



# The new German Space Strategy makes the space sector fit for the future

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6th Eilene M. Galloway Symposium  
Washington D.C., December 1st, 2011



Deutsches Zentrum  
für Luft- und Raumfahrt e.V.  
in der Helmholtz-Gemeinschaft

# Space Policy of the Federal Government: BMWI - Means and Instruments

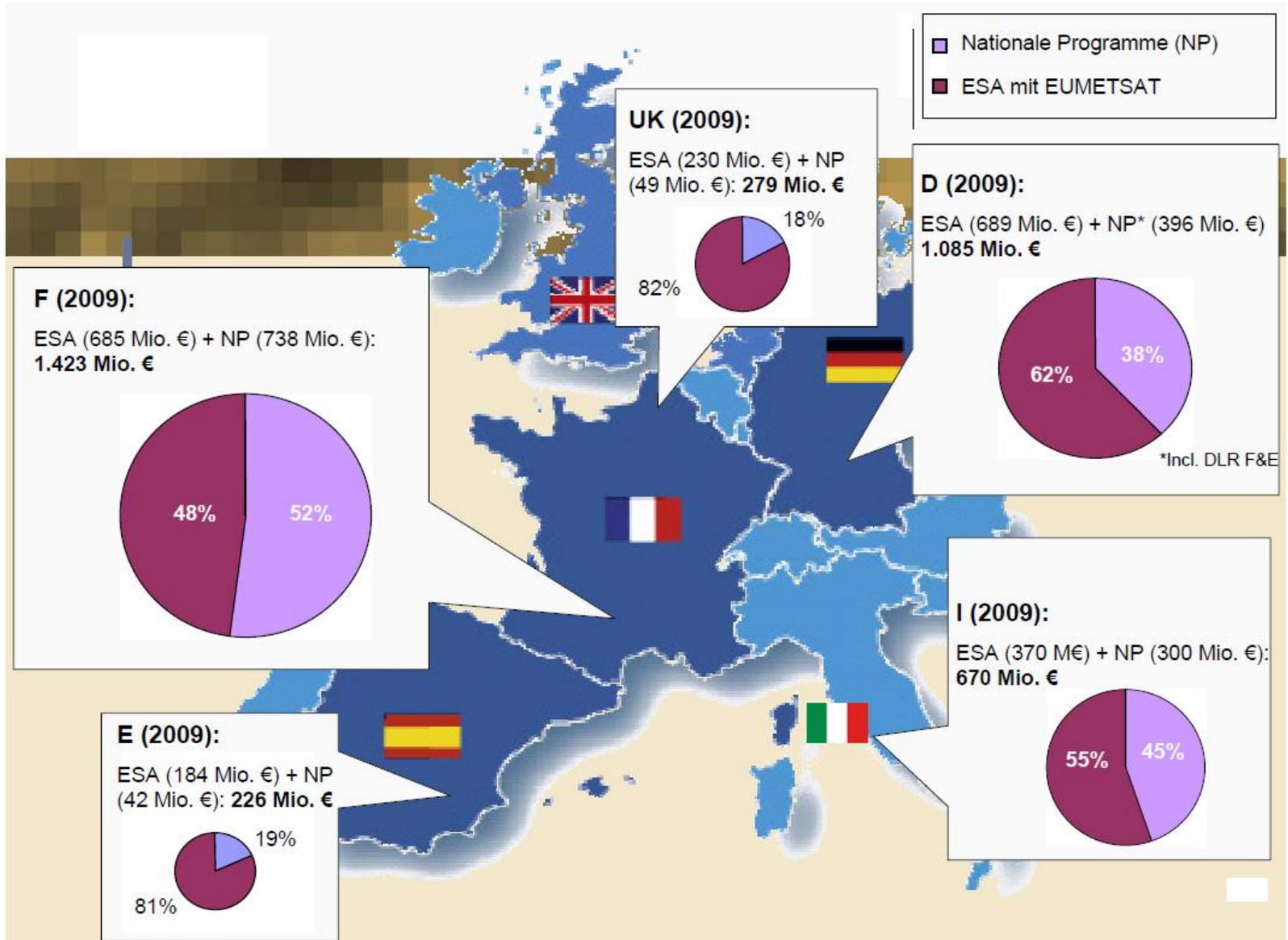
## means / instruments

- participation in ESA programmes, bi- and multi-lateral cooperation
- national R&D space programs
- institutional support to DLR and academia
- PPP, legislation, etc.

