

Proposal for a Council Decision adopting a specific programme for research and technological development, including demonstration, to be carried out by means of direct actions for the European Community (1998-2002) by the Joint Research Centre

(98/C 260/08)

(Text with EEA relevance)

COM(98) 305 final — 98/0184 (CNS)

(Submitted by the Commission on 10 June 1998)

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 130I (4) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

Having regard to the opinion of the Economic and Social Committee,

Whereas, by Decision No .../EC⁽¹⁾, the European Parliament and the Council adopted a fifth framework programme of the European Community activities in the field of research, technological development and demonstration (RTD) for the period 1998 to 2002, specifying *inter alia* the activities to be carried out by means of direct action;

Whereas Article 130 I (3) of the Treaty stipulates that the framework programme shall be implemented through specific programmes developed within each of the activities integrating it, and that each specific programme shall define the detailed rule for its implementation, fix its duration and provide for the means deemed necessary;

Whereas, according to Article 4(2) of the European Parliament and Council Decision No 1110/94/EC of 26 April 1994, concerning the European Community fourth framework programme for activities in the field of research, technological development and demonstration (1994 to 1998)⁽²⁾ and to Article 7(3) of the Council

Decision related to the specific programmes implementing the Direct Action in the fourth framework programme, the Commission has requested to proceed to an external evaluation which has been transmitted, with its conclusions and observations, to the European Parliament, to the Council, to the Economic and Social Committee and to the Committee of the Regions;

Whereas the Board of Governors of the JRC has been consulted on the scientific and technological objectives of this specific programme as described in the working document adopted on 5th November 1997⁽³⁾ by the Commission and also on the present Decision;

Whereas according to Article 130 J of the Treaty, the Decision .../EC⁽⁴⁾, concerning the rules for the participation of undertakings, research centres and universities and for the dissemination of research results, is applied to the present specific programme and allows the participation of the Joint Research Centre in indirect actions;

Whereas in the implementation of the present programme, international co-operation activities could be appropriate, in conformity with notably Article 130 M, with third countries or international organisations;

Whereas the implementation of the present programme also includes activities and mechanisms aiming to stimulate, disseminate and exploit RTD results, in particular towards small and medium enterprises (SMEs), as well as activities supporting mobility and training of researchers;

Whereas, according to the objectives of the first Action Plan for Innovation, research activities in the fifth framework programme must be better oriented to

⁽¹⁾ Common position 31/98, adopted by the Council on 23 March 1998 (OJ C 178, 10.6.1998, p. 1).

⁽²⁾ OJ L 126, 18.5.1994, p. 1. Decision as last amended by Decision No 2535/97/EC (OJ L 347, 18.12.1997, p. 1).

⁽³⁾ COM(97)553 final.

⁽⁴⁾ COM(97)587 final (OJ C 40, 7.2.1998, p. 14).

innovation; whereas the JRC should actively pursue activities in innovation and technology transfer;

Whereas implementation of this programme should be monitored with a view to its possible adaptation to scientific and technological developments and needs; whereas in due course there should be an independent evaluation of the progress of the programme;

HAS ADOPTED THIS DECISION

Article 1

1. In conformity with Article 3 (1) of the fifth framework programme, a specific programme related to direct research and technological development actions, including demonstration, to be carried out by the JRC, (hereinafter referred as the 'specific programme') is hereby adopted for the period from [.....] to 31 December 2002.

Article 2

1. In agreement with Annexe III of the fifth framework programme, the amount deemed necessary for the execution of direct actions by the JRC under this programme (hereinafter referred as 'the amount') is ECU 815 million.

2. An indicative breakdown of this amount is given in Annex II.

3. Of this amount

- ECU 200 million for the period 1998 to 1999, and
- ECU 615 million for the period 2000 to 2002.

This amount will be adapted, in accordance with the conditions established in Article 3 (3) of the fifth framework programme.

4. The budgetary authority shall lay down, in accordance with the scientific and technological objectives and priorities detailed in the present Decision, the appropriations for each financial year, subject to the availability of resources within the pluriannual financial perspectives.

