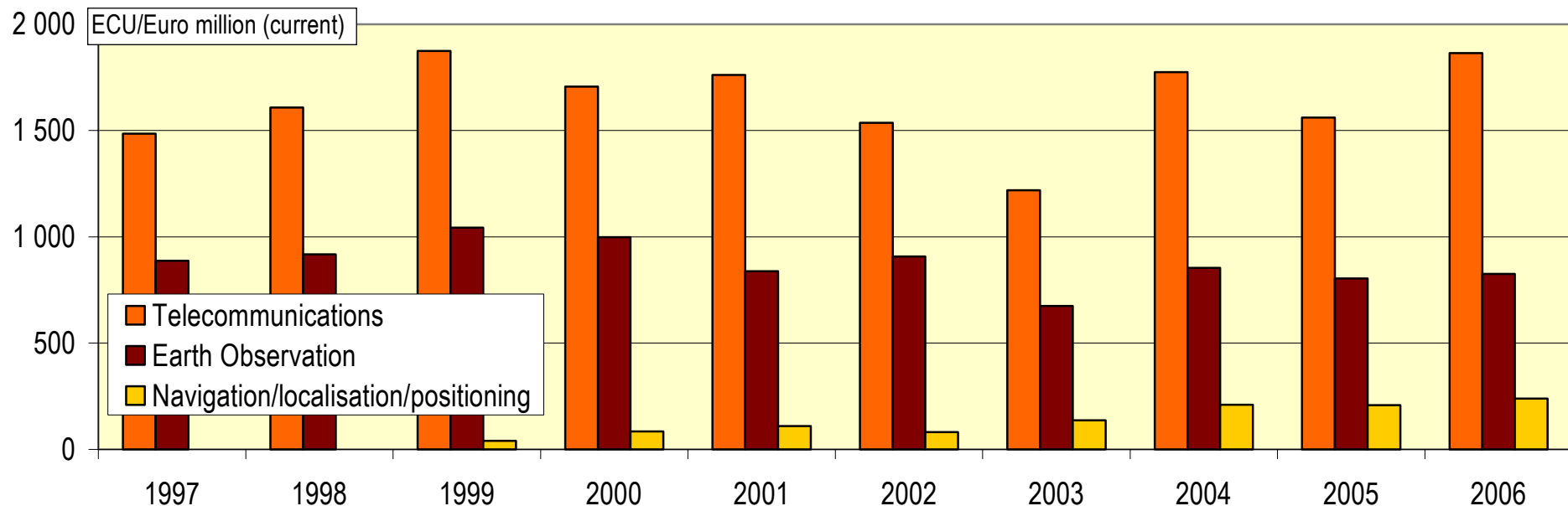
Turnover by activity 1997-2006

- **The European space industry designs, develops and builds space systems, equipment and parts within three main activity areas**
 - **Satellite applications (2.9 B€)**
 - Including development activities and operational systems for telecommunications, Earth observation and navigation purposes
 - **Launcher activities (1.2 B€)**
 - Including development and production activities of launch systems
 - **Scientific activities (700 M€)**
 - Including development and production activities of scientific spacecraft, space infrastructure elements (ISS, ATV) and scientific experiments & equipment for space
 - **Support and other activities (150 M€, not shown on graph)**
 - Including transversal activities (e.g. testing, engineering etc.) that could not be traced to any activity area due to lack of information



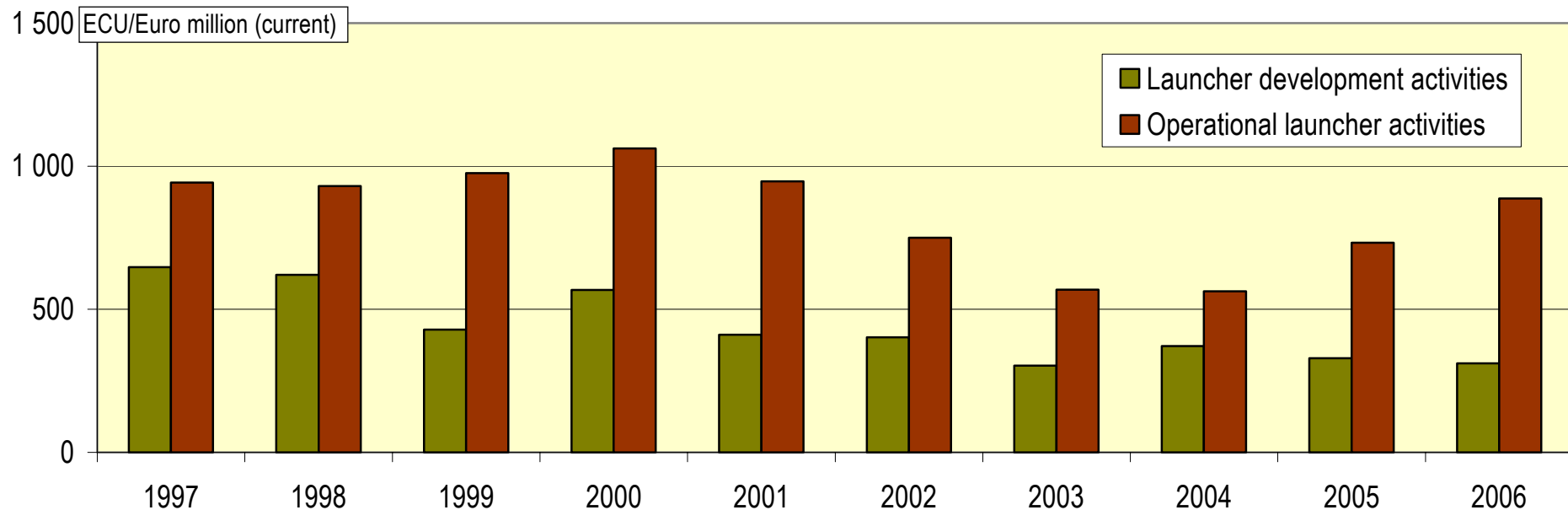
Satellite applications 1997-2006

- **Satellite applications are composed of three main segments**
 - **Telecommunications (1.8 B€)**
 - A segment mainly driven by the GEO commercial business (840 M€)
 - Military programmes (including payloads & equipment exported) represent a growing share of this segment
 - **Earth observation (825 M€)**
 - A segment driven by European public programmes, mostly civilian, but with significant involvement from the military too
 - **Navigation/localisation/positioning (239 M€)**
 - A sector in growth, supported by European public programmes (EGNOSS & Galileo mainly)



