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European Space Policy Institute
Director: Kai-Uwe Schrogl

Kai-Uwe Schrogl
Spyros Pagkratis
Blandina Baranes (eds.)

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Space for Society

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Kai-Uwe Schrogl
Spyros Pagkratis
Blandina Baranes
European Space Policy Institute, Vienna, Austria

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Preface

The financial and economic crisis is still an issue of great concern for the global space sector. While space activities fared quite well during the first year of the crisis, effects on public programmes and commercial activities might still become more visible in the future, when public budgets have to be confirmed and when investment cycles in the private sector are completed. So far, however, the governments as well as the companies in the sector have kept to their promises and have been able to even modestly increase their business. This shows that space is regarded on the governmental level as a strategic asset and that it has generated a robust market, which through its services in telecommunications, direct broadcasting, navigation and Earth observation still has a huge potential that can be even further tapped during a situation like the global crisis. Europe is well positioned in this context, but the largest dynamic can be seen in emerging countries, which are partners, markets and competitors at the same time. But so far, growth in the space sector has allowed for beneficial international cooperation and joint economic growth. Europe is taking strong efforts in further developing its internal structures for governing space activities efficiently and seeing a competitive industrial base with manufacturers, operators and service providers grow.

One remarkable event in the timeframe that to is covered by the Yearbook – the period from July 2009 to June 2010 – has been the issuing of a new U.S. Space Policy. A rare expression of a comprehensive approach to all space activities, this document has become the point for extended analysis. While it contains remarkable statements and also changes from the last document of its kind, its impact will have to be seen only in the future. More immediate impacts and concrete effects had a number of policy discussions and events, which all are related to one of the largest issue area for space applications: natural disasters, where space plays a crucial role in their mitigation and related global discussions, as the Summit in Copenhagen, epitomising the problem of climate change. Through this, space received a large visibility and demonstrated its impact. It is for this reason that the thematic title of this Yearbook reflects on "Space for Society", since the application issues – not only for disaster management but also for other areas such as telecommunications, navigation and Earth observation – are highlighted throughout this volume.

As usual, the Yearbook on Space Policy comprises three parts. The first part shows an overview on the global space endeavours. It is prepared in-house in ESPI and it contains the whole spectrum of actors, issues, policies and economic

developments. While its perspective is European, is provides an analytical whole of space around the world. The second part again contains contributions from highly distinguished experts in the field. We have been able to assemble personalities mainly from the academic sector, adding also views from agencies and users. Issues which are covered have been highlights during the period of mid 2009 to mid 2010, of course reflecting on the new U.S. Space Policy and the Copenhagen summit, but also highlighting important European issues, like Galileo or the Lisbon Treaty, and in addition looking into international relations and benefits from space activities for societies world-wide. For this purpose, we have again invited contributors from within and outside Europe, thus showing that the network established by ESPI, the European Space Policy Research and Academic Network (ESPRAN) is getting more and more global. The third part of the Yearbook maintains the additional character of the Yearbook as an archive for space activities. Again prepared in-house in ESPI, a chronology, a bibliography and data about institutions is provided, where readers of the now four volumes of the Yearbook can identify statistical developments and trends.

An important milestone in the preparation of the Yearbook was again ESPI's Autumn Conference, where the authors met for an exchange on drafts of their contributions. Having taken place in Vienna in September 2010 and sponsored by the German Aerospace Center DLR, it provided the forum for a constructive exchange and coordination of the contributions. We appreciated very much the excellent discussion culture at that meeting, which lead to new insights and shared analyses. The discussions at the Autumn Conference were additionally supported by members of ESPI's Advisory Council (its Chairman Herbert Allgeier and its member Alfredo Roma), which also acts as the Editorial Advisory Board to ESPI's book series and the Chairman of its General Assembly (Harald Posch). Thanks also go to Johannes Pseiner, Conor Francois and Renaud Abram.