Article 3

1. Annex II specifies the major domains, scientific and technological objectives and priorities of this programme,

which are defined according to the fundamental principles and to the three categories of selection criteria indicated in Annex I of the fifth framework programme.

2. The rules for dissemination of results apply to this specific programme.

3. The general rules for the Community's financial contribution are laid down in Article 4 of the fifth framework programme.

4. Direct RTD Actions are defined in Annexes II and IV of the fifth framework programme.

5. Annex III sets out the specific rules for implementing this programme.

Article 4

With due regard to the criteria set out in Article 3 (1), and to the scientific and technological objectives and priorities indicated in Annex II, the Commission shall:

- a) monitor the implementation of this specific programme and submit, if necessary, proposals for adaptation, in conformity with Article 5 (1) of the fifth framework programme;
- b) make an external assessment of the activities carried out within the areas covered by this programme, as foreseen in Article 5 (2) of the fifth framework programme.

Article 5

1. The Commission establishes a work programme detailing:

- a) the content of Annex II;
- b) an indicative timetable for the implementation of the specific programme.

2. This work programme is updated, if necessary.

Article 6

1. The Commission is responsible for the implementation of the present programme, carried out by the JRC.

2. The Commission is advised by the Board of Governors of the JRC (hereinafter referred to as the 'Board of Governors') in this task.

3. The representative of the Commission submits to the Board of Governors:

- a) projects of measures related to the establishment and updating of the work programme referred to in Article 5 of this Decision;
- b) the terms of reference for the external evaluation foreseen in Article 5 (2) of the fifth framework programme;
- c) any necessary adaptation to the objectives and priorities indicated in Annex II, or the distribution of financial resources indicated in Annex I of the specific programme, to ensure that it is still appropriate in view of scientific and technological developments and needs.

4. The Commission regularly informs the Board of Governors of the implementation of this specific programme.

Article 7

The Commission may request the JRC to execute, on the basis of the criterion of mutual benefit, projects with legal entities established in third countries when this contributes effectively to the execution of direct actions.

Article 8

This Decision is addressed to the Member States.

ANNEX I

INDICATIVE BREAKDOWN OF THE AMOUNT DEEMED NECESSARY FOR THIS PROGRAMME

Type of activity	
Serving the citizen	39,39 %
Enhancing sustainability	43,56 %
Underpinning european competitiveness	17,05 %
Total	ECU 815 million ⁽¹⁾, ⁽²⁾

⁽¹⁾ Of which approximately 6 % may be allocated to exploratory research.

⁽²⁾ This total includes the JRC's budget contribution necessary for its participation in shared-cost actions.

ANNEX II

SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES AND PRIORITIES OF THE DIRECT ACTIONS

A. The mission of the JRC

The mission of JRC is to provide customer-driven scientific and technical support for the conception, implementation and monitoring of European Union policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of commercial or national interests.

Carrying out specific high-level research in close contact with industry and other bodies, the JRC supports the policy maker in addressing the concerns of the individual citizen, alleviating conflict between man and the environment and promoting sustainable development.

The JRC's work depends upon intensive networking with public and private institutions in the Member States through, for example, research networks, joint projects or staff exchanges. This is important because the JRC's mission is complementary to the indirect action part of the fifth framework programme; while the indirect actions will continue to be the European Union's main mechanism for developing and testing new ideas, the JRC's role is to help apply them in the service of the policy maker.

B. Objective: Support the management of change

Progress in technology, especially in the life sciences and information technology, is changing the way we live, the way we do business and the world we live in. These changes are complex and inter-related so those involved with policy need support in understanding how to harness the technologies to provide better services to the citizen, to allow industry to take advantage of new opportunities and to promote policies that protect the citizen from the risks that accompany the benefits of such changes. JRC as the scientific arm of the Commission, must be able to underpin the management of change by supporting the European Union policy making process through: facilitating a better understanding of emerging issues; providing scientific and technical support to the elaboration and implementation of policies; providing realistic monitoring of the effectiveness of policy measures.