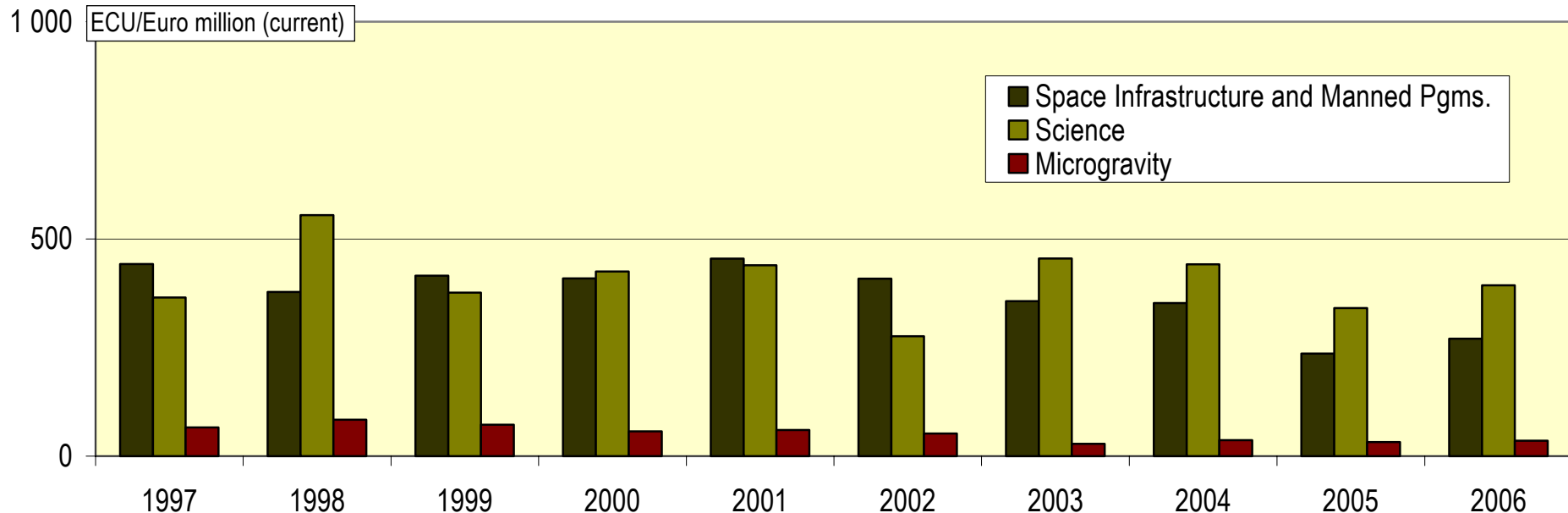
Launcher activities 1997-2006

- **Launcher activities of European space industry include**
 - **Launcher development activities (311 M€)**
 - European launcher development activities of industry are funded by European states mostly through ESA programmes
 - They are related mainly to two launcher systems: Ariane 5 (EGAS, ARTA...) and VEGA
 - The activity has decreased significantly
 - **Operational launcher activities (825 M€)**
 - The European industry produces operational systems and parts for the Ariane 5 launcher (860 M€), and marginally for non European launch systems (28 M€)
 - The segment is strongly driven by Arianespace orders
 - The activity is in growth



Scientific activities 1997-2006

- **Scientific activities include**
 - **Space infrastructure and manned programmes (271 M€)**
 - Funded almost completely by European states through ESA
 - The activity includes the design, development and production of ISS elements, and other related infrastructure activities (such as ATV)
 - **Science (393 M€)**
 - For scientific activities the funding sources are more varied, still with ESA at the forefront, but with a variety of national and multilateral endeavours.
 - The activity includes the design and development of scientific spacecraft and instrumentation
 - **Microgravity (35M€)**
 - The activity includes the design and development of instrumentation and experiments to perform scientific research in microgravity (aboard the ISS of course, but also parabolic flights, drop towers etc.)



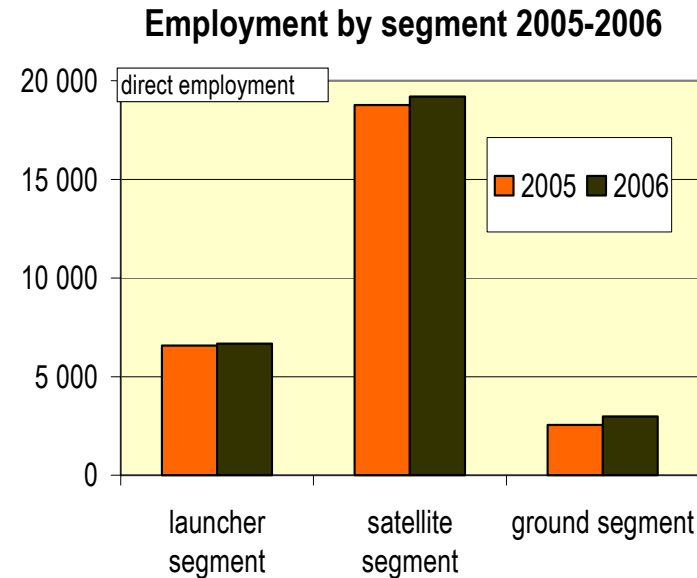
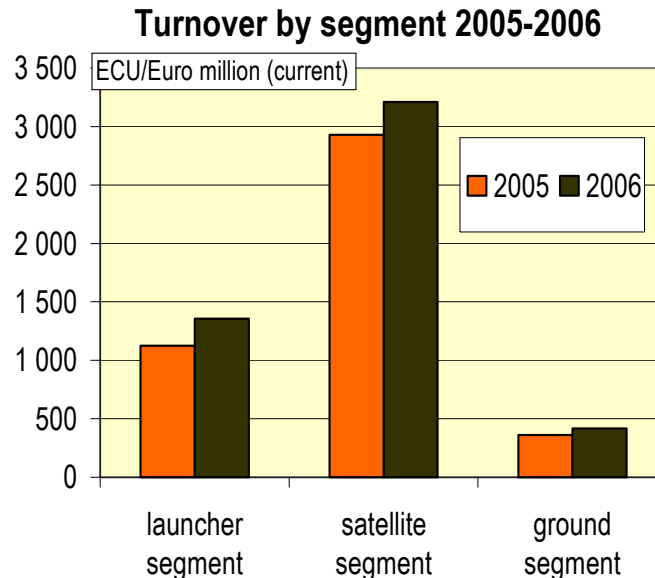
- **Companies in the survey are grouped in three categories, based on their main line of product**
 - The European space industry designs, develops and produces mainly three types of products
 - Launchers, satellites (and other unmanned spacecraft) and ground systems (for satellite and launcher operations, and to test and integrate space systems).
 - It also designs and develops space infrastructure elements (ISS, ATV) and planetary exploration systems (landers, rovers). However, these activities are usually less important in the companies' business and cannot be used to set up a specific group.
- **Launchers, satellites and ground systems have very different requirements**
 - Launchers are highly energetic systems of significant mass and size (hundreds of tons) destined to faultlessly operate autonomously, for a short period (less than one hour) in highly stressful conditions. Launchers are produced in batches (of a few tens each). European launchers are expendable, meaning that they can be used only once.
 - Satellites (and spacecraft) are highly sophisticated systems, of relatively modest mass (from 10-50 kg to 4-6 tons) designed to deploy and perform faultlessly in space for an extended period of time (from months to years) without physical servicing, after a highly stressful trip from Earth. Most satellites and spacecraft are one-of-a-kind (although they may share common equipment), and often integrate new technology.
 - Ground systems (used to track and operate launchers and spacecraft, or to perform various test and integration operations on space systems) are sophisticated devices, designed to perform faultlessly for an extended period of time (years) on the earth environment. Ground segment can be maintained and upgraded of course.
- **These very diverse sets of requirements explain the relative specialisation of space industrial units: since the industrial capabilities required by each main product are indeed different.**