Kai-Uwe Schrogl, Spyros Pagkratis, Blandina Baranes
ESPI Editorial Team

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List of acronyms

A
AATSR: Advanced Along Track Scanning Radiometer
ACI: Airports Council International
ADF: Australian Defence Force
ADM: Atmospheric Dynamics Mission
AEHS: Advanced Extremely High Frequency Satellite
AFRL: Air Force Research Laboratory
ALOS: Advanced Land Observing Satellite
APRSAF: Asia-Pacific Regional Space Agency Forum
APSCO: Asia-Pacific Space Cooperation Organisation
ARATS: Association for Relations Across the Taiwan Straits
ARMC: African Resource Management and Environmental Constellation
ARTA: Ariane 5 Research and Technology Accompaniment Programme
ARTES: Advanced Research in Telecommunications Systems
AR5: 5th Assessment Report
ASAT: Anti Satellite
ASI: Agenzia Spaziale Italiana (Italian Space Agency)
ATM: Air Traffic Management
ATV: Automated Transfer Vehicle
AVIC: Aviation Industries of China

B
BAE: British Aerospace
BGAN: Broadband Global Area Network
BRIC: Brazil Russia India China

C
CALT: China Academy of Launch Vehicle Technology
CASC: China Aerospace Corporation
CASTC: China Aerospace Science and Technology Corporation
CEO: Chief Executive Officer
CEOS: Committee on Earth Observation Satellites
CFSP: Common Foreign and Security Policy
CGWIC: China Great Wall Industry Corporation

CMA: China Meteorological Administration
CMSEO: China Manned Space Engineering Office
CNES: Centre National d'Etudes Spatiales (French Space Agency)
CNNC: China National Nuclear Corporation
CNSA: China National Space Administration
COF: Columbus Orbital Facility
COFUR: Cost Of Fulfilling User Requests
COPUOS: Committee on the Peaceful Uses of Outer Space
COSMO-Skymed: Constellation of small Satellites for the Mediterranean basin Observation
COTS: Commercial Orbital Transportation Services
CSA: Canadian Space Agency

D
DARPA: Defence Advanced Research Projects Agency
DBS: Direct Broadcast Services
DLR: Deutsches Zentrum für Luft- und Raumfahrt (German Space Agency)
DMSP: Defence Meteorological Satellite Program
DOC: Department of Commerce
DoD: Department of Defence
DSTO: Defence Science and Technology Organisation
DTH: Direct-to-Home

E
EADS: European Aeronautic Defence and Space Company
EarthCARE: Earth Clouds, Aerosol and Radiation Explorer
EC: European Commission
ECB: European Central Bank
e-CORCE: e-Constellation of Observation by Recurrent Cellular Environment
EDA: European Defence Agency
EDRS: European Data Relay Satellite
EELV: Evolved Expandable Launch Vehicle
EERP: European Economic Recovery Plan
EGNOS: European Geostationary Navigation Overlay Service
EISC: European Interparliamentary Space Conference
EJSM: Europa Jupiter System Mission
ELINT: Electronic signals Intelligence
ELV: Expandable Launch Vehicle
EMS: Electromagnetic Sciences
EO: Earth Observation

EPS: EUMETSAT Polar System
ERA: European Research Area
ERC: European Research Council
ERS: European Remote Sensing Satellite
ESA: European Space Agency
ESDP: European Security and Defence Policy
ESP: European Space Policy
ESPI: European Space Policy Institute
EU: European Union
EUMETSAT: European Organisation for the Exploitation of Meteorological Satellites
EUSC: European Union Satellite Centre
EVA: Extravehicular Activity

F
FAA: Federal Aviation Administration
FAO: Food and Agricultural Organisation
FCC: Federal Communications Commission
FLPP: Future Launcher Preparatory Programme
FOC: Full Operational Capability
FP7: Framework Programme for research and technological development 7
FSS: Fixed Satellite Services
FY: Fiscal Year