## strong focus on European cooperation

- Germany is second largest contributor to ESA (after France)
- e.g. BMWI budget (2011)
  - contribution to ESA programs 611 MEuro
  - national R&D space program 242 MEuro
  - DLR (German Aerospace Center) 158 MEuro





# Space strategy of the Federal Government



1991



1993

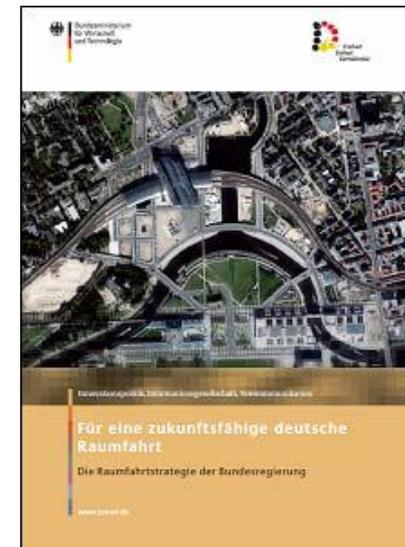


2001



2009

- **approved** by the Federal Government (Council of Ministers) on **Nov. 30** and communicated to the public on 12/01/2010 by Minister Brüderle;
- first comprehensive description of **political objectives and guidelines** since 2001;
- **stresses the strategic dimension of space** for the future development of Germany



# Space strategy of the Federal Government

- draft prepared under **lead of BMWi**, contributions by MoD, Foreign Affairs, Transport
- **consensus** of all concerned ministries (Transport, Defense, Foreign Affairs, Interior, Environment, Agriculture, Development ...) and Chancellery
- **consultation of Industry and Academia** on the draft in September 2010
- **overall positive reactions** by parliament, industry, European partners
- some criticism by parts of academia: e.g. not ambitious enough, more manned spaceflight



# Point of Departure: Setting the Stage

- **space has changed**
  - from a **political situation of the Cold War** - “Space Race” to an **essential tool** for politics, economy, society, science, safety & security
- **Germany has developed a competitive space sector** which has achieved a number of significant successes (e.g. EO, optical SatCom, robotics, HSF...)
- **a fundamentally changed environment**
  - increasing international competition
  - changed legal environment at the European level
  - new US space policy
  - growing importance of private enterprise business models
  - increasing risks (and threats) to space assets



# Space – a key solution to meet Global Challenges

## ➤ globalisation

- flows of data, transportation and goods exchange are set to further expand
- security & safety of the world wide traffic is essential in a distributed global economy
- dependable access to satellite-based services

## ➤ knowledge society

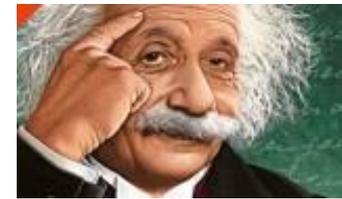
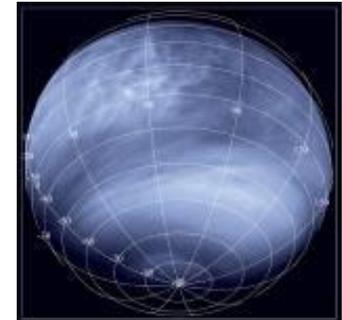
- knowledge is a strategic resource (Germany is short of raw materials)
- science and research are the basis for technical innovation
- technology on the very edge of what is feasible
- access information at any time from anywhere

## ➤ climate change, preserving essential natural resources and global change

- essential to the existence mankind
- analysis and action to deal with changes is required

