EUROPE'S ACTIVITIES IN SPACE

SECURITY DIMENSIONS, FROM INITIAL DRIVERS TO CURRENT EFFORTS

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EUROPE'S ACTIVITIES IN SPACE

CONTENTS

- Introduction - The European Space Policy Institute
- The Evolution of Europe's Launcher and Flagship Space Initiatives
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THE EUROPEAN SPACE POLICY INSTITUTE (ESPI)

Mission Statement

The European Space Policy Institute (ESPI) provides decision-makers with an informed view on mid- to long-term issues relevant to Europe's space activities.

In this context, ESPI acts as an independent platform for developing positions and strategies.

ESPI provides decision-makers and the global space community with:

- Arguments underpinning the "Case for Space"
- Policy concepts for international, regional and national activities
- Analyses for mid-term visions
- Platforms for expert exchanges
- Source for cutting-edge information

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2004 set up as an association under Austrian law in Vienna

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BACKGROUND INFORMATION

Name: Cenan Al-Ekabi (Canadian)

Professional Background

2012–2017	Resident Fellow, ESPI, Vienna, Austria
2011	Research Intern, ESPI, Vienna, Austria
2008	Legal Intern, Vernon | David Law Firm, Bucharest, Romania
2002–2006	Marine Engineering Systems Operator, Canadian Forces Naval Reserves, Canada
2003	Operations Agent - Level 2, Bank of Canada – Operations – TAOC, Canada

Professional Licences

July 2014	New York State Bar law licence, New York, USA

Academic Background

2016	ISU SSP16, Haifa, Israel
2010-2011	Advanced LL.M. in Air & Space Law, Leiden University, Netherlands
2009-2010	Advanced LL.M. in European & International Business Law, Leiden University, Netherlands
2006-2009	J.D., Cooley Law School, Michigan, USA
2000-2005	B.A. Political Science, McMaster University, Canada

Publications

Books

Yearbook on Space Policy 2016

Space for Sustainable Development

Cenan Al-Ekabi
Stefano Ferretti
Editors

Reports

Space Exploration Benefit Assessment

(Support role, delivered to ESA)

Perspectives

External Publications (ISU)

ISU Team Project Starport 1 Full Report

ISU Team Project Starport 1 Executive Summary

EUROPE'S ACTIVITIES IN SPACE

The Evolution of Europe's Launcher and Flagship Space Initiatives

- European launcher development leading up to the Ariane 6
- European Earth observation initiatives leading to Copernicus
- European navigation initiatives leading to Galileo
- Global space expenditure
- Trends in space defence spending
- Current security challenges in the space domain

EUROPEAN LAUNCHER DEVELOPMENT

Origins from World War II

- Germany developed the A-4 rocket (renamed V-2 rocket), which could reach an altitude of 85 km at 5,000 km/hr.

Post WWII – Cold War period

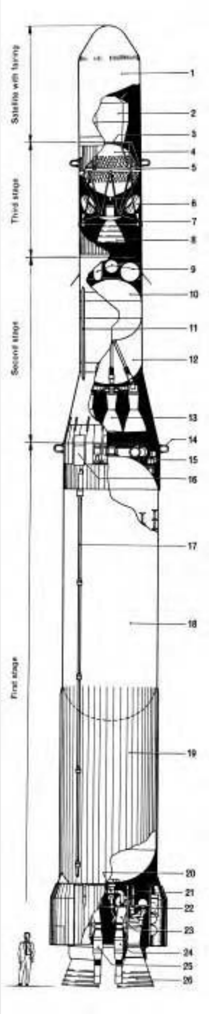
- The US and Soviet Union rapidly developed their missile/launcher capability with researchers and technicians that were involved in the A-4 programme.

- In Europe, still recovering from WWII and in the shadow of war, slower to develop launcher capabilities.

  - **Diamant**: In the 1960s, France developed the Diamant launcher for independent access to space. France was the first European country to successfully place a small satellite into orbit; but not suitable to launch larger communications satellites.

  - **Blue Streak**: In the 1950s-60s, the United Kingdom (in collaboration with the US) developed the Blue Streak IRBM.
    - Wanted to repurpose it into a medium-to-large satellite launcher
      - Led to the creation of the **European Launcher Development Organisation** (ELDO) (1962)

THE EUROPA LAUNCH SYSTEM



ELDO's Europa1 launcher

- 1st stage: the UK "Blue Streak" rocket
- 2nd stage: France's "Coralie" rocket
- 3rd stage: Germany's "Astris" rocket

- Italy provided the first series of satellite test vehicles

- Belgium provided the down range ground guidance stations

- The Netherlands provided the long-range telemetry links

- Australia's contribution was its Woomera launch site

- Failure partly due to conflicting economic and political priorities of ELDO member states

EUROPE'S AUTONOMOUS ACCESS TO SPACE

The Need for Independent Access to Space

- In the 1970s, France and Germany jointly developed the two-communication satellites project "Symphonie", which was intended for launch on the failed Europa 2 launcher.
- Lacking a domestic launch provider, France and Germany turned to the US to launch the Symphonie telecommunication satellites, which agreed to do so requiring it to be used only for experimental purposes, not commercial.
  - This spurred Europe's efforts towards autonomous access to space, as its absence had hindered Europe's entry into the very profitable field of satellite communication.
  - The European Space Agency (ESA) formed shortly afterward out of ELDO and ESRO.

With the experience gained in developing the Europa and Diamant launch systems, France led the effort in developing the new Ariane 1 launch system (paying 60% of the costs plus any cost overruns).

THE ARIANE LAUNCH FAMILY

From Left to Right

Ariane 1: 1850 kg to GTO
(9 in 11 launches successful; from 1979 to 1986)

Ariane 2: 2175 kg to GTO
(5 in 6 launches successful; from 1986 to 1989)

Ariane 3: 2700 kg to GTO
(10 in 11 launches successful; from 1984 to 1989)

Ariane 4: 2000 kg - 4300 kg to GTO (6 variants)
(113 in 116 launches successful; from 1988 to 2003)

Ariane 5: 6,100 kg (GS) / 10,865 kg (ECA) to GTO
Currently in operation (dual-launch capability)
(91 in 95 launches successes; from 1996 to current)

Ariane 6: future launch system (agreed upon at the December 2014 ESA ministerial council meeting – industry-led development)

(© ESA)

ESA'S CURRENT FAMILY OF LAUNCH VEHICLES

From Left to Right

Vega: 1,400 kg to LEO – small launcher
(11 in 11 launches successful; from 2012 to today)

Soyuz at CSG: 3,250 kg to GTO – medium launcher
(16 in 17 launches successful; from 2011 to today)

Ariane 5 ES: 21,000 kg to LEO – ATV missions to ISS
(6 in 6 launches successful; from 2008 to 2016)

Ariane 5 ECA: 10,865 kg to GTO – heavy launcher
(63 in 64 launches successful; from 2002 to today)

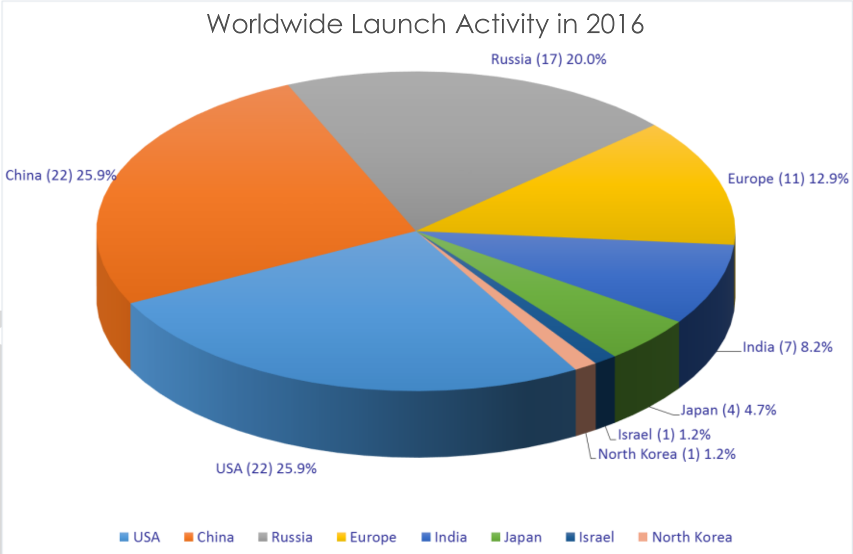
(© ESA)

From Left to Right
Vega, Soyuz at CSG, Ariane 5 ES (GS launcher shown), Ariane 5 ECA