G
GAC: GMES Advisory Council
GAD: General Armaments Department
GAGAN: GPS-Aided Geosynchronous Augmented Navigation System
GAO: Government Accountability Office
GCM: GMES Contributing Missions
GDP: Gross Domestic Product
GEO: Geostationary Orbit
GEO: Group on Earth Observations
GEOSS: Global Earth Observation System of Systems
GERD: Gross Domestic Expenditure on R&D
GES: Global Exploration Strategy
GIANUS: Global Integrated Architecture for iNnovative Utilisation of space for Security
GIO: GMES Initial Operations
GIOVE: Galileo In-Orbit Validation Element

GIP: Galileo Inter-institutional Panel
GIS: Geographic Information System
GJU: Galileo Joint Undertaking
GLONASS: Global Navigation Satellite System
GMES: Global Monitoring for Environment and Security
G-MOSAIC: GMES services for Management of Operations, Situation Awareness and Intelligence for regional Crises
GOCE: Gravity field and steady-state Ocean Circulation Explorer
GOES: Geostationary Operational Environmental Satellite
GOSAT: Greenhouse Gases Observing Satellite
GPS: Global Positioning System
GSA: GNSS Supervisory Authority
GSC: GMES Space Component
GSC: Guyana Space Centre
GSLV: Geosynchronous Satellite Launch Vehicle
GTO: Geostationary Transfer Orbit
G8: Group of Eight
G20: Group of Twenty

H
HDTV: High Definition Television
HR: High Resolution
HSPG: High-Level Space Policy Group
HTV: H-2 Transfer Vehicle

I
IAEA: International Atomic Energy Agency
IBEX: Interstellar Boundary Explorer
ICAO: International Civil Aviation Organization
ICBM: Intercontinental Ballistic Missile
ICG: International Committee on Global Navigation Satellite Systems
ICT: Information and Communication Technologies
IEA: International Energy Agency
IFAD: International Fund for Agricultural Development
IGS: Integrated Geo Systems
IGT: Innovation Growth Team for Space
IGY: International Geophysical Year
IHY: International Heliophysical Year
ILS: International Launch Services
IMF: International Monetary Fund

IMINT: Imagery Intelligence
IMO: International Maritime Organisation
INMARSAT: International Maritime Satellite Organisation
INSPIRE: Infrastructure for Spatial Information in Europe
IOV: In-Orbit Validation
IP: Internet Protocol
IPCC: Intergovernmental Panel on Climate Change
IRIS: Interface Region Imaging Spectrograph
ISA: Israeli Space Agency
ISAF: International Security Assistance Force
ISC: International Space Company
ISECG: International Space Exploration Coordination Group
ISRO: Indian Space Research Organisation
ISS: International Space Station
ITAR: International Traffic in Arms Regulations
ITU: International Telecommunication Union
IXO: International X Ray Observatory

J
JAXA: Japan Aerospace Exploration Agency
JEM: Japanese Experiment Module

K
KSLV: Korea Space Launch Vehicle

L
LEO: Low Earth Orbit
LM: Long March
LMCLS: Lockheed Martin Commercial Launch Services
LRO: Lunar Reconnaissance Orbiter

M
MDA: Missile Defence Agency
MDG: Millennium Development Goals
MEJI: Mars Exploration Joint Initiative
MEO: Medium Earth Orbit
MERIS: Medium Resolution Imaging Spectrometer
MHI: Mitsubishi Heavy Industries
MoD: Ministry of Defence
MoU: Memorandum of Understanding

MPLM: Multipurpose Laboratory Module
MR: Medium Resolution
MSG: Meteosat Second Generation
MSI: Multi-Spectral Imager
MSL: Mars Science Laboratory
MSS: Mobile Satellite Services
MSV: Mobile Satellite Venture
MTCR: Missile Technology Control Regime
MTG: Meteosat Third Generation
MUOS: Mobile User Objective System
MUSIS: Multinational Satellite-based Imagery System