Industry product segments

- Note 1: a segment is a group of companies, each company belongs to only one segment
- Note 2: a limited number of companies do not exhibit a marked specialisation towards a specific group but were categorised based on the most significant share of business

- **The three industry product segments are**

- The **launcher segment** (6684 employed, 1.4 B€ turnover)
 - Launchers Companies in this group are primarily involved in launcher development and production activities. For most of them, launcher activities represent more than 75% of the business.
- The **satellite segment** (19208 employed, 3.2 B€ turnover)
 - Companies in this segment are primarily involved in satellite design and development activities. The segment is more diversified due to a wide variety of mission-driven parameters.
- The **ground segment** (2904 employed, 418 M€ turnover)
 - Companies in this segment are primarily involved in the design, development, manufacturing and (sometimes) operations of ground systems (for TT&C and AIT)



Industry product segments

- **Relevance of product segment analysis**

- The tables below highlight the relevance of the segments identified by Eurospace.

- The table on the left shows the **distribution of each segment's turnover by main activity**

- The **launcher segment** is primarily devoted to launcher activities (80% of the segment's turnover, including the relevant ground systems), then to scientific activities (14%, mostly space infrastructure) and last to satellite applications (6%, mostly propulsion subsystems and equipment for satellites and spacecraft)

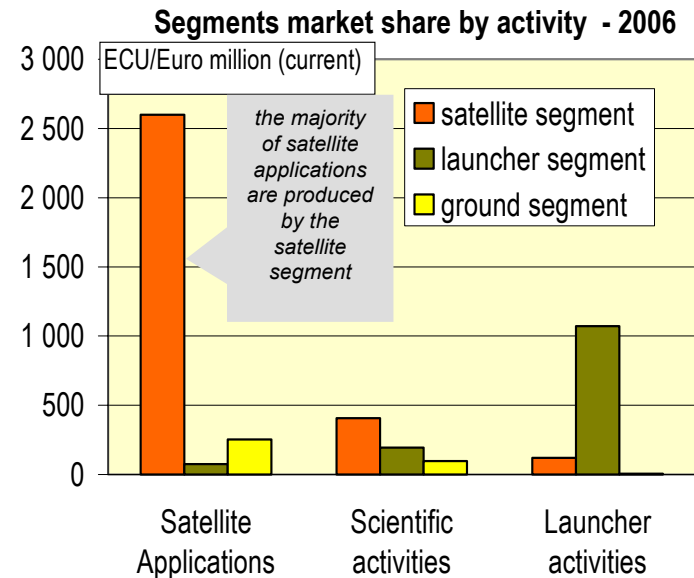
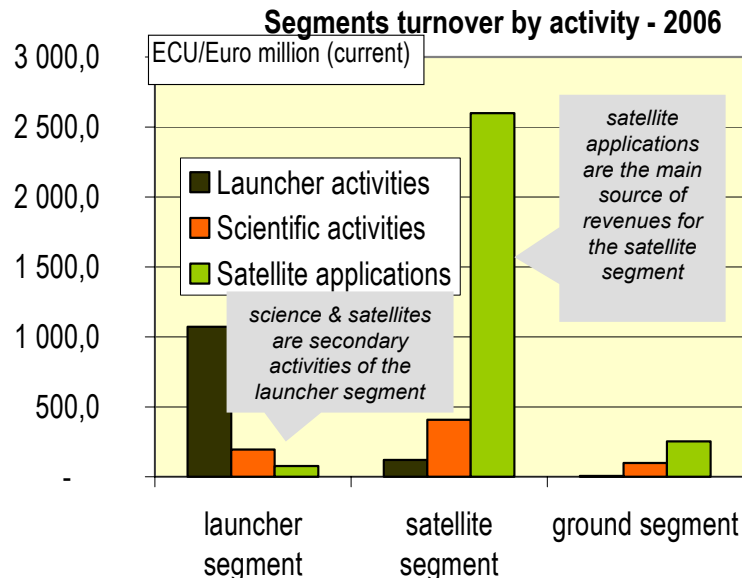
- The **satellite segment** is mainly active in the satellite applications markets (83% of the segment's revenues). Scientific activities (spacecraft and instruments mostly) and launcher activities represent a small fraction of the segment's business (13% & 4% resp.)