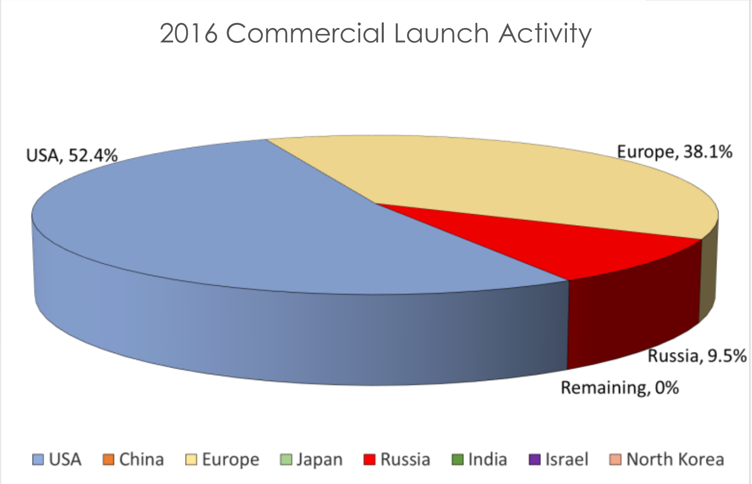
WORLDWIDE LAUNCH ACTIVITY IN 2016

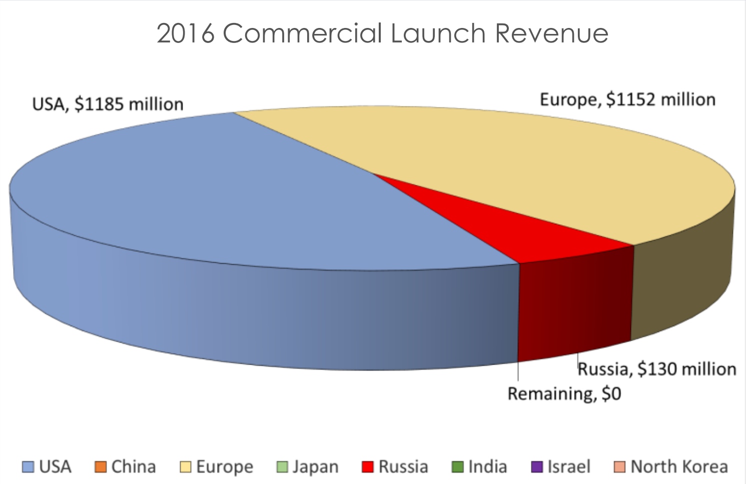
Europe's launch performance in 2016

- Conducted 12.9% (11) of the 85 launches in 2016
- Conducted 38.1% (8) of the 21 commercial launches in 2016
- Europe earned 46.7% of commercial launch revenue in 2016, on par with the U.S. owing to the Ariane 5's dual launch capability.
- Arianespace reports its revenue to be €1.4 billion annually, and has a big reliance on the commercial launch market.



(Source: FAA)





ESA'S FUTURE LAUNCH VEHICLE FAMILY

At the December 2014 ESA Ministerial Council, ESA's member governments decided to develop the next generation Ariane 6 launcher and to upgrade its small-satellite Vega launcher, in addition to using the current configurations of the Ariane 5 ECA launcher and Vega launcher.

However, the responsibility for the commercial exploitation of the Ariane 6 and Vega C rested with industry. So in order to balance the commercial risk, industry also became the design authority.

Airbus Defence & Space and Safran are leading the development of the Ariane 6 and Vega C launch systems through a joint venture called 'Airbus Safran Launchers' (ASL).

From Left to Right
Vega, Vega C, Ariane 5 ECA, Ariane 6 (A62), Ariane 6 (A64)


(© ESA)

EUROPEAN EARTH OBSERVATION

(© PAPA International)

Origins from the 19th Century

- first aerial photographs of the Earth taken by the French photographer, Félix Tournachon (Aka. Nadar) in his Géant balloon.

By WWI

- Military aircraft equipped with ordinary cameras used to observe the position and the strength of enemy forces.

Post WWII – Cold War period

- In 1960, the US launched its first meteorological satellite TIROS-1, followed by its Landsat satellite system, which demonstrated the value of space technology for meteorological research.

- By the 1970s, the European Space Research Organisation (ESRO), a precursor of ESA, developed Europe's first meteorological satellites, Meteosat-1 and -2, launched in 1977 and 1981.
  - Led to the establishment of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) in 1986.

EUROPEAN EARTH OBSERVATION

EUMETSAT's current operational weather satellites are Meteosat-8, 9 and 10, Metop-A, Metop-B, Jason-2 & 3 and Sentinel-3A.

ESA had its own European Remote Sensing (ERS) project, ERS 1 (1991) and ERS 2 (1995), followed by the ENVIronmental SATellite (ENVISAT) satellite (2002).

National Earth Observation systems

- CNES → SPOT programme (launched 5 imaging satellites from 1986)
- DLR → launched its first radar satellite TanDEM-X in 2007
- And other joint programmes such as the COSMO-SkyMed (French/Italian system)

EUROPEAN EARTH OBSERVATION

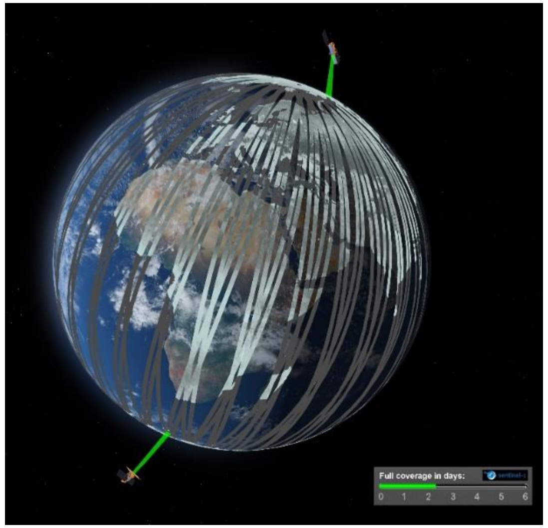
The EU Flagship Copernicus Programme

After signing the Kyoto protocol in 1997, the EU saw the strategic need for the development of its Flagship Copernicus programme (formerly Global Monitoring for Environment and Security (GMES) prior to 2012) as a necessary element to implement the EU "post-Kyoto strategy".

Europe desired access to information sources that are independent from any control imposed by foreign governments.

Copernicus Programme Details

Number of Sentinel missions: 7
Phase: In Operation
Currently orbiting: Sentinel 1A and 1B
Sentinel 2A and 2B
Sentinel 3A
Sentinel 5P



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EUROPEAN SATELLITE NAVIGATION

Pre-industrial origins

- Navigation by stars for travel by night and by day.

Post WWII – Cold War period

The initial purpose of satellite navigation was for military use, but near the end of the Cold War a second set of signals was made available for civil, industrial, and scientific use.

U.S. Systems

1960s: TRANSIT, the Timation programme, System 621B

1973: NAVSTAR (aka GPS)

Soviet Systems

1965: Tsikada, Parus

1982: GLONASS

EUROPEAN SATELLITE NAVIGATION

Initial reliance on GPS and GLONASS

Europe initially relied on other countries for navigation signals: US Military GPS signals were made publically available for civil use following the downing of the commercial Korean flight KAL007, which had inadvertently crossed into Russian airspace in 1983, at the height of the Cold War.

However, the GPS system had a selective availability feature to its signals, which would put other countries relying on its signals at a disadvantage in times of war.

European Navigation Systems

Europe began working on its European Geostationary Navigation Overlay Service (EGNOS) in 1994, to augment the use of GPS and GLONASS signals in the most critical phases of landing aircraft.

But to be fully autonomous in satellite navigation, a second flagship initiative Galileo was approved by the EU in 2001.

EUROPEAN SATELLITE NAVIGATION

<ins>The EU Flagship Galileo Programme</ins>

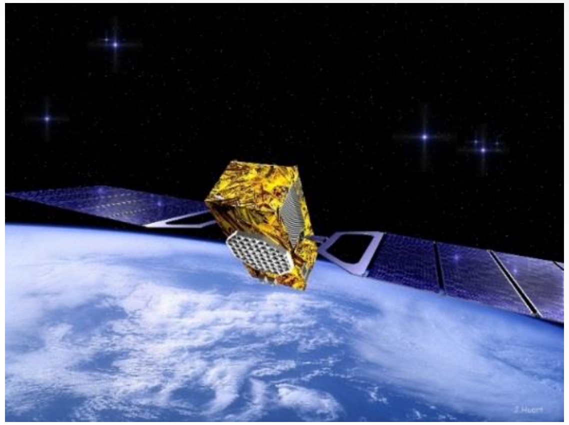
The Galileo system will have five main services:

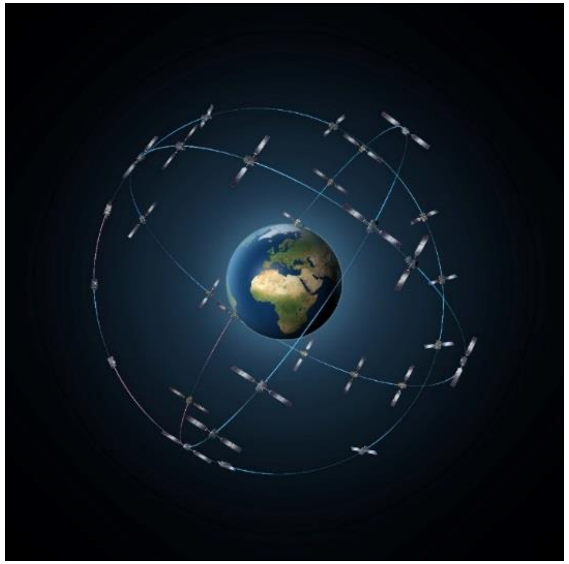
- Open access navigation
- Commercial navigation (encrypted)
- Safety of life navigation
- Public regulated navigation (encrypted)
- Search and rescue

Other secondary services will also be available.