## ➤ whole-of-government security preparedness

- political environment has undergone substantial changes



# General Guidelines

- **orientation towards benefits for the society and needs**
  - state-funded space activities: “space for the benefit of the Earth”
  - contribution to the challenges facing the global society
  - high levels of funding must result in adequate benefits (innovation / utilization)
  - broader involvement and responsibility of users (public and private)
- **orientation towards the principle of sustainability**
  - industrial nations depend on space infrastructures which are vulnerable
  - conduct space activities in a such manner that also allow that future generations can take full advantage of space
- **intensifying international cooperation**
  - because of technical complexity and high cost
  - correct balance between cooperation and competition
  - European cooperation on large infrastructures (ESA, EUMETSAT, EU), bi- and multilateral cooperation

# Fields of Action – making Germany's space sector fit for the future

## a) expanding strategic space expertise

- strengthen scientific, technical and industrial base within Germany (via National Programme **and** involvement in ESA programmes)
- system capability and leading capabilities in **selected** key technologies
- e.g. earth observation, SatCom, space robotics, SatNav
- downstream markets

## b) establishing a unified legal framework

- nationally: create a reliable legal framework for nongovernmental (commercial) activities, complementing the existing act on satellite data security
- international cooperation on SSA (space debris, collision avoidance, space weather, NEO)
- PAROS; pragmatic step: Code of Conduct



## Fields of action (cont.)

### c) **sustainable reinforcement of Germany's strong position in space research**

- ESA science program and national (bi- and multilateral) activities
- transfer of results to terrestrial applications

### d) **tapping new markets**

- develop competences that give rise to business models (e.g. applied remote sensing and GIS, SatCom, SatNav, Space robotics, comm. SF)
- emerging (public) markets for space technology and services – Space tourism
- ST: launch cost reduction as key to further growth



## Fields of action (cont.)

### e) exploiting space for security & safety applications

- make use of synergies between civil and military developments
- closer coordination among government departments
- building up a national competence for space situational awareness in civil-military cooperation

### f) shaping the distribution of roles in the European space sector (ESA/EU)

- top EU priorities: Galileo and GMES
- avoid double structures; “no need to reinvent the wheel”
- strengthen ESA with its proven mechanisms
- third pillar: national programmes incl. bi- and multilateral cooperation



## Fields of action (cont.)

### g) defining the roles of Germany and Europe in space exploration

- human spaceflight activities focus on ISS utilization (international cooperation)
- exploration to be driven by clear scientific objectives

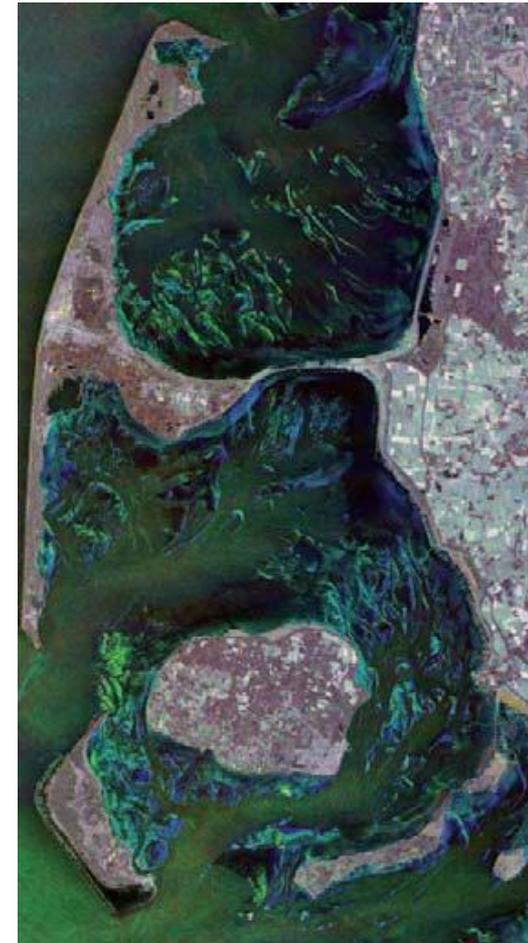
### h) securing technological independence and guaranteed access to space

- ensure access to technologies and to space for the lowest possible cost
- Ariane 5 must remain competitive on the commercial market
- consider possibilities for international cooperation