N
NASA: National Aeronautics and Space Administration
NATO: North Atlantic Treaty Organisation
NEO: Near-Earth Objects
NGO: Non-governmental Organisation
NOAA: National Oceanic and Atmospheric Administration
NORAD: North American Aerospace Defence Command
NPOESS: National Polar-orbiting Operational Environmental Satellite System
NRO: National Reconnaissance Office
NSSA: National Security Space Authority

O
OECD: Organisation for Economic Co-operation and Development
OHB: Orbitale Hochtechnologie Bremen
OPEC: Organisation of Petroleum Exporting Countries
ORFEO: Optical and Radar Federated Earth Observation
ORS: Operationally Responsive Space
OSTM: Ocean Surface Topography Mission

P
PBEO: Programme Board for Earth Observation
PLA: People's Liberation Army
PNT: Positioning, Navigation and Timing
POES: Polar Operational Environment Satellites
PPP: Public Private Partnership
PRS: Public-Regulated Service
PSA: Programme on Space Applications
PSLV: Polar Satellite Launch Vehicle

Q
QDR: Quadrennial Defence Review

R
R&D: Research & Development
RISAT: Radar Imaging Satellite
RLV-TD: Reusable Launch Vehicle Technology Demonstrator
RSCC: Russian Satellite Communications Company
RTD: Research and Technology Development

S
SA: Société Anonyme
SAFER: Services and Applications for Emergency Responses
SAR: Synthetic Aperture Radar
SBSS: Space Based Surveillance System
SDA: Satellite Data Association
SDI: Strategic Defence Initiative
SDO: Solar Dynamics Observatory
SELENE: SELenological and ENgineering Explorer
SES: Single European Sky
SES: Société Européenne des Satellites
SHF: Super High Frequency
SHSP: Strategic Headquarters for Space Policy
SIA: Satellite Industry Association
SICRAL: Sistema Italiano per Comunicazioni Riservate ed Allarmi
SIGINT: Signal Intelligence
SME: Small and Medium Enterprise
SMOS: Soil Moisture and Ocean Salinity
SOHO: Solar and Heliospheric Observatory
SPOT: Satellite pour l'Observation de la Terre (Earth Observation Satellite)
SS2: Space Ship 2
SSA: Space Situational Awareness
SSC: Swedish Space Corporation
SSL: Space Systems/Loral
SSN: Space Surveillance Network
SSOT: Sistema Satelital para Observacion de la Tierra (Satellite System for EO)
SSTL: Surrey Satellite Technology Ltd.
S&T: Science and Technology
START: Strategic Arms Reduction Treaty
STSS: Space Tracking Surveillance System

T
TCBM: Transparency and Confidence Building Measures
TSAT: Transformation Communications Satellite

U
UAE: United Arab Emirates
UHF: Ultra High Frequency
ULA: United Launch Alliances
UN: United Nations
UNCCC: United Nations Climate Change Conference
UNEP: United Nations Environment Programme
UNESCO: United Nations Educational, Scientific and Cultural Organization
UNFCCC: United Nations Framework Convention on Climate Change
UNGA: United Nations General Assembly
UNGIWG: United Nations Geographic Information Working Group
UNIDIR: United Nations Institute for Disarmament Research
UNISPACE: United Nations Conference on the Exploration and Peaceful Uses of Outer Space
UNOOSA: United Nations Office for Outer Space Affairs
UNSC: United Nations Security Council
UNSDI: United Nations Spatial Data Infrastructure
UN-SPIDER: UN Platform for Space-based Information for Disaster Management and Emergency Response
USAF: United States Air Force
USGS: United States Geological Survey
USSTRATCOM: United States Strategic Command
UV: Ultraviolet

V
VC: Venture Capital
VHR: Very High Resolution
VNIR: Visible and Near Infrared

W
WEU: Western European Union
WFP: World Food Programme
WGS: Wideband Global Satcom
WHO: World Health Organisation
WTSA: World Telecommunication Standardisation Assembly