<ins>Galileo Programme Details</ins>

Number of satellites: 30 (24 operational and 6 active spares)
Currently orbiting: 18
Phase: Operational
Programme completion date: 2020





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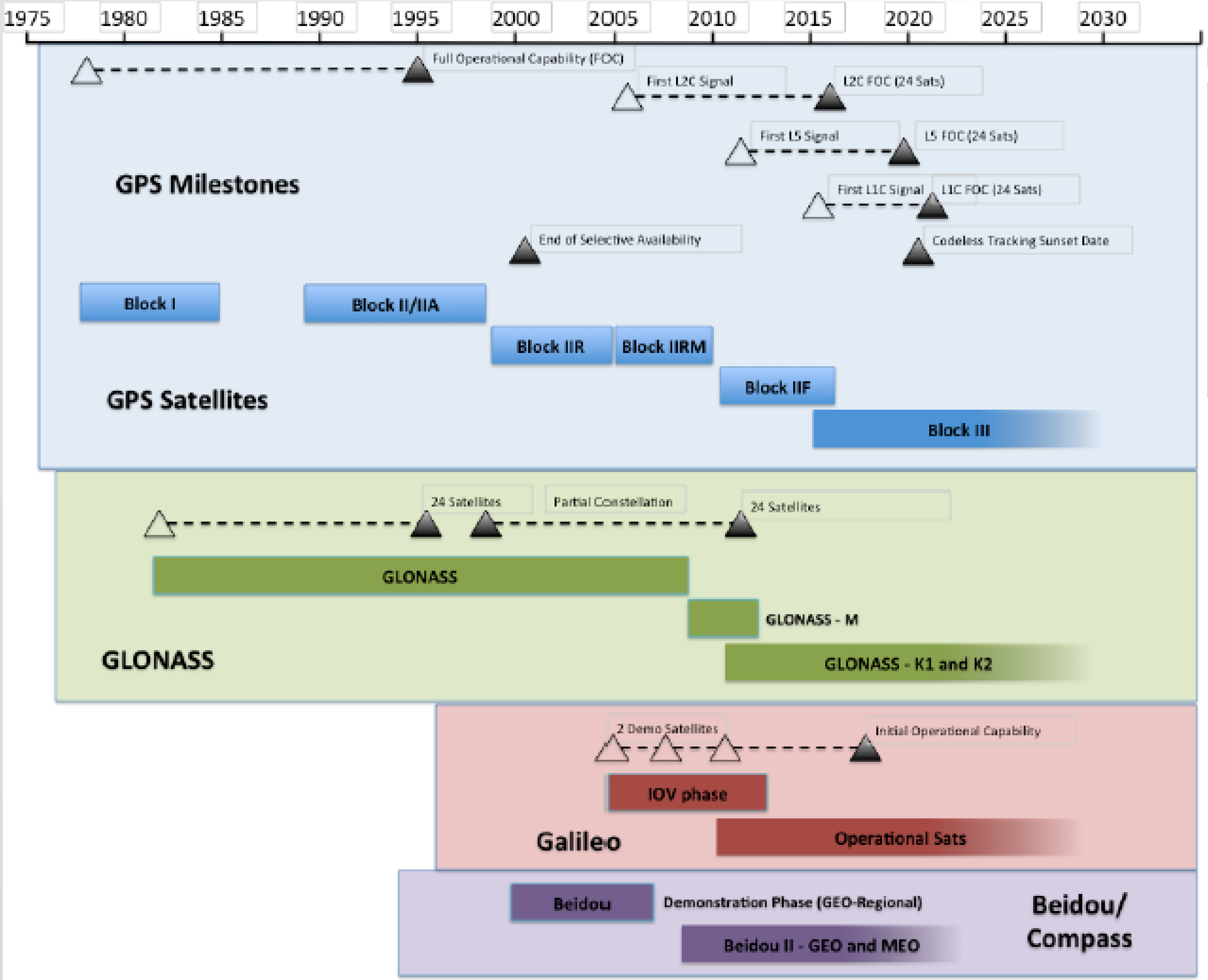
APPROXIMATE GNSS TIMELINE



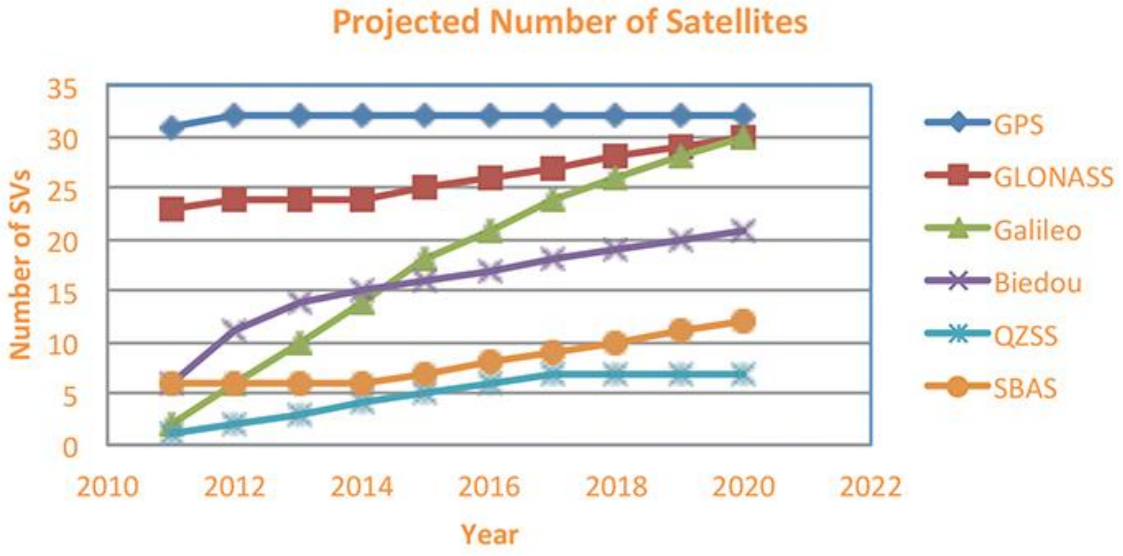
Source: Winternitz, 2017

Global Constellations

U.S.: GPS, 24+ satellites
Russia: GLONASS, 24 satellites
Europe: Galileo, 30 satellites (2020)
China: Beidou(Compass), 35 satellites (2020)

Regional Systems

Japan: QZSS, 7 satellites
India: IRNSS, 11 satellites



Source: GPS World, 2013

GLOBAL SPACE EXPENDITURE

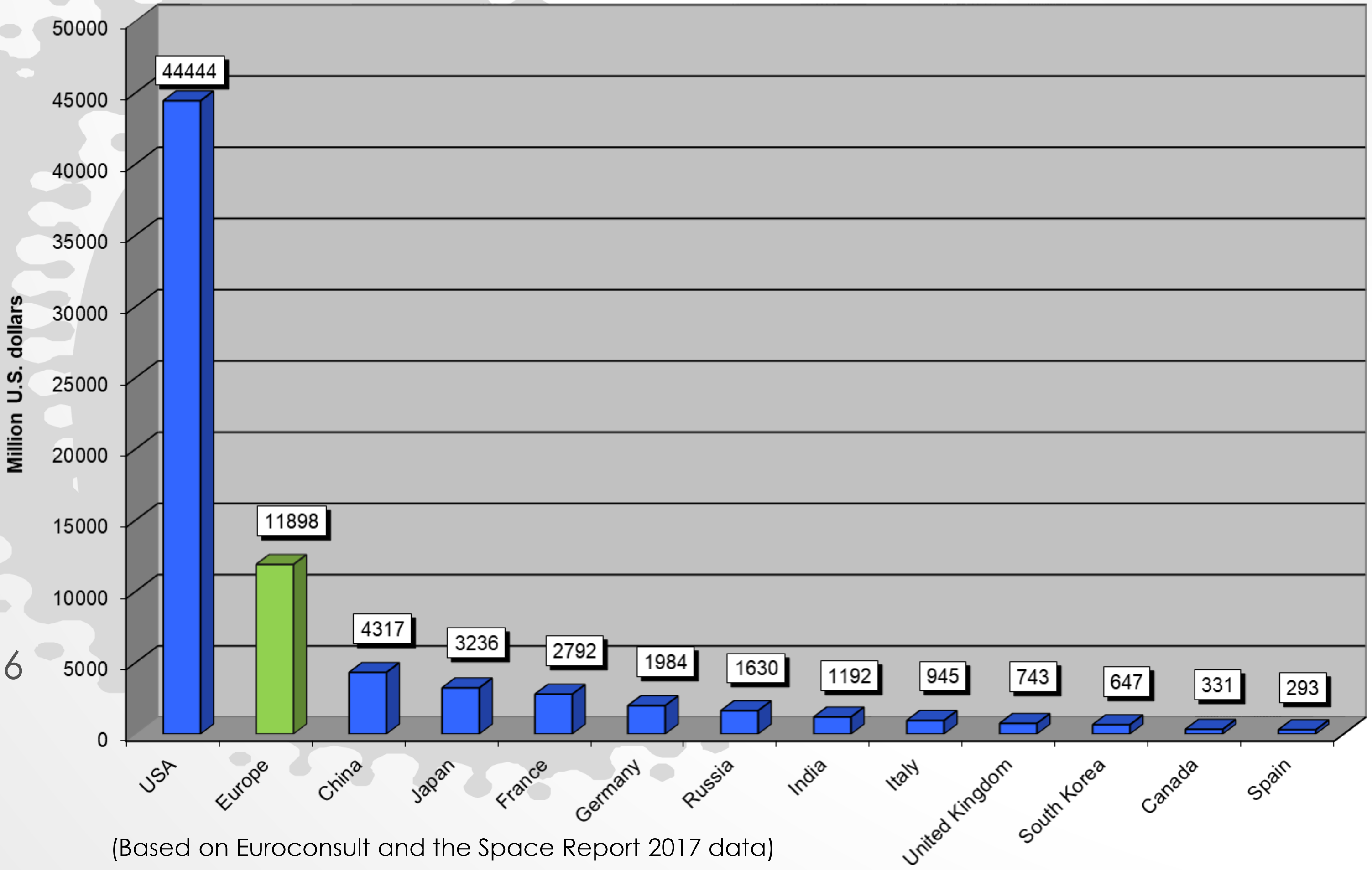
Combined Civil and Defence Space Budgets Overview for 2016