- The **ground segment** is primarily active in relation to satellite applications programmes (71% of the segment's turnover).

- The table on the right shows the share of each segment in the total area considered

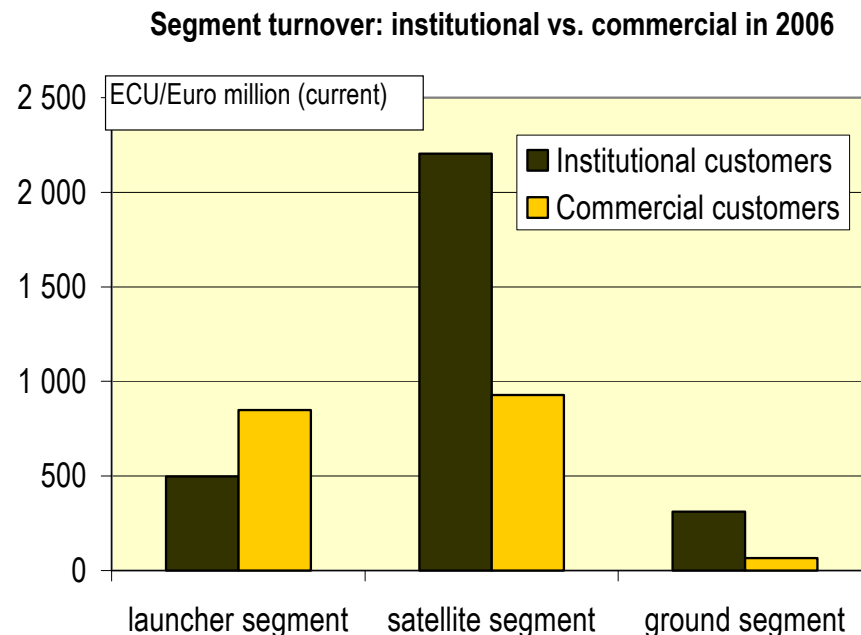
- The **satellite segment owns an 89% share of the total satellite applications market accessible to the European space industry**

- Similarly the **launcher segments owns an 89% share of the total launcher market accessible to the European space industry**



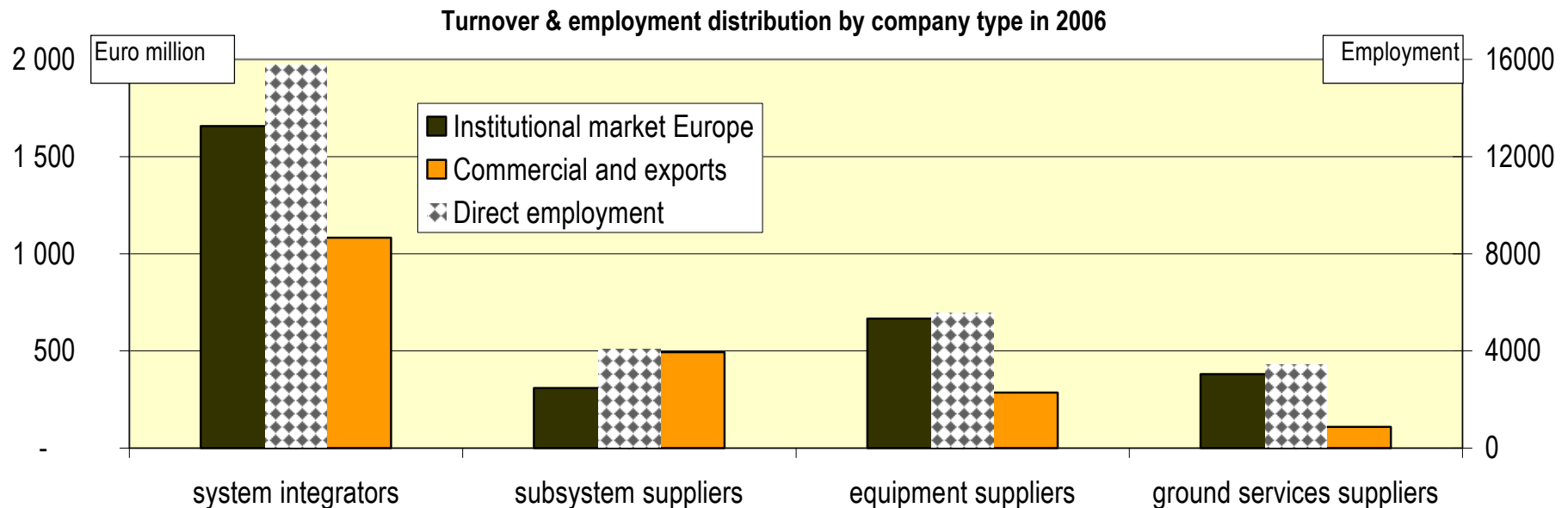
Industry product segments

- **Industry segments face different market drivers**
 - As illustrated below, the **satellite** and **ground segments** have a comparable commercial to institutional business ratio (inferior to 1/2)
 - Less than one third of these segment's activity is driven by the commercial market (where the GEO commercial market is the main force)
 - For the **launcher segment**, the ratio is almost reversed
 - The largest share of the segment's activity is driven by Arianespace business (where the GEO commercial market is the main force).



Company types

- **Companies in the model are also organised by type of company, based on the company's position in the supply chain**
 - **System integrators** (15783 employed, 2.7 B€ turnover). Today the largest space systems integration capabilities are found within EADS Astrium and Thales Alenia Space. These companies are also active at subsystem and equipment level. Other space systems integration capabilities are found in smaller companies, such as SSTL or OHB.
 - **Subsystem suppliers** (4067 employed, 802M€ turnover) are mostly companies of the launcher segment (e.g. Snecma, Mt Aerospace), which explains why they exhibit the characteristic reversed institutional to commercial ratio.
 - **Equipment suppliers** (5567 employed, 962 M€ turnover, e.g Saab Space, Tesat) and **ground services suppliers** (3446 employed, 490 M€) exhibit the same commercial to institutional ratio of the system integrators