PART 1

THE YEAR IN SPACE
2009/2010

European space activities in the global context

Spyros Pagkratis

1. Global political and economic trends

In 2009 the global financial crisis entered a new stage, in which the adverse effects of last year's credit crisis started to weigh on worldwide economic activity. The year was marked by a fall in global industrial production and trade activity and a consequent steep rise in unemployment. However, the first signs of improvement also made their appearance, as bank earnings and capital levels began to rise again and GDP growth started to return, although it is not expected to reach pre-crisis levels for several years. In 2010 this trend is expected to continue, but economic recovery will be slow and precarious. This year's economic policies are expected to focus on continuing the reform of the financial and banking system, rebalancing the patterns of global trade, boosting private consumption, enhancing international cooperation and restraining unemployment rates before they change from cyclical to structural. The pace of economic recovery is expected to be slow and very different from country to country. Emerging economies will exit the crisis at a quicker pace than advanced ones, but the whole process will remain fragile and extremely vulnerable to adverse events such as rising commodity prices, geopolitical events, or a resurge of protectionism.

1.1. Global economic outlook

In 2009 the global economy appears to be expanding again and this trend is expected to continue in 2010. At present, Asian economies seem to be the driving force behind global economic recovery, whereas stabilisation and modest improvement is the case elsewhere. Apart from Asia however, recovery is projected to be weak and slow by historical standards and GDP growth will remain well below pre-crisis levels until 2014 at least.[1] For 2010 global activity is expected to expand by approximately 3%, after a 1% contraction in 2009. Growth in emerging economies will be significantly higher.[2] This sluggish recovery will be marked by long lasting post-crisis characteristics such as low inflation, a drop in private

consumption and investment, and a steep rise in unemployment which may become structural. Markets and financial institutions have been stabilising and will continue to do so in 2010. Nevertheless, market financial stress and risk aversion will remain elevated for the foreseeable future, which will put considerable stress on households and medium-size enterprises, and will consequently continue to increase bank loan delinquencies. On the upside, international capital flows are on the way to recovering.[3]

In the financial sector the year has been marked by a slow return of risk appetite that has led to considerable currency fluctuations, with the Euro strengthening its position against both the Dollar and the Yen on the second half of 2009, before falling again in 2010. Bank loans to the private sector however are still stagnating, especially in advanced economies. In fact, credit risks remain elevated and the sustainability of bank earnings is still precarious at best: in October 2009 global bank write-downs were estimated to reach $2.8 trillion and more than half of this amount has not yet been recognised. The bulk of these losses are attributed to U.S., UK and Euro zone banks. In addition to this, a further $1.5 trillion wall of maturing dept will have to be met by 2012.[4] By comparison to European banks, U.S. banks have deleveraged faster and this may help credit conditions in that country to ease sooner. Nonetheless, financing conditions for consumers and medium-size companies in developed countries are expected to remain difficult.

In the second half of 2009 global markets continued to stabilise and this is expected to continue in 2010. Even though investment will not attain pre-crisis levels in the foreseeable future, a certain risk appetite has returned. For the moment, however, market recovery seems fragile, a number of financial stress indicators remains high and the fear of a possible reversal weighs heavily on investors. In the context of the credit conditions described above, global markets are thought to remain extremely sensitive to external factors such as geopolitical events or real-estate-related shocks. Real-estate in particular will continue to put pressure on bank balance sheets, whereas subsequent low construction activity is expected to create additional risks for the financial sector in general.[5]

On a global scale inflation moderated to 1% in mid 2009 down from 6% a year earlier and is expected to remain low in 2010 as well. Inflation rates in emerging economies varied considerably from region to region, dropping in Asian countries and rising in East European ones. Advanced economies are still facing mild deflation risks as the pace of economic recovery remains slow, even though inflation rates are expected to rise above zero in 2010. Deflationary dangers in these countries are aggravated by the fact that interest rates have been brought close to zero and there is little room left for additional financial stimulus from monetary policy measures.[6]