World's space budgets: $76.42 billion

- US: $44.444 billion
- Europe: $11.898 billion*
- China: $4.317 billion
- Japan: $3.236 billion
- Russia: $1.630 billion
- India: $1.192 billion

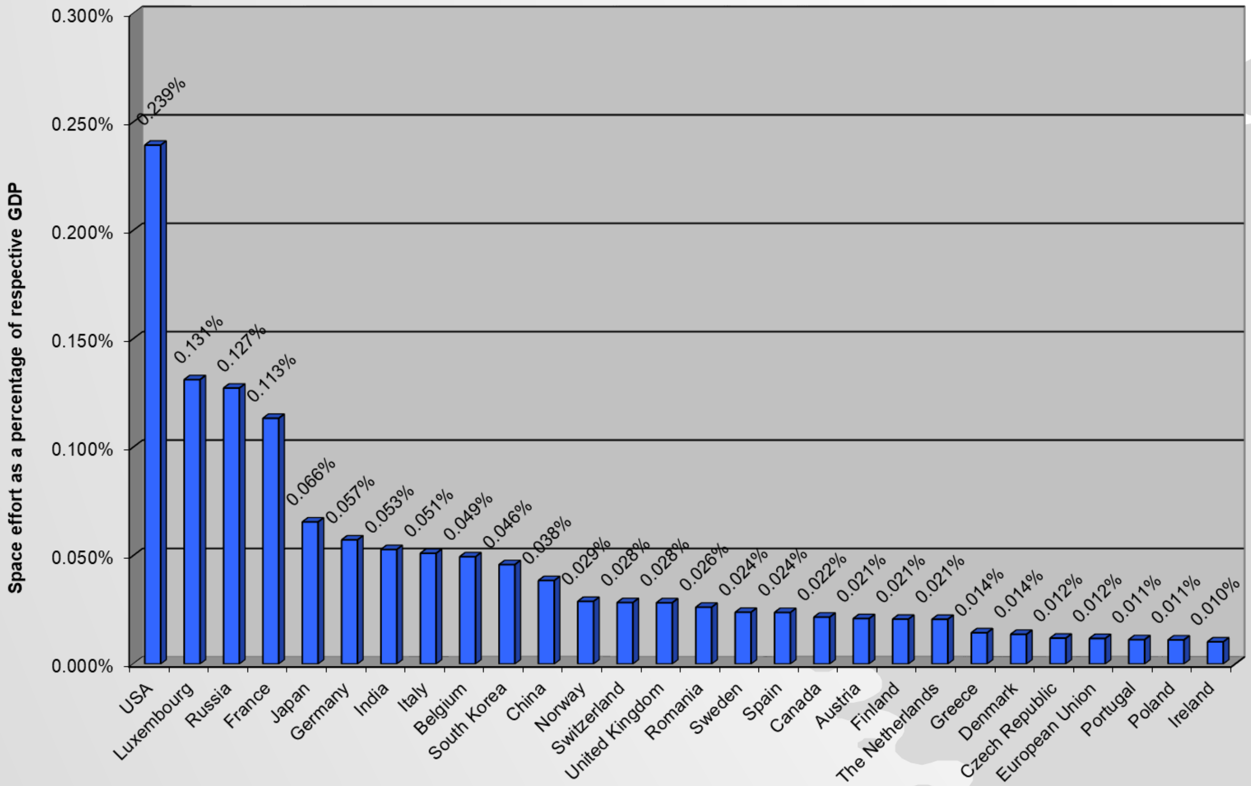
According to the Space Report 2017
Global Military Space Spending in 2016

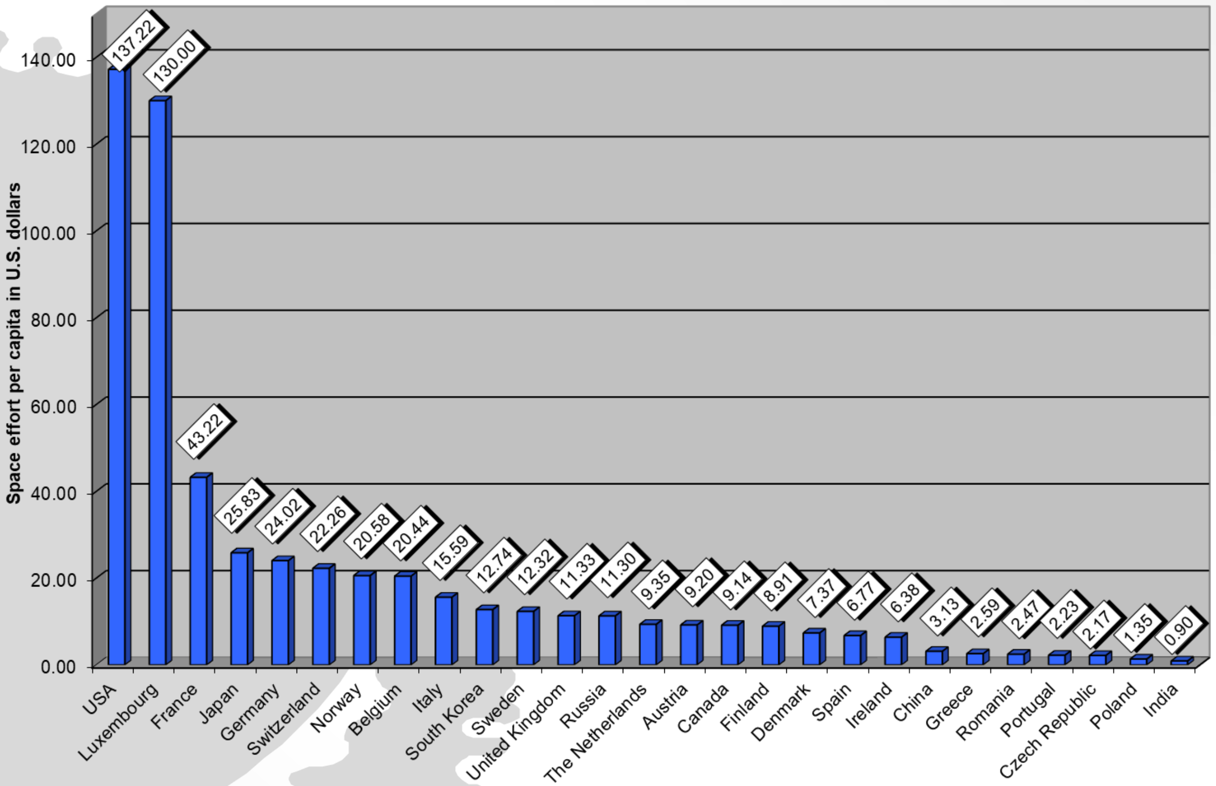
- US: $22.000 billion
- Non-US: $11.000 billion



(Based on Euroconsult and the Space Report 2017 data)