Country details

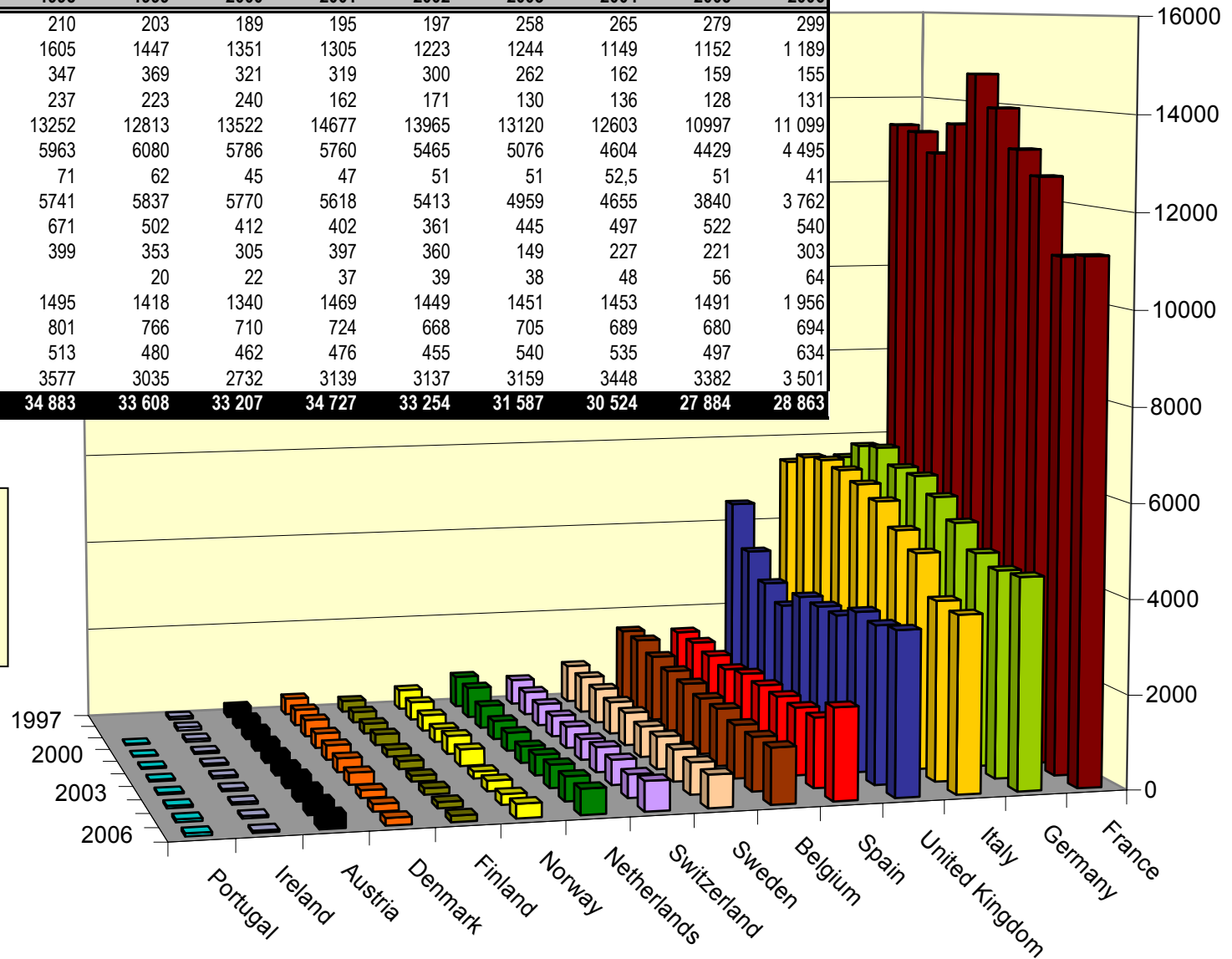
- The collection of company details at national entity level allows to distribute turnover and employment among European countries
 - **Warning:** for the smallest national industrial sectors, the limited number of data points in the model, and, in some cases, the relatively high proportion of proxies, suggest to use the data cautiously.

Employment & Turnover distribution by country in 2006

in 2006	Direct Space employment	Consolidated Turnover (€ million)	Turnover distribution by customer (€ million)					Turnover distribution by activity (€ million)				
			Civil Institutional programmes (Europe)	Military institutional programmes (Europe)	Commercial satellites and parts	Operational launchers and parts	Other	Satellite applications	Launch system activities	Scientific activities	Support & test activities	Other activities
Austria	299	34,9	22,2	-	2,5	3,7	6,4	15,3	3,9	7,0	0,1	8,6
Belgium	1 189	134,4	55,1	1,2	25,2	34,6	18,3	50,6	43,3	19,2	12,0	9,3
Denmark	155	15,2	14,2	-	0,9	-	0,1	4,2	-	4,2	5,8	0,9
Finland	131	11,6	11,2	-	0,4	-	-	8,6	-	2,4	0,1	0,5
France	11 099	2 151,9	617,5	389,0	657,7	468,6	19,0	1 388,6	559,8	182,5	4,2	16,8
Germany	4 495	791,0	432,7	136,5	24,6	171,5	25,6	355,2	203,4	218,7	10,7	3,0
Ireland	41	3,5	2,2	-	-	1,3	0,1	0,2	2,2	0,0	1,0	0,1
Italy	3 762	716,1	439,6	71,3	62,5	116,7	26,1	316,8	234,5	126,9	17,6	20,3
Netherlands	540	60,9	43,3	-	3,0	7,8	6,8	17,9	14,8	19,3	1,0	7,9
Norway	303	55,8	18,1	-	17,4	12,9	7,3	26,7	17,1	10,9	-	0,9
Portugal	64	4,7	4,6	-	-	-	0,1	3,0	0,0	0,5	1,2	-
Spain	1 956	231,9	134,7	28,0	46,2	21,4	1,7	138,0	35,8	45,3	5,9	6,8
Sweden	694	102,3	69,0	2,7	18,5	9,7	2,4	53,0	35,2	14,1	-	-
Switzerland	634	85,5	44,1	-	2,0	34,7	4,6	18,1	42,1	19,4	2,2	3,6
United Kingdom	3 501	583,7	156,3	320,2	94,6	4,3	8,4	532,3	6,6	28,6	11,5	4,7
Total Europe	28 863	4 983,3	2 064,9	948,7	955,6	887,4	126,7	2 928,6	1 198,8	698,9	73,5	83,5