The two selection criteria for JRC activities are:

- relevance to European Union policies. An understanding of the policy agenda allows JRC research to be timely and support the formulation of policy where it is most needed;
- subsidiarity. This has two aspects. First the research must be in an area where European Union involvement is appropriate and secondly it should be appropriate for this involvement to be through the JRC. Thus JRC operates in areas such as cross-border-issues, consumer protection and anti-fraud where its unique pan-European identity provides an added-value.

C. The JRC programme

JRC's specific programme for the fifth framework programme reflects the large changes that have taken place in Europe and the wider world in the past ten years. Whilst these changes have all been beneficial for growth and prosperity, care is needed to ensure that the growth continues, that European industry can compete on a fair basis within the internal market and on the wider world market, that the growth is sustainable and that Europe's citizen's can live in a clean and safe environment.

Accordingly JRC's programme has been divided into three main themes:

- I. Serving the citizen
- II. Enhancing sustainability
- III. Underpinning European competitiveness

The objective of the first theme is to provide support to policy that protects individual citizens. This includes measures to give the consumer confidence that the food he or she eats or buys is identified and labelled correctly, that the European tax payer is protected against fraud, that he or she can fully utilise the benefits of modern medicine, that the information that he or she receives is dependable and that he or she is protected against natural and man-made hazards.

The second main theme is sustainability; achieving growth whilst protecting the environment, conserving natural resources, maintaining biodiversity and ensuring that European Union can continue funding the relevant policies and avoiding that efforts in these regards are not undermined by fraud. It is a major European policy objective that environmental considerations be integrated into all other policies and framing legislation that achieves this integration whilst maintaining a broad free market policy is a major challenge to legislators. JRC will support sustainability through analysis of the environmental impact of

policy options, through support to anti-fraud measures in the agriculture and fishery policies, through support to the international effort to prevent global change and through the study of how European ecosystems are changing and could be preserved.

The main objective of the third theme is to contribute to the European Union's industrial competitiveness policy by supporting the transfer of knowledge and research results from the scientific community to industrial users. The JRC will for example, exploit its specific expertise to facilitate the utilisation of the latest technologies by emerging industries, such as earth observation and advanced materials (e.g. biomaterials). Other appropriate actions will be taken to support key policy areas such as enlargement and integration of candidate countries into a common internal market, pre-accession and European Union-Mediterranean cooperation, where further efforts are required to optimise potential synergies between the scientific and industrial communities of the European Union and its partner countries.

Two horizontal elements run through all three JRC research themes. The first of these, measurements, standard and testing, constitutes one of the key specialities of the JRC. The second is a techno-economic intelligence that can provide European Union institutions with timely advice concerning the development of new technologies, the likelihood of breakthroughs, the social challenges that they pose and their possible impact on policy. This includes monitoring developments in the other major industrialised trading blocs to determine what lesson can be learned. Both these tasks are generic to all JRC activities even where not explicitly mentioned.

Finally the program which follows should not to be considered a rigid blue-print for the work programme of JRC over the next four years but rather a general outline that reflects the current view of the policy agenda and its priorities. Changes to the JRC program are to be expected as science and technology advance and as the policy agenda and the priorities of the customer change.

I. SERVING THE CITIZEN

The first theme of JRC's research is centred on the citizen. The objective is to support those European Union policies that are intended to protect him or her, provide him or her with information, maintain his or her health and protect his or her safety.

Consumer policy and consumer health protection are most important factors in European Union policy and, in fact, the legal basis for consumer protection will be further strengthened by the Amsterdam Treaty. The main objectives of the policy are to protect the consumer in the internal market; to reinforce market transparency; to improve consumer confidence, especially by a more complete and effective information and education; develop a system of dialogue and consultation between the European Commission and organisations representing consumers, and improve the dialogue between the latter and industry; and to ensure that the interest of the consumer are given due consideration in the development of other European Union policies. JRC will provide scientific support for this policy.

Along with biotechnology, information technology is the fastest moving technology and the European Union's information society initiative, whilst recognising that progress is driven by market forces, ensures that policy fully takes advantages of the benefits of the technology and that individuals can depend on information that has been processed securely. JRC will support the initiative through technical advice on dependable services and improving the ease of access to information.

The third thrust of JRC's effort in services to the citizens is in health. The objective here is to exploit specific technologies where the JRC has unique technologies and expertise for the diagnosis and treatment of disease.

Beside safety of food and feed products, European Union measures to protect the safety of citizens include, amongst others, car safety legislation, directives on industrial safety and construction guidelines. JRC will provide a technical back-up to these measures, determine how new technologies can help cope with natural disasters with a cross-border dimension such as flooding and contribute to the European Union effort on civilian de-mining.

I.1 *Consumer protection*

For consumer health European Union institutions manage scientific committees whose work is based on excellence, independence and transparency; carry out inspections to ensure that rules of hygiene and food safety are respected; and evaluate and assess possible risks to consumer health.

This marked strengthening of consumer policy has been prompted by the general desire to match, on the one hand, the rapid growth in the possibilities offered by advanced technologies to increase the variety and lower the cost of products in the market by, on the other hand, adequate measures to protect consumers. It is clear that a strong scientific support to this policy is required — both to understand the complex issues involved and to apply the latest technology for checking the quality and origins of products. JRC will support European Union policy in this area by applying emerging technologies for consumer protection measures and will be ready to assess and react to new hazards as they occur. This work will involve:

- research to underpin the harmonisation and validation of methods for quality and safety analysis of feeding stuffs, food, beverages, and consumer products; provision of references for the determination of food and beverages authenticity and origin, for the establishment of inspection practices and for risk-assessment; methods and references in support of food-labelling and development of anti-fraud techniques;
- support to implementation of Community policy on biotechnology including methods for the monitoring and detection of genetically modified organisms and risk assessment studies;
- toxicological studies on the impact and health effect of diverse food contaminants, toxic chemicals (e.g., endocrine disrupters) and pathogenic micro-organisms; establishment of models and procedures for risk assessment;
- validation of safe alternative procedures to in-vivo experiments currently used to determine the toxicological hazards posed by chemicals, pharmaceuticals and consumer products.

I.2 *Medical and health applications*

Several JRC generated technologies related to nuclear engineering, metrology, informatics and material sciences have potential applications in the area of medicine and health care and are sufficiently mature for further development. The implementation of this work will rely on the use of JRC facilities and unique expertise, and will continue to be carried out in networks together with the medical and pharmaceutical communities; it will include:

- active support to development of anti-cancer therapies based on nuclear technologies, applications of boron neutron capture therapies and alpha-immuno therapies and to medical imaging;
- prenormative research and validation of testing methods for bio-compatible materials and bio-mechanical components; qualification of certain medical equipment for the harmonisation of norms and standards; development, production and certification of reference materials for clinical diagnostics and validation of testing instruments;
- support to telematics systems for the secure exchange of regulatory information on pharmaceuticals in the European Union.

I.3 *Benefiting from the information society*

JRC's information technology expertise will be used to support dependability aspects of the European Union's information society initiative and to strengthen fraud control measures; the work includes:

- support to the European dependability initiative including research on systems survivability, dependability characterisation of services and qualification procedures for embedded systems; application and demonstration of emerging networking technologies, decision support systems and medical data systems; use of research results in statistical and geographic information applications;

- support to anti-fraud measures including the development and operation of effective, reliable and safe communication systems amongst European Union public authorities and the Commission, development of an early-warning system and methods for analysis and control of large quantities of information from different sources.

1.4 *Safety of the citizen: man-made hazards and natural hazards*

The European Union has a number of measures to protect individuals against hazards. These include standard in car construction, high pressure equipment, obligations on the labelling and notification of dangerous chemicals and the notification of accidents. JRC plays an active part in the implementation of these policies and in support for the development of new safety measures:

- support of Community industrial safety regulations through analysis of industrial accident data, supply of information to the competent authorities and industry and technical advice to the Commission;
- design, prototyping, validation and harmonisation of inspection procedures for High Pressure Equipment, with a view to provide maximum safety at the work place; support to the development and implementation of new standards. Interactions of hydrogen with structural materials and preparation of industrial safety norms and standards;
- monitoring, control and management of chemical products: implementation and improvement of regulations for the notifications, authorisation, classification and labelling of new and existing chemicals; research on environmental risk assessment;
- maintenance and further development of a research platform contributing to the scientific and technical basis needed for civilian land de-mining operations; compilation of an index of mine types and their signatures; development of strategies for examining mine fields and establishing secure detection and destruction methods; establishment of reference criteria and standards and validation of clearing methods and available devices;
- chemical characterisation and tools for the determination of the origin of illicit drugs;
- characterisation of the structural safety of transport vehicles and crash barriers; calibration of test facilities in the Member States together with validation of simulation methods intended to complement traditional impact tests;
- support to the establishment of a common European reporting system for in-flight incidents including analysis of the influence of human error;
- support to the formulation and development of construction standards (Eurocodes); research to ensure safety and reliability of buildings and civil engineering structures against seismic movements, rapid impacts and traffic vibrations including applications for the preservation of significant monuments for the European cultural heritage, assessment of their degradation and techniques for their restoration;
- applications of Earth observation techniques for the risk and damage assessment, monitoring and post-crisis management of natural hazards such as forest fires, floods, landslides, droughts and coastal storms.

II. ENHANCING SUSTAINABILITY

Technological development, sustainable growth, respect and care for the environment are key issues for the Union, enshrined in the Treaty and pursued through common policies and actions.

The Community's Fifth Environmental Action Programme (1992-2000) forms the basis of environment policy of the European Union and describes the challenge of the 1990s as making progress towards sustainable development. A recent published action plan identifies five priority areas where Community action needs to be stepped up. These are firstly improved integration of the environment into other policies such as; agriculture, transport, energy, industry and tourism; secondly the use of a wider range of instruments, especially market based instruments but also structural policy, to implement Union policy; thirdly improving the implementation and enforcement of Community legislation; fourthly a raising of

public awareness and lastly a raising of the Union's profile in international affairs strengthening co-operation with Central and Eastern European countries and the Mediterranean Partnership countries, enhancing the European Union's role in international environmental actions and dealing with trade and environmental issues.

JRC's scientific and technical services will provide the expertise necessary to help in the understanding of the issues involved and to support the implementation of all five points of the action plan. Its broad range of disciplines will contribute to the establishment of sound and feasible limits for pollutants, the production of commonly accepted reference materials and measurements for monitoring them, the determination of the impact of proposed legislation, the identification of the best available technologies and the assessment available scientific knowledge for improving industrial processes and reduce pollution, the understanding of global climate change processes and their impact, the identification of new technologies that could affect sustainability. Particular efforts will be made in the energy and transport sectors.

The JRC research aimed at enhancing sustainability will provide support to the Commission, the European Parliament, the Member States and relevant European Union Agencies, and will include the following targeted issues:

II.1 *Integration of environmental protection in other European Union policies*

The Commission is obliged by Treaty to assess the consequences of any proposal that has an impact on the environment and to endeavour to integrate sustainability objective into all sectoral policies such as agriculture, energy, transport and regional development. JRC will support this effort through:

- socio- and techno-economic studies to improve the integration of environmental protection in sectoral European Union policies, including case-studies and development of methods to measure and analyse regulatory instruments (e.g. 'green-accounting');
- research on land cover and land use dynamics, regional and urban development trends; research on agro-environmental issues mainly using earth observation; coastal zone management, development and harmonisation of indicators of environmental degradation.

II.2 *Pollution prevention and control*

European Union legislation requires that new industrial developments use the best available techniques in order to reduce pollution in an integrated manner (i.e., to take account of all forms of pollution — air, soil and water). As a support to this and all other pollution control management measures it is a prerequisite that systems be developed for detecting pollutants and that measurements throughout the Union be harmonised. JRC's work will therefore involve:

- support to environmental legislation for integrated (e.g. water, air, soil) pollution prevention and control in industry; development of the reference framework for the use of best available techniques in several industrial sectors; assessment of the impact of legislation on competitiveness and employment;
- support to the international harmonisation of pollution monitoring techniques; development and production of reference materials and measurements in different matrices (e.g. soil, water, air, biota, etc.), for pollution control;
- research to underpin the harmonisation and validation of reference methods for the analysis of water quality, water monitoring, water treatment and water management; assessment of toxicological risks posed by water pollutants; interventions in emergency cases; procedures and criteria for water quality control; studies on water management practices and their impacts in geographical areas protected by European legislation and in those prone to flooding and drought;
- development of techniques for localisation of soil contamination due to industrial and military activities and to monitor marine pollution events (e.g. algae blooms, oil spills) including the detection of vessels causing pollution;

- research to underpin harmonisation and validation of air-quality control methods and criteria for air-quality in urban and con-urban areas; impact of alternative fuels on air quality and emissions of micro-particulates; surveillance of radioactivity in the environment; regional programs for environmental monitoring of selected regions (e.g., the Alpine Convention).

II.3 *Global change*

By signing the 'Kyoto Protocol' industrialised nations have committed themselves to reducing greenhouse gas emissions. The European Union, which negotiated on behalf of the member states, has promised to reduce emissions to 8 % below 1990 levels. The European Union needs strong technical support in order to maintain credibility as a Party to the Climate Convention, strengthen its position on the international scene, understand possible futures for Europe including implications for managed and unmanaged natural resources, public health and biodiversity, highlight risks and uncertainties and formulate appropriate policy. JRC will support European Union policy by:

- study on the fluxes of greenhouse gases and aerosols; research on the processes leading to green house emissions; assessment of the consequences of the Kyoto Protocol on emission levels, air quality, climatic change and the European economy; support to European political initiatives;
- exploitation of earth observation for mapping, monitoring and making an inventory of key global, marine and terrestrial resources. Global information systems and models will support the analysis and understanding of observed trends. Access to global data sets will be provided to European research networks.

II.4 *Energy and transport*

The final consumption of energy in Europe is divided almost equally between industry (29 %), transport (32 %) and the household and tertiary sectors (39%). The majority of this is from fossil fuel with petroleum products dominating the transport sector and almost two thirds of all coal being used for the production of electricity. Only by effective measures to reduce emissions and replace fossil fuels with renewable energies can Europe respect international agreements and achieve sustainable growth. The 1996 Green Paper on renewable energy found that the European Union Treaty offered ample scope for promoting renewable energy and suggested that the European Union reinforce its policy in order to achieve a target 12 % of gross inland energy consumption by 2010. JRC will support European Union policy through:

- integration of renewable energies in energy systems and related socio-economic studies; development of new testing techniques and proposals for the preparation of norms and standards for photovoltaic and solar thermal systems, the new generation of energy — storage systems, fuel cells and the typology of insulation materials, study of hydrogen as a fuel with particular regard to safety issues and analysis of techno-economic aspects;
- improvement and assessment of advanced materials and new surface treatments to enhance the safety and efficiency of high temperature systems; applications to the reduction of emissions and improvement of cost effectiveness of high efficiency power generation systems and components, including engineering and materials techniques for extending operational lifetimes of engines and plants; contribution to the development of new norms and standards. Harmonisation of testing methods, inspection procedures, and standard for characterising structural materials and components;
- research on the interaction between neutrons and materials; provision of neutron reference data for energy production in the framework of international conventions. Related techno-economic studies and high-level training in support to industry, with particular attention to partners in enlargement and pre-accession countries;
- development and validation of new emission control and reduction technologies for land, air and sea transport systems; analysis of data concerning various emission reduction technologies and creation of a reference laboratory for co-ordination of round robin experiments and networks; execution of cost benefit studies and techno-economical modelling, and development of the technical standards base;
- studies to assess demand evolution for urban and regional transport systems.

II.5 *Agriculture, rural development and fisheries*

European Union policy is to make agriculture more competitive in world markets and to give new priority to sustainable rural development, consumer-friendly products and more environmentally sensitive practices. It should prepare for the Eastwards enlargement which means a 50 % increase of agricultural land and a doubling of the farm labour force. Fraud control is important because of the size of the budget involved and because of health concerns in the case of agriculture, and because of sustainability concerns in the case of fisheries. JRC will continue to play an active role in supporting policy through:

- prospective techno-economic studies and scenarios to support better understanding of long-term trends of policies related to the food chain and to regional development policies. Emphasis will be on the contribution of science and technology to these central European Union policies and will consider the wider political context (e.g. enlargement, Mediterranean policy);
- studies on the evolution of the rural environment; Earth observation monitoring of change in rural and coastal areas (environmental impacts, forest development and management, trends in agriculture and aquaculture, tourism); coastal zone management;
- development and assessment of methods for the surveillance of regulated activities in the fisheries sector;
- development of agro-meteorological models for the prediction of crop yields (particularly with a view to European Union-enlargement); monitoring of results to ensure consistency with priorities of the Common Agricultural Policy and anti-fraud measures; harmonisation and quality control of work done in Member States on farmers' declarations; re-orientation of the agriculture information system towards priority sectors of agricultural activities; development of advanced statistical methods and sampling strategies to control subsidies at the decisive stage of the clearance of accounts.
- design and operation of a data-base for registering and monitoring livestock movements throughout the European Union; technical support for the implementation of a reliable identification and labelling system for the entire European Union herd, including overall quality control and electronic systems certification.
- development and production of certified reference materials and development of reference methods for securing the quality of agricultural products (e.g., nutritional components, trace contaminants in raw materials, etc).

III. UNDERPINNING EUROPEAN COMPETITIVENESS

The primary contributions of the European Union towards economic development, growth and the creation of employment are the promotion of industrial competitiveness and an efficient internal market in all products and services. The European Union likewise negotiated trading agreements with third countries that ensure fair access to markets for European Union products and stimulate economic growth in developing countries. Economic growth is also the objective of structural funding, including programs such as PHARE and TACIS, that can help prepare less favoured regions and countries for fuller integration in the internal market and the global economy.

Fair trading depends on internationally agreed standards and JRC will continue to support the promotion and development of soundly-based European and international norms, standards, codes of practice and reference tools. Support to structural policy will include the transfer of technology developed in JRC to industry and measures to stimulate the competitiveness on world markets of emerging industries, such as earth observation, where JRC has specific expertise, and the development of a scientific infrastructure in the Mediterranean partnership countries. These efforts will be backed up by more generic studies to determine how technology is transferred from research to industry and how employment is affected by changing patterns of industry.

III.1 Employment, technology and industrial competitiveness

The issues related to employment and competitiveness will continue to dominate the political debate in Europe in the years to come. JRC will support this issue through:

- investigation of the technology, employment and competitiveness inter-relationship. Identification of best practices to foster growth and employment. Analysis of the influence of societal trends (age, gender, etc), structural changes in sectors (industry, services, institutions, etc.) technology changes and European Union policies (Euro, enlargement and deregulation, etc.) on future competitiveness and employment in Europe;
- analysis of factors limiting the development of less favoured European regions with a view to eliminating bottle-necks and improving competitiveness and employment; prospective analysis of European research priorities and role of science and technology for regional development.

III.2 *Normative support to the international trading system*

Industries need predictable and reliable market access conditions before making the considerable investments needed for their penetrations. There is also a need for all market operators to refer to well-established, verifiable and internationally accepted measurements, in order to ensure the transparency of market regulations and avoid unfair competition and unnecessary litigation. In pursuance of these objectives, JRC will undertake:

- the characterisation, production, storage, stability testing and international distribution of Bureau Commun de Reference (BCR) certified reference materials is underpinning many of the activities performed by JRC in support of different policies (environment, consumer protection, health, industrial competitiveness, etc.); production of industrial certified reference materials particularly when urgent intervention is needed or when stocks need to be replaced;
- development and performance of primary isotopic measurements; production of isotopic reference materials and establishment of a virtual institute of primary isotopic measurements with national measurements institutes, for transboundary comparability of chemical measurements, to support accreditation bodies