PUBLIC SPACE BUDGETS WORLDWIDE



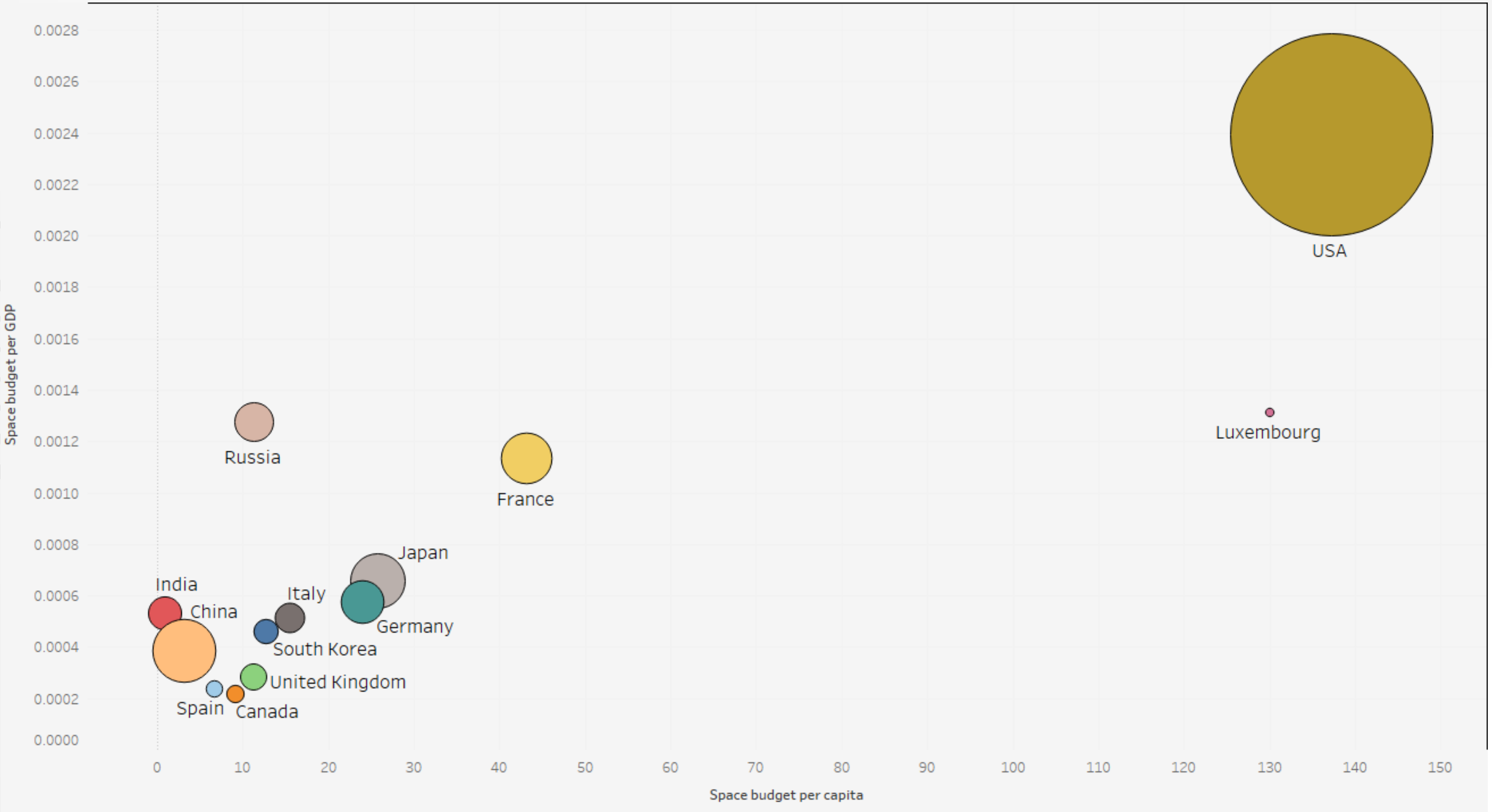


(Based on Euroconsult and the Space Report 2017 data)

PUBLIC SPACE BUDGETS WORLDWIDE

Combining the Charts

- The U.S. invests the most in space in terms of budget, percentage of GDP, and per capita.
- France invests the most in space in Europe (in all categories, with the exception of Luxembourg)
- Russia's investment in space is understated, due to a weak exchange rate (strong in spending as a percentage of GDP).
- China and India estimates are likely understated in per capita spending due to population sizes



(Based on Euroconsult and the Space Report 2017 data)

DOMESTIC MARKET LAUNCHES

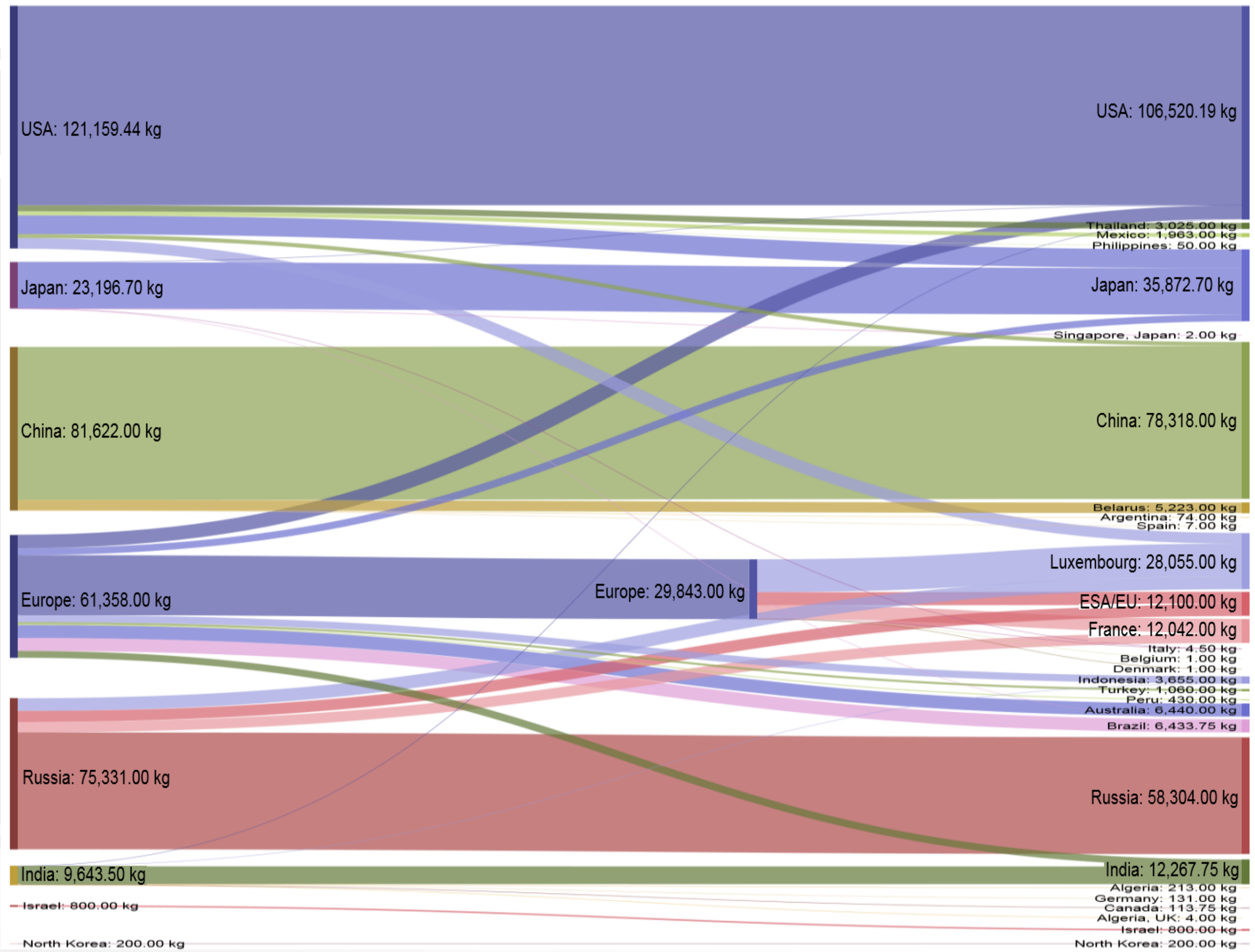
Institutional spending reflected in the share of the total mass of payloads launched into space

Percentage of Domestic Market Launches in 2016

- US: 82.1%
- Japan: 99.9%
- China: 93.5%
- **Europe: 48.6%**
- Russia*: 77.4%
- India: 91.7%

Europe is a leader in the commercial launch market. But with less of an institutional safety net, it is vulnerable to periodic changes in launch demand.