Country details – employment 1997-2006

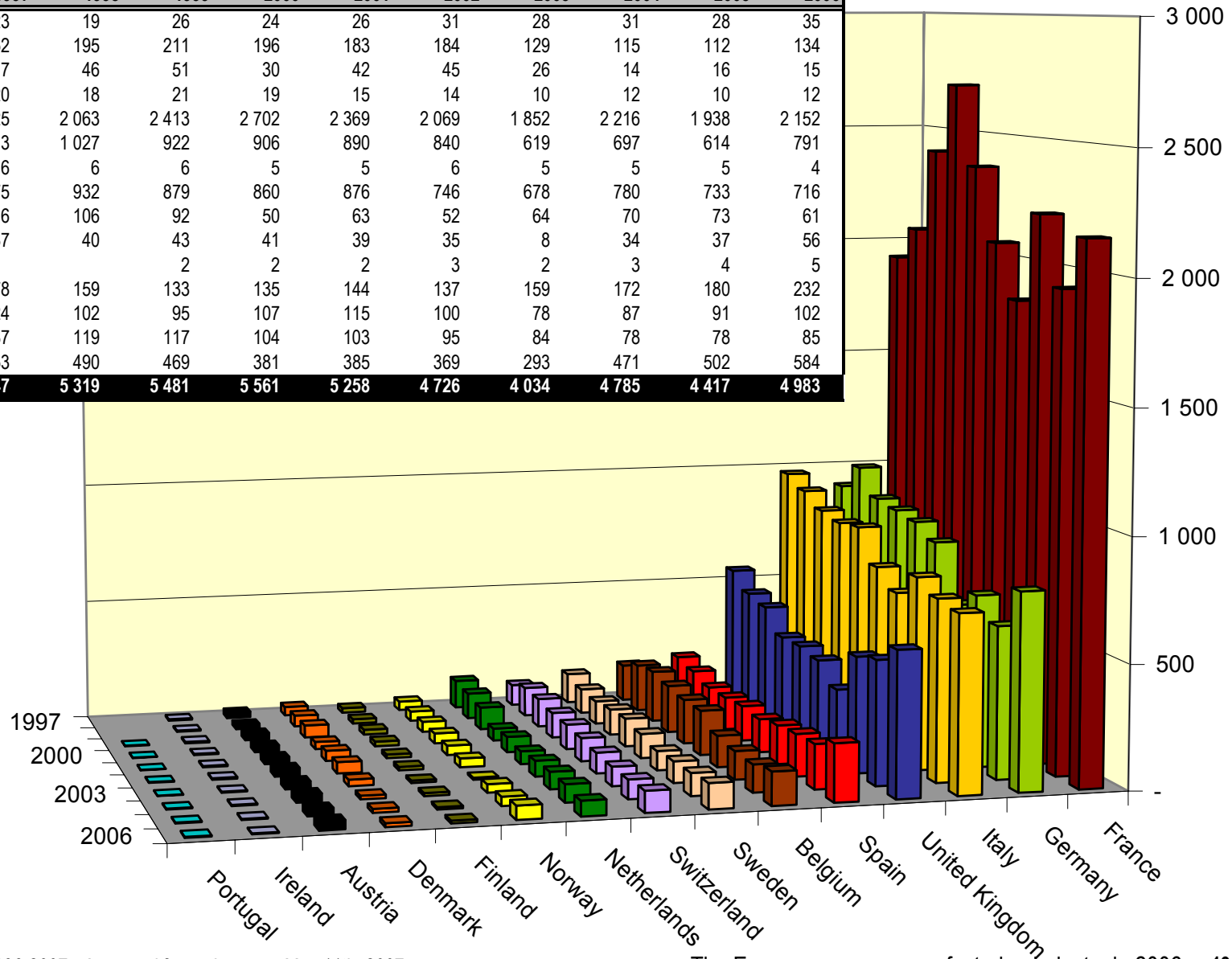
Employment	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Austria	220	210	203	189	195	197	258	265	279	299
Belgium	1592	1605	1447	1351	1305	1223	1244	1149	1152	1 189
Denmark	361	347	369	321	319	300	262	162	159	155
Finland	243	237	223	240	162	171	130	136	128	131
France	13368	13252	12813	13522	14677	13965	13120	12603	10997	11 099
Germany	5545	5963	6080	5786	5760	5465	5076	4604	4429	4 495
Ireland	62	71	62	45	47	51	51	52,5	51	41
Italy	5469	5741	5837	5770	5618	5413	4959	4655	3840	3 762
Netherlands	689	671	502	412	402	361	445	497	522	540
Norway	434	399	353	305	397	360	149	227	221	303
Portugal			20	22	37	39	38	48	56	64
Spain	1515	1495	1418	1340	1469	1449	1451	1453	1491	1 956
Sweden	828	801	766	710	724	668	705	689	680	694
Switzerland	553	513	480	462	476	455	540	535	497	634
United Kingdom	4512	3577	3035	2732	3139	3137	3159	3448	3382	3 501
Total Europe	35 391	34 883	33 608	33 207	34 727	33 254	31 587	30 524	27 884	28 863