Unemployment rose throughout 2009 and is anticipated to continue rising in advanced economies throughout 2010. Both in the U.S. and the Euro zone, unemployment rates are anticipated to exceed 10% in 2010. Non-financial corporations and medium-size companies will continue to lay off workers due to the aforementioned difficult financial conditions. Countries with proportionately greater construction sectors will suffer even greater job losses. Euro zone countries are projected to face higher unemployment rates than the U.S. (up to 12% in 2010) due to a more sluggish recovery and a less adjustable job market. In the medium-term, historical evidence suggests that in the aftermath of major economic crises and the protracted recovering period that succeeds them, unemployment can become structural and difficult to deal with. This might be the case in the Euro zone, where unemployment rates are not expected to fall bellow 10% before 2014 at the earliest.[7] In any event, rising unemployment will pose a major challenge to all advanced economies throughout 2010.[8]

As a result of the above-mentioned factors, governments worldwide will continue to implement extraordinary public support measures for financial institutions well into 2010. These measures however will have to face the challenge of transforming from short-term financial stimulus schemes to medium-term comprehensive reform policies. Formulating these policies faces three major challenges: rallying the necessary public support, choosing the right timing, and respecting as much as possible macroeconomic budgetary and fiscal constraints. Indeed in 2009 and the first half of 2010, public support for the recapitalisation of financial institutions diminished considerably, especially in advanced economies. Public opinion is becoming more and more sceptical on measures that are perceived as generous government bailouts for firms that were largely responsible for the credit crisis in the first place.[9] This development, in conjunction with increasing unemployment, will make governments reluctant to increase recapitalisation measures in the face of mounting political pressure to do the opposite.

In 2010, political considerations together with an improving financial environment will push governments to consider lifting the extraordinary monetary accommodation that they offered to financial institutions in 2008. It seems that the most difficult task ahead will be to carefully choose the timing of this decision. If the unwinding of public intervention comes too soon, it will place the progress made in 2009 in jeopardy. If it is protracted for a longer period than necessary, it will distort market incentives and create fiscal problems for national budgets.[10] Although monetary accommodation measures are likely to stay in force throughout 2010, governments will probably have to decide on this matter before the end of the year.

Finally, lifting recapitalisation measures will have to be accompanied by medium term policy decisions on reforming the financial sector framework, while

restructuring fiscal policies to accommodate the large public dept that the crisis generated in many countries. Prudent macroeconomic decisions will have to be made on both issues in 2010 and this development is already under debate both on a national and an international level. In fact in 2009, there has been an unprecedented level of international cooperation in tackling the credit crisis aftermath. In 2010, this cooperation is expected to expand into taking specific regulatory decisions on reforming the financial sector operating framework, stabilising the economic circle, and avoiding financial protectionism. Indeed, protecting public finances and especially central banks' balance sheets already became a key plank of economic measures in the second half of 2009, and this is expected to continue. In conclusion, the main challenge that advanced economies are facing in 2010 is the need to find room for adequate macroeconomic countercyclical policies in the face of fiscal problems caused by accumulated public dept during the crisis period.[11]

One of the key trends in 2009 and 2010 has been that emerging economies have entered recovery much faster and easier than advanced ones. This is particularly the case for China and India, which escaped a severe recession. With considerable help from its robust fiscal position and the overall health of its banking sector, China has initiated large policy stimuli (up to 5% of its GDP in 2009) and successfully managed to overcome the fall of its exports, which in 2009 were reduced by 30% compared to 2008. This was mainly achieved through boosting domestic demand (private credit rose by 25% in the first half of 2009) and undertaking major infrastructure and industrial retooling projects. This led to an 8.4% GDP growth in 2009 and a continued expansion in 2010.[12]