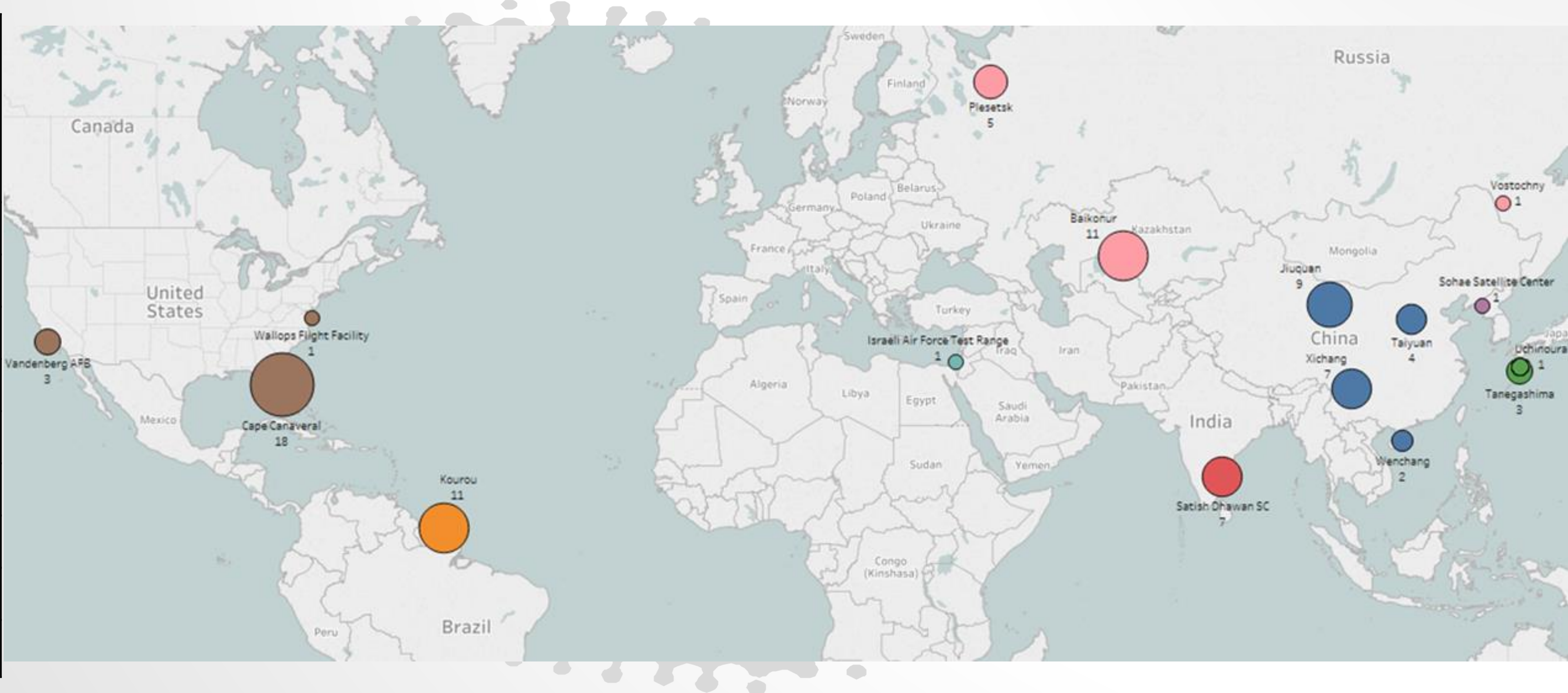
*Russian launchers lifted all the Russian payloads for the year



LAUNCHES FROM SPACEPORTS IN 2016

Countries	Total number of launches	Commercial	Civil	Military
United States	22	11	4	7
China	22	0	18	4
Russia	17	2	12	3
Europe	11	8	3	0
India	7	0	7	0
Japan	4	0	4	0
Israel	1	0	0	1
North Korea	1	0	0	1
Total	85	21	48	16

Source: FAA



EUROPE'S CIVILIAN SATELLITES IN OPERATION

Country	Communications	Communications/ Technology Development	Earth Observation	Earth Observation/ Space Science	Earth Observation/ Technology Development	Earth Science	Earth Science/ Earth Observation	Navigation/ Global Positioning	Space Science	Space Science/ Technology Development	Technology Demonstration	Technology Development	Technology Development/ Educational	Grand Total
Austria												1		1
Belarus	1		1											2
Belgium									1					1
Bulgaria	1													1
Czech Republic												1		1
Denmark			1									1		2
ESA		1	11					18	6		2			38
ESA/USA									1					1
ESA/USA/Russia									1					1
Finland												1		1
France			1			1					1	1		4
France/Belgium/Sweden			2											2
France/Israel			1											1
France/Italy			1											1
France/USA						1								1
Germany	2		8	1	1	1					1	5		19
Germany/USA			2											2
Greece	1													1
Greece/United Kingdom	1													1
Italy						1				1	1	1		4
Latvia												1		1
Lithuania												1		1
Luxembourg	18													18
Netherlands	9											2		11
Norway	6		1				1							8
Slovakia												1		1
Spain	6	1	2									1		10
Sweden	1		1											2
Switzerland												2		2
United Kingdom	25		4									7	1	37
United Kingdom/ESA		1												1
Multinational	50		6						9					65
Grand Total	121	3	42	1	1	4	1	18	18	1	5	26	1	242

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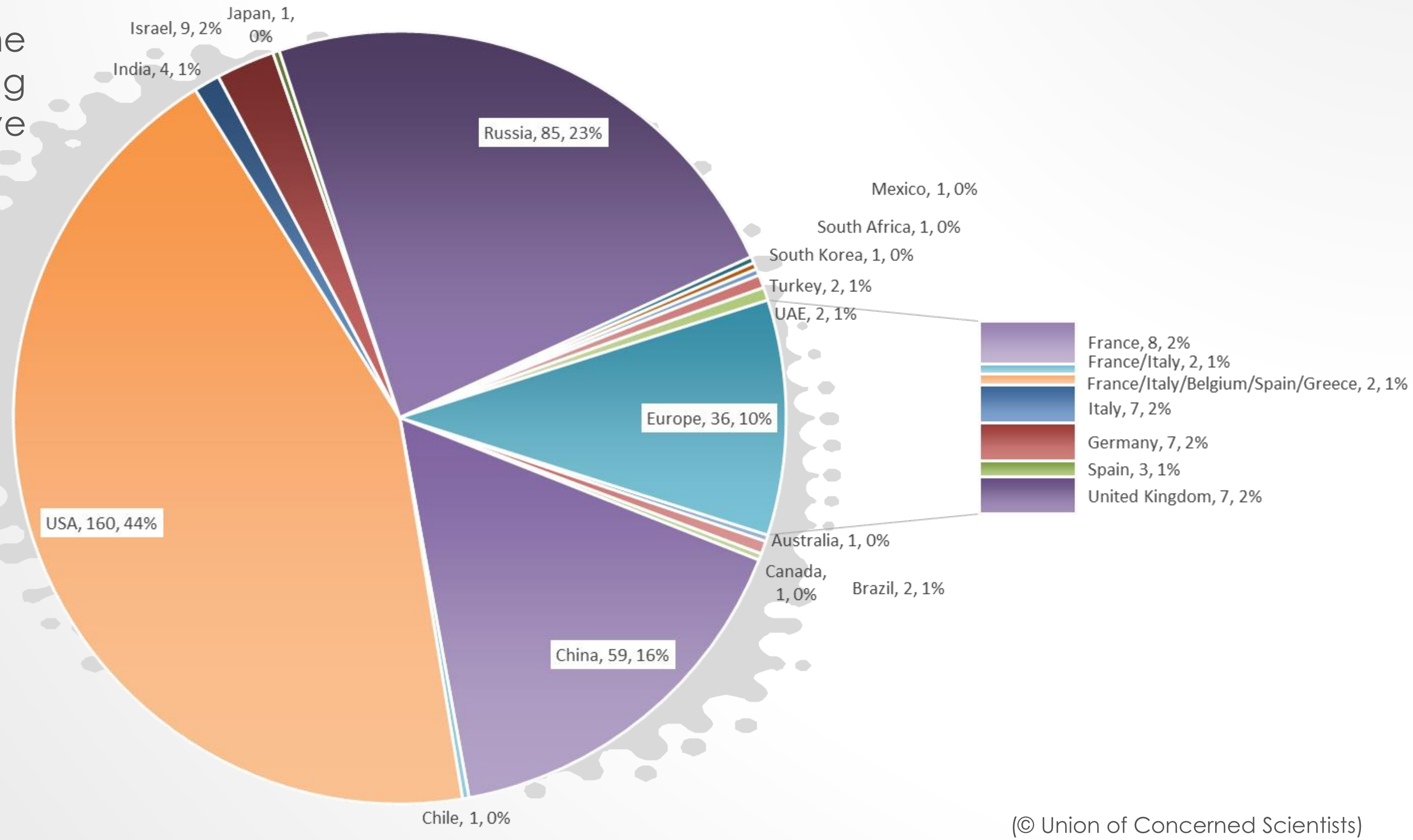
NATIONAL DEFENCE SATELLITES

Approximately 366 satellites of the 1,738 satellites currently orbiting Earth (as at 31 August 2017) have some form of military user.