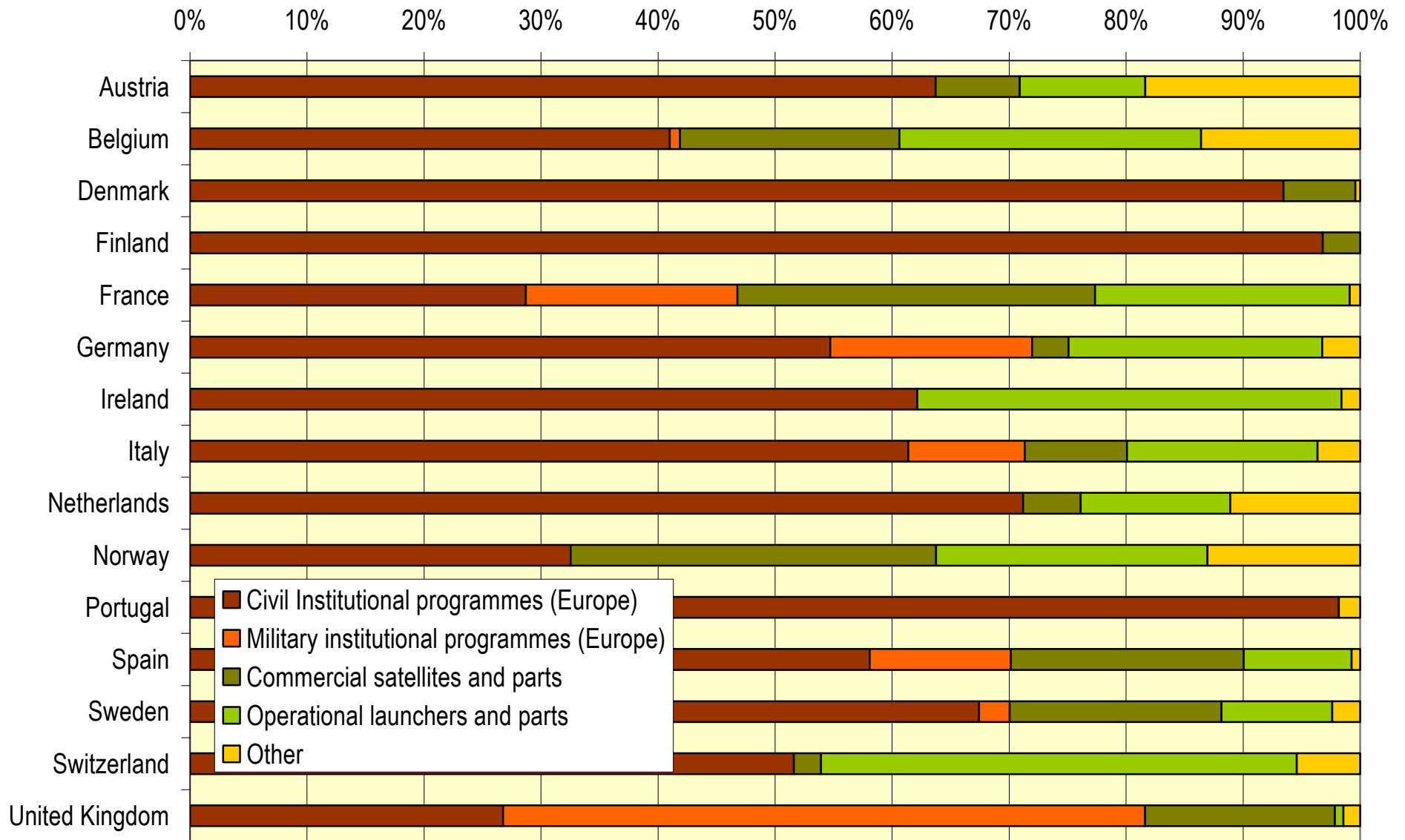
Please note that perimeter changes for personnel count in Spain and Switzerland explain most of the variation in 2006

Country details – turnover 1997-2006

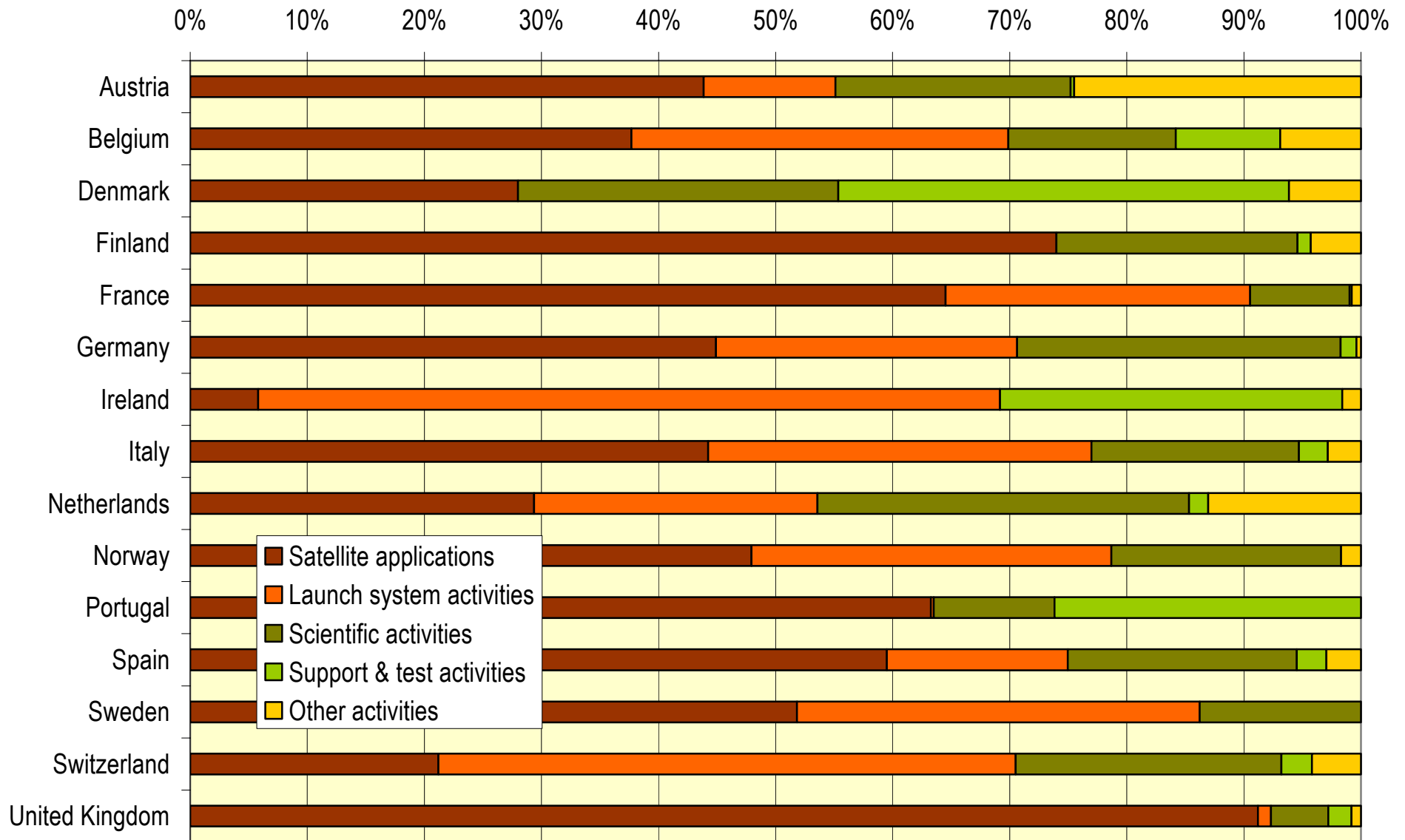
Turnover (M€)	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Austria	23	19	26	24	26	31	28	31	28	35
Belgium	152	195	211	196	183	184	129	115	112	134
Denmark	37	46	51	30	42	45	26	14	16	15
Finland	20	18	21	19	15	14	10	12	10	12
France	1 925	2 063	2 413	2 702	2 369	2 069	1 852	2 216	1 938	2 152
Germany	913	1 027	922	906	890	840	619	697	614	791
Ireland	6	6	6	5	5	6	5	5	5	4
Italy	975	932	879	860	876	746	678	780	733	716
Netherlands	116	106	92	50	63	52	64	70	73	61
Norway	37	40	43	41	39	35	8	34	37	56
Portugal			2	2	2	3	2	3	4	5
Spain	178	159	133	135	144	137	159	172	180	232
Sweden	124	102	95	107	115	100	78	87	91	102
Switzerland	87	119	117	104	103	95	84	78	78	85
United Kingdom	553	490	469	381	385	369	293	471	502	584
Total Europe	5 147	5 319	5 481	5 561	5 258	4 726	4 034	4 785	4 417	4 983