In fact, China has been the driving force behind the recovery of the entire SE Asia region, where capital flows resumed in 2009 and markets rose sharply. Nevertheless, given the slow pace of recovery in advanced economies, it remains unclear whether Chinese growth will be able to sustain itself beyond 2010 without an adequate increase in exports. At the same time, boosting domestic demand by prolonged credit growth may increase inflationary pressure in the medium term. The Indian economy grew at a somewhat slower pace in 2009 and 2010 as well, at an annualised rate a little above 6%. Growth has been facilitated by adequate monetary policies and a relatively smaller dependence of the Indian economy on exports.[13]

In 2009, Russia experienced an estimated 8.7% contraction of its GDP.[14] This development was the result not only of the world credit crisis, but also of the fall of the oil price that occurred. Low oil prices caused a considerable surge in capital flows in the first half of 2009, which led to an important 5.9% depreciation of the ruble, but this trend was reversed in the 4th Quarter, following a rise in oil prices and a considerable increase in exchange and gold reserves.[15] Domestic demand in the country fell sharply, followed by production (−12.6% in tradable goods in

2009) and investment. Unemployment adjusted to 7.6% at the third Quarter of 2009, from 9.2% at the beginning of the year and it is projected to remain stable in 2010 as well. From the fourth Quarter of 2009 industrial output has been improving slowly and consumption has been regaining lost ground, but real wage reductions and tight credits have caused non-tradable goods production to continue stagnating. At the same time the credit market is not expected to ease throughout 2010.[16]

In economically advanced countries the pace of economic recovery has been considerably slower. In the U.S. the financial situation has been stabilising throughout 2009 and the first Quarter of 2010. GDP contraction has been slowing down from −6.4% at the beginning of 2009 to a 2.2% increase in the third Quarter.[17] On an annual basis, the U.S. economy is expected to contract by 2.45% in 2009, but a modest growth of 1.5% is expected for 2010. Although economic stabilisation is likely to continue, growth will probably not exceed the rate of 2% in the medium turn. In the mean time, credit conditions remain uncertain and unemployment has risen to the highest rates since the early 1980s (in 2009 it is expected to reach 10% on an annual basis). The greatest challenge for the U.S. economy in 2010 is to prevent high cyclical unemployment rates from becoming structural, as well as addressing long-term imbalances in public, corporate and household expenditures.[18]

In Europe, recovery seems to be more sluggish than in the U.S. The Euro zone did not emerge from recession before the end of 2009, and it is predicted to attain growth rates less than 1% in 2010. Further growth will only be attained gradually and in the medium-term. Unemployment reached 10% in 2009 and might reach 12% in 2010. Credit in the Euro zone remains tight due to the greater role of banks in the financing system, as well as major exposures to cross-border risks regarding banking activity in Eastern Europe. Emerging EU economies, such as those of the Baltic States, Bulgaria and Romania, have been hit particularly hard by the crisis, whereas countries with moderate current account deficits or surpluses have shown more resilience.[19] In 2010, public expenses in most EU countries are deteriorating sharply, and addressing this problem will be of great importance. Containing the rise of unemployment and supporting demand under strict budgetary restrictions will prove a major challenge in 2010 for most European countries.

In Japan, stabilisation started in the second half of 2009 and continues in 2010.[20] After a steep GDP drop (−11.9%) in the first Quarter of 2009, modest growth (2.7–1.3%) returned during the rest of the year and continued in 2010.[21] Unemployment rates throughout the aforementioned period remained high by Japanese standards, hovering above 5% on an annual basis in 2009, while at the same time real wages continued to decline. Corporate and bank profits were

substantially reduced and mild deflationary pressures appeared on prices. Business investment continued falling and uncertainty about the future of the economic outlook remained high among both investors and consumers. Nevertheless, industrial output has been increasing since the third Quarter of 2009, profiting mostly from the rise of regional commercial activity, and consumption has been increasingly showing signs of improvement.[22] In general terms, recovery in Japan is following the slow and gradual path witnessed in the rest of the advanced economies, with the addition of a relevantly elevated deflation risk.[23]

1.2. Political developments

1.2.1. Security

Security is a field in which space systems are vital. For the purposes of this report, security is defined in its traditional narrow definition related to defence and the ability to effectively engage in military operations. A broader definition of security is briefly discussed in section 1.2.5. Satellite systems are identified as key enablers of military capabilities. These space applications include image and electronic surveillance gathering, communications, meteorological and navigation/positioning data, among others.