US: 30.6% Remote Sensing (49)
27.5% Communications (44)
19.4% Navigation (31)
17.5% Technology (28)
3.1% Space Observation (5)
1.9% Space Science (3)

Russia: 50.6% Communications (43)
31.8% Navigation (27)
11.8% Remote Sensing (10)
2.4% Space Observation (2)
2.4% Technology (2)
1.2% Earth Science (1)

China: 50.8% Remote Sensing (30)
37.3% Navigation (22)
6.8% Communication (4)
3.4% Technology (2)
1.7% Earth Science (1)



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EUROPEAN NATIONAL DEFENCE SATELLITES

France (8)

- French Defence Ministry: **Syracuse 3A** and **3B** (Communication)
- DGA (Arms Procurement Agency)/CNES: **ELISA-E12**, **-E24**, **-W11**, **-W23** (Electronic Intelligence)
- French Defence Ministry/DGA: **SPIRALE-A** and **–B** (Infrared Imaging)

France/Italy (bilateral) (2)

- CNES/ASI: **Athena-Fidus** (Communication)
- Italian Defence Ministry/French Defence Ministry: **Sicral 2/Syracuse 3C** (Communication)

France/Italy/Belgium/Spain/Greece (multilateral) (2)

- CNES/DGA: **Helios 2A** and **2B** (Optical Imaging)

Italy (7)

- Italian Defence Ministry: **Sicral 1A** (Communications)
- Italian Defence Ministry/Telespazio: **Sicral 1B** (Communications)
- ASI/Italian Defence Ministry: **COSMO-Skymed 1**, **2**, **3**, **4** (Radar Imaging)
- Italian Defence Ministry: **Optsat-3000** (Optical Imaging)

Germany (7)

- Armed Forces: **COMSATBw-1**and **-2** (Communications),
- Armed Forces: **SAR-Lupe 1**, **2**, **3**, **4**, **5** (Radar Imaging)

Spain (3)

- Hisdesat/Ministry of Defence: **Spainsat** (Communications),
- Hispasat: **Hispasat 1D** (Communications)
- Ministry of Defence/XTAR: **XTAR-EUR** (Communications)

United Kingdom (7)

- Intelsat/Paradigm Secure Communications (Airbus): **Skynet 4C**, **5A**, **5B**, **5C**, **5D** (Communications)
- Ministry of Defence: **Skynet 4E** and **4F** (Communications)

Applications

50% Communications satellites (18)
25% Radar Imaging (9)
11% Electronic Intelligence (4)
8% Optical Imaging (3)
5% Infrared Imaging (2)

POOLING & SHARING RESOURCES

Europe's satellite communications capability is segregated in five separate, near-entirely dedicated systems.

Not much pooling & sharing of capacity is achieved, and other European Member States have little access to Milsatcom, with the exception of Sicral 2 and Athena-Fidus between France and Italy.

European Commission released European Defence Action Plan (November 30, 2016)

- proposes a European Defence Fund to support more efficient spending by Member States in joint defence capabilities, strengthen European citizens' security and foster a competitive and innovative industrial base.

- The three main pillars under this plan include:
  1) Launching a European Defence Fund;
  2) Fostering investments in defence supply chains; and
  3) Reinforcing the single market for defence.

The Commission will promote civil and military synergies whenever appropriate within EU policies.

BUSINESS CASE FOR SHARING RESOURCES

The U.S. invested more than twice as much as the total spending of EU Member States on defence in 2015.

China has increased its defence budget by 150% over the past decade.

Cost of lack of cooperation between EU Member States in field of defence and security costs:

- Between €25 billion and €100 billion annually,
  due to
  - inefficiencies,
  - lack of competition and
  - lack of economies of scale for industry and production.

In Europe, around 80% of defence procurement is run on a purely national basis, leading to a duplication of military capabilities.

And defence spending and greater defence cooperation in Europe would have a positive spill-over effect on the European economy

- the European defence industry generates a total turnover of €100 billion per year
- European defence industry directly or indirectly employs 1.4 million highly skilled peopled in Europe

GOVSATCOM DEMONSTRATION PROJECT

In June 2017, the EDA Steering Board approved the outline description for the Governmental Satellite Communications (GOVSATCOM) Pooling and Sharing demonstration project.

GOVSATCOM will provide satellite communication resources that cannot be obtained on the commercial market with a sufficient level of guaranteed access and security to EDA Member States.

14 participating EDA Member States:

- Spain (Project Leader), Austria, Belgium, Germany, Estonia, Greece, France, Italy, Lithuania, Luxembourg, Poland, Portugal, Sweden and the United Kingdom.
- Norway is also participating in the project under an Administrative Arrangement with the EDA.

CURRENT SECURITY CHALLENGES IN SPACE

Access to Space is Still an Issue

DEVELOPMENTS AFFECTING EUROPE'S SPACE CAPABILITY

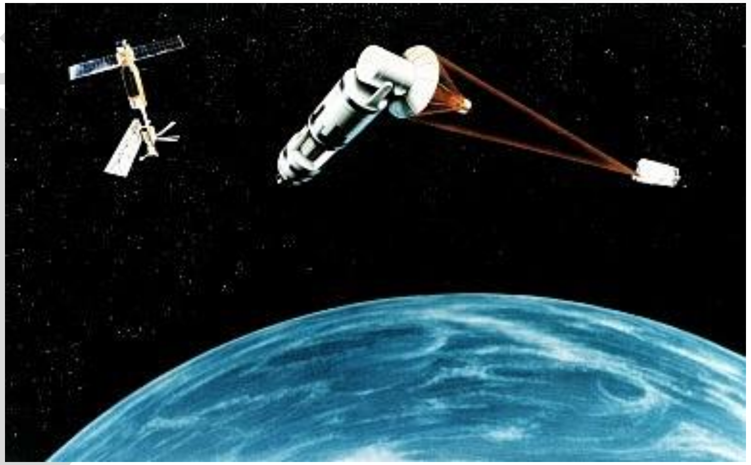
Orbital Debris

(© ESA)

ASAT Testing

(© USAF)

Counter-Space Capabilities



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ORBITAL DEBRIS

About 23 000 orbital debris are regularly tracked by the US Space Surveillance Network and maintained in their catalogue.

These objects can be larger than 5–10 cm at LEO and 30 cm to 1 m at GEO altitudes; and approximately 750,000 objects larger than 1 cm.

Puts the International Space Station (ISS) and operating satellites at risk

SATELLITE BOX SCORE
(as of 4 January 2017, cataloged by the U.S. SPACE SURVEILLANCE NETWORK)

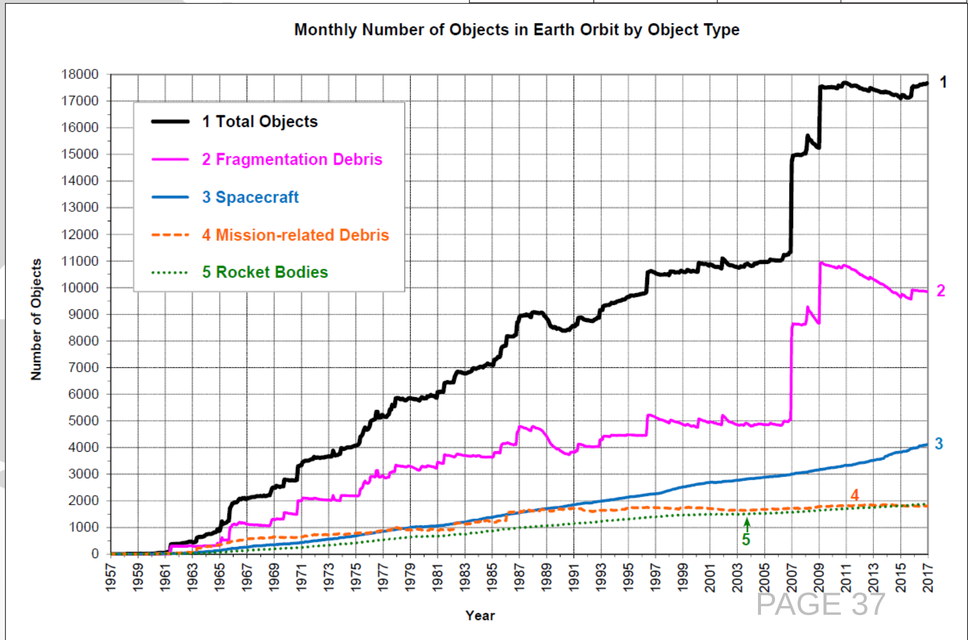
Country/ Organization	Payloads	Rocket Bodies & Debris	Total
CHINA	233	3573	3806
CIS	1508	4838	6346
ESA	73	60	133
FRANCE	62	470	532
INDIA	76	114	190
JAPAN	157	92	249
USA	1405	4314	5719
OTHER	789	112	901
TOTAL	4303	13573	17876

(© NASA, Orbital Debris Quarterly 2017)