Country details, turnover by customer (%) in 2006



Country details, turnover by activity (%) in 2006



Complete data sets

- Space industry turnover distribution by customer 1997-2006

Distribution by customer		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
a	ESA	1 501,0	1 674,0	1 520,8	1 529,6	1 342,5	1 491,7	1 449,1	1 464,5	1 261,9	1 489,7
b	European Commission	14,0	17,0	16,9	57,6	23,9	27,1	15,5	14,7	14,3	12,0
c	Eumetsat	-	-	-	-	-	77,6	73,7	109,2	89,8	56,9
d	National Civil Programmes	794,0	617,0	754,3	653,7	706,8	576,9	486,3	591,0	501,0	426,8
e	Civil Multilateral Programmes	-	-	-	-	-	76,7	75,6	52,4	82,3	79,4
f=a+b+c+d+e	European Civil institutional programmes	2 309,0	2 308,0	2 292,0	2 240,9	2 073,1	2 250,0	2 100,3	2 231,8	1 949,3	2 064,9
g	European Military Programmes	383,0	512,0	521,8	405,5	358,2	470,6	547,5	724,1	713,2	948,7
h=f+g	Institutional market Europe	2 692,0	2 820,0	2 813,8	2 646,4	2 431,4	2 720,6	2 647,8	2 955,9	2 662,5	3 013,7
i	GEO Commercial Systems	1 450,0	1 524,0	1 647,2	1 804,0	1 772,1	1 114,5	657,4	920,5	838,5	840,7
j	Other commercial systems & parts	-	-	-	-	-	89,1	43,4	66,8	72,2	114,8
k=i+j	Commercial satellites	1 450,0	1 524,0	1 647,2	1 804,0	1 772,1	1 203,5	700,8	987,4	910,7	955,6
l	Arianespace	943,0	931,0	976,2	1 061,6	947,4	748,0	545,5	533,7	704,9	859,7
m	Other launch systems	-	-	-	-	-	2,3	22,7	29,6	28,0	27,7
n=l+m	Operational launch systems	943,0	931,0	976,2	1 061,6	947,4	750,3	568,1	563,3	732,9	887,4
o=n+k	Commercial & exports	2 393,0	2 455,0	2 623,4	2 865,6	2 719,5	1 953,9	1 268,9	1 550,6	1 643,6	1 842,9
p	Other/unidentified	61,0	42,0	44,0	48,8	107,3	51,7	117,4	278,1	111,2	126,7
q=p+o+h	Total	5 146,0	5 317,0	5 481,2	5 560,8	5 258,1	4 726,2	4 034,1	4 784,6	4 417,3	4 983,3

Complete data sets

- Space industry turnover distribution by activity 1997-2006

Distribution by activity		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
a	Telecommunications	1 486,0	1 609,0	1 875,0	1 706,3	1 761,9	1 536,3	1 219,0	1 775,6	1 561,3	1 864,5
b	Earth Observation	888,0	917,0	1 042,6	998,3	837,6	907,9	675,2	854,2	804,1	825,2
c	Navigation/localisation/positioning	-	-	39,7	85,0	109,4	80,3	136,7	210,2	207,6	238,9
d=a+b+c	Satellite applications	2 374,0	2 526,0	2 957,3	2 789,6	2 708,9	2 524,5	2 030,9	2 840,0	2 573,0	2 928,6
e	Launcher development activities	647,0	620,0	428,8	568,0	411,1	401,9	303,2	371,7	328,9	311,4
f	Operational launcher activities	943,0	931,0	976,2	1 061,6	947,4	750,3	568,1	563,3	732,9	887,4
g=e+f	Launcher activities	1 590,0	1 551,0	1 405,0	1 629,6	1 358,5	1 152,2	871,3	934,9	1 061,7	1 198,8
h	Space Infrastructure and Manned Pgms.	442,0	378,0	415,2	409,3	454,4	408,3	356,3	352,3	236,0	270,6
i	Science	365,0	555,0	376,4	425,1	439,4	275,9	455,0	441,7	340,6	393,0
j	Microgravity	66,0	84,0	72,4	57,0	60,0	51,7	28,1	37,0	32,3	35,3
k=h+i+j	Scientific activities	873,0	1 017,0	864,0	891,4	953,8	735,9	839,4	831,0	608,9	698,9
l	Support Activities	173,0	156,0	165,1	182,4	119,3	190,3	160,4	89,6	82,3	73,5
m	Other/unidentified	136,0	67,0	89,8	67,8	117,7	123,3	132,2	89,1	91,5	83,5
n=d+g+k+l+m	Total	5 146,0	5 317,0	5 481,2	5 560,8	5 258,1	4 726,2	4 034,1	4 784,6	4 417,3	4 983,3