A major development in 2009 and 2010 was the rapid deterioration of the security situation in Afghanistan. Taliban insurgents considerably improved their operational and logistics capabilities in the aforementioned period, resulting in a record high number of casualties for the ISAF coalition forces in the country. These amounted to 520 dead in 2009, a significant increase from 295 in 2008. During the same period, U.S. forces casualties marked a 100% increase, to 316.[24] The bulk of fatalities was attributed to improvised explosive device attacks, which were up by 60% from the year before. Civilian casualties also increased by 12%.[25] The total number of such incidents exceeded 7,200 from 4,169 in 2008, whereas their average explosive charges and destructive capability doubled.[26]

For the first time since August 2009, Taliban insurgents launched a series of suicide attacks inside Kabul. On 28 October 2009 a United Nations personnel residence came under an attack that resulted in the loss of 5 U.N. staff members. As a direct result of this incident, more than 340 U.N. personnel members were relocated outside the country, seriously downgrading the U.N. assistance mission's performance in the area.[27] Taliban forces also resumed their intimidation tactics against the local population with a series of targeted assassination attempts. The overall deterioration in security conditions crippled the United Nation's humanitarian aid and reconstruction programmes.[28]

Security conditions in the country were also affected by mounting political instability. On 19 November 2009, Afghanistan's President H. Karzai was finally inaugurated for a second term. This development ended two months political turmoil between the President and his principal political opponent Dr. Abdullah over the latter's accusations of electoral fraud in the 20 August presidential ballot. President Karzai was proclaimed the winner of the electoral process only because his opponent refused to participate in the second round. However, the run-up to the finalisation of the result increased civilian unrest and paralysed the government. Consequently, public confidence in the country's reconstruction and future also waned.[29]

In the midst of these negative developments, the U.S. President announced on 1 December 2009 a new strategy for Afghanistan. He announced the dispatch of an additional 30,000 troops reinforcement to the country. At the same time, President Obama reiterated his plan to begin the gradual withdrawal of U.S. forces from the country by July 2011. The additional forces proposed would increase annual war costs by $30 billion, or almost by 50% in comparison to the current budget.[30]

The new U.S. policy in Afghanistan followed from a comprehensive strategy document released on 27 March 2009. The new strategy widened the scope of U.S. objectives in the region by including neighbouring Pakistan in its scope of operations. It also recognised that the Taliban principal logistics and command posts were concentrated in Pakistan's border regions with Afghanistan. The proposed action plan included disrupting terrorist operations inside Pakistan, while at the same time increasing military and political assistance to that country. Supporting Pakistan would also involve increased financial cooperation and government building measures to promote democratic rule in that country. The new U.S. policy also called for state building actions in Afghanistan itself, including a new strategic communications and joint civilian-military counterinsurgency strategy.[31]

Another issue that continued to provoke tensions on the international scene was the negotiations regarding the Iranian nuclear programme. On 18 February 2010, the International Atomic Energy Agency (IAEA) published its latest regular two month revue of Iran's atomic energy related activities, in the framework of the relevant U.N. Security Council resolutions. In this document, the IAEA clearly stated that Iran was not cooperating in the verification of the peaceful purposes of its nuclear programme. Furthermore, the Agency found that Iran had failed to meet the requirements set by the U.N. Security Council in order to provide assurances for the nature of its programme. Finally, it particularly took notice of the continued operation of the enrichment facilities in Natanz.[32]