Recent Debris Causing Events

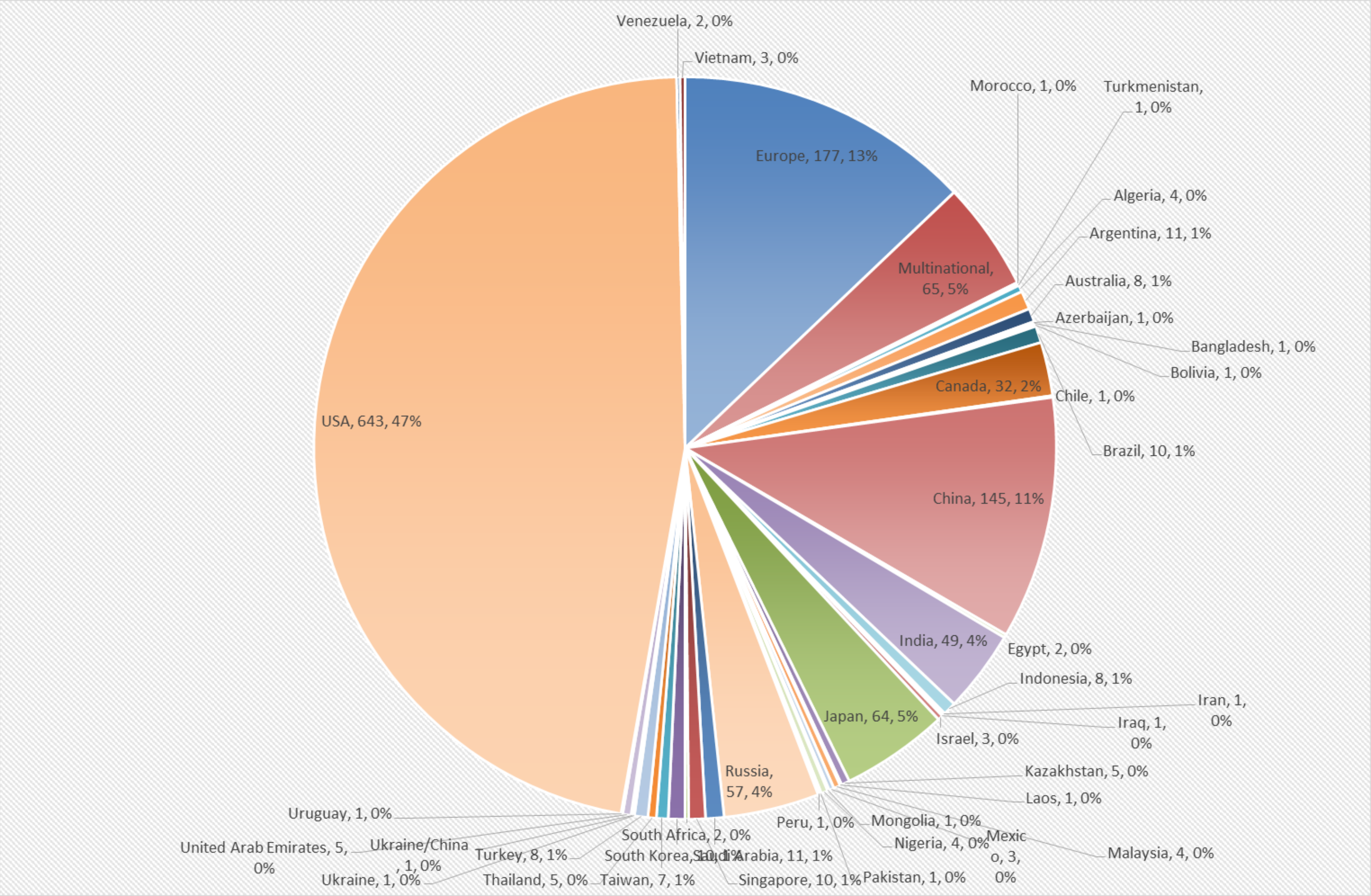
January 11, 2007 – China's ASAT test
- Generated ~3,400 trackable pieces of debris, 25% debris increase

February 10, 2009 – Iridium-33–Kosmos2251 collision
- The first collision of its kind at 776 km altitude
- Generated 2,300 trackable fragments.



CIVILIAN SATELLITES IN OPERATION

1,372 of the 1,738 satellites currently orbiting Earth (as at 31 August 2017) do not have a military user.



(© Union of Concerned Scientists)

ANTI-SATELLITE (ASAT) TESTS

United States	China	Russia
September 13, 1985 U.S. destroyed its '**P78-1 Solwind**' research satellite at 525 km using an air launched missile 'ASM-135'. • Created 285 trackable pieces of debris; all pieces deorbited by 2008 • Four other tests did not generate debris	**January 11, 2007** China destroyed its non-functioning '**Fengyun-1C**' weather satellite at 850 km using a ground-based, medium-range ballistic missile • Created **~3,400 trackable pieces of debris**; over half still in orbit by 2027	**November 18, 2015** Russia conducted the first successful test of its Nudol direct ascent anti-satellite missile (followed two previously unsuccessful tests) • No debris generated
February 20, 2008 The U.S. destroyed its non-functioning NRO satellite '**USA-193**' (whose orbit was rapidly deteriorating) at 240 km with an 'SM-3 missile'. • Created 174 pieces of trackable debris; all pieces of debris had deorbited near the end of 2009 • The SM-3 missile is also part of the Aegis Ballistic Missile Defence programme used the NATO missile defence architecture	**January 11, 2010** **January 27, 2013** **July 2014** **October 30, 2015** China conducted similar missile defence tests. • none generated debris, likely due to the international condemnation to the initial ASAT 2007 test	**May 25, 2016** Russia conducted the second successful test of its Nudol direct ascent anti-satellite missile. • No debris generated

COUNTER-SPACE CAPABILITIES

The New Space Race

United States `	China	Russia
February 2014 declassification of the Geosynchronous Space Situational Awareness Program (**GSSAP**) satellites following China's May 13 launch.	**May 13, 2013** a **ballistic missile launch** had its apex at an altitude above 30,000 km, i.e. near GEO orbit where numerous communication and Earth observation satellites are stationed.	**September 27, 2014** **Olimp K** satellite parked into a GEO orbit between two of Intelsat satellites, Intelsat 7 and Intelsat 901, converging at a distance of 10 km from both spacecraft over a period of 5 months, before relocating near the Intelsat 905 satellite in September 2015.
September 16, 2015 The first two GSSAP satellites taken out of test mode twice by to make observations of specific objects in geosynchronous orbit.	**May 2014** The **Shijian 15** began to converge toward another Chinese satellite Shijian 7, exhibiting atypical propulsion capabilities, followed by an interception with the possible use of a remote capture arm and close proximity operations.	**November 2014** Launch of the **2014-28E** spacecraft, while assumed to be debris, after the launch the object changed its orbit, and then manoeuvred back to a similar orbit to the Rokot launcher's spent upper stage, with the two objects rendezvousing shortly after.
August 18, 2016 a GSSAP satellite was sent to observe the status of the stalled MUOS-5 satellite that had experienced a failure of its orbit raising propulsion system partway through its climb to GEO at the end of June 2016; Two more GSSAP satellites were launched on 19 August 2016.		**March 31, 2015** Launch of **Cosmos 2504**, which made at least 11 close approaches to the upper stage that had launched it into orbit, including at least one case where the upper stage of its launcher appeared to be nudged to a higher orbit.

PROPOSED INTERNATIONAL AGREEMENTS

The ICoC and the PPWT

Draft International Code of Conduct for Outer Space Activities (ICoC)

- In 2008, the EU began developing the ICoC
  - Lukewarm initial reception due to development within the EU system without parallel diplomatic process involving the considerations of the international community.
  - After several revisions and three open-ended multilateral consultations (2013-14), the fifth draft of ICoC issued on 31 March 2014, had gained wider acceptance.
  - Stalled in discussions at the UN in 2015

Draft Treaty on the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects (PPWT)

- In 2008, Russia and China introduced the PPWT to the UN Conference on Disarmament (CD)
  - Submitted an updated PPWT to CD in June 2014
  - Focuses mainly on security issues regarding the placement of weapons in outer space and does not address issues of ASAT missile testing and space debris.

CONTRASTING THE COMPETING INSTRUMENTS

Draft International Code of Conduct for Outer Space Activities (ICoC)

- European-led non-binding set of principles and guidelines
- Agreed to on a voluntary basis
- Would be a separate agreement among interested countries
- Calls for international cooperation and agreed standards of responsible behaviour

Draft Treaty on the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects (PPWT)

- Would be a UN-based process, negotiated at the UN Conference on Disarmament,
- Legally binding treaty
- Lacks verification measures and specific compliance measures
- Focuses on security issues regarding the placement of weapons in outer space
- Does not address issues of ASAT missile testing and space debris

ADDRESSING EUROPEAN SPACE SECURITY

SPACE SECURITY WILL BE THE CENTRAL THEME FOR ESPI IN 2018

Planned Upcoming Studies

- Looking for an Enhanced Role of Europe in Space Security
- Means and Stakes of a Space Power
- Security Challenges for Space Infrastructures - Transatlantic Activities
- Cybersecurity in Space: Threats and Challenges
- Historical Perspectives on Collaboration Between COPUOS and the Conference on Disarmament

Conferences

- 12th Autumn Conference on 'Space Security' (September 2018)

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