# Earth Observation (1)

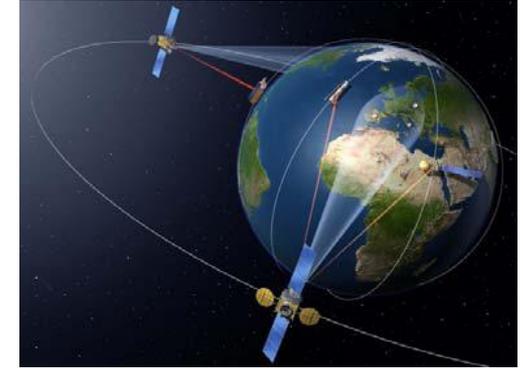
- **essential contributions to**
  - environmental policy, monitoring of environmental treaties
  - weather forecasting, climate change monitoring and applied research
  - sustainable management of natural resources
  - disaster management, early warning, security
- **commercial earth observation is at the edge of reaching self sustainability**
  - new models for financing earth observation systems (public-private-partnerships)
  - new markets and private business models for data and services
  - mixture of state-owned and commercial systems can provide higher flexibility, independence and availability



## Earth Observation (2)

- **strong German focus on Earth observation**
  - complete technology chains: space segment, ground segment, GIS applications
- **leading German contributions to large European programmes**
  - EUMETSAT operational weather satellite programmes
  - ESA scientific earth observation and technology programmes
  - EU/ESA Global Monitoring for Environment and Security - GMES
- **national priorities**
  - SAR and SAR Interferometry (TerraSAR-X, TanDEM X, next generation systems TSX 2)
  - optical (e.g. METimage)
  - hyperspectral (EnMAP)
  - atmospheric sensors (MERLIN, lidar-sensor for atmospheric CH<sub>4</sub>)
- **development of applications, market development**
- **defining a political and legal framework**

# Satellite Communication



## ➤ **space technology with high commercial and strategic relevance**

- high commercial potential
- high relevance for down-stream markets
- relevance for government and security-related applications

## ➤ **current status**

- German companies have a strong position in components and sub-systems
- SatCom is gaining a growing role in the national space programme
- strong position in high bandwidth optical communication payloads (LCT)
- extend system capability for small ComSats (SGEO)

## ➤ **challenges**

- establish optical communication as the next-generation standard
- national technology mission “Heinrich-Hertz” (2015)
- establish data relay capabilities EDRS

# Space Robotics Technology



- **since 2009 space robotics technology is being strengthened as an additional topic in the national space activities**
  - key technology for long term sustainable use of space
  - challenging conditions of space force technological solutions at the leading edge
  - high potential for technology transfer - “spill-over” into terrestrial application (e.g. deep-sea robotics, automated production, health care, autonomous systems...)
- **develop technologies**
  - on orbital servicing & maintenance, telepresence, teleoperations
  - robotics for space exploration (deep space missions)
- **challenge**
  - German experimental mission for on orbit servicing robotics (DEOS)



# Main messages of the German Space Strategy (1)

- **focus on concrete benefit, driven by user demand**
  - applications (governmental or private)
  - research
  - broader basis of responsibilities (in government and industry)
- **focus on strategic technologies and systems**
- **continue to use potential for commercialization** and new funding models (such as PPP)
- **continue to set a clearly defined legal environment**  
National Space Law essential for further commercialization
- **use specific challenges in space technologies to induce technology transfer and innovation**

## Main messages of the German Space Strategy (2)

- **continued support to space sciences and research**, keep balance between basic and applied research
- make use of **synergies between military and civil space**; coordination of technology, industrial and security policy
- **human space flight** focuses on ISS and beyond; decision on possible successor to be based on evaluation of ISS experience
- secure access to **key technologies and launchers**
- maintain **independence of ESA** as intergovernmental organization
- **EU** to focus on applications in support of its policies (at present: Galileo and GMES) and framework conditions

# Conclusion

- **Strategy / policy paper**,  
not down to the project level, no budget projections
- **provides a yardstick** against which to measure future proposals:  
**contribution to solutions to meet global challenges**
- **space** is a tool & environment with infrastructure, **not an end in itself**
- **using space where space technologies provide the best solution:**  
competition with other technologies
- space policy is **benefit-driven**, not technology-driven
- **Germany cannot act alone, but must be able to judge,**  
**to promote and master key technologies and**  
**to secure its space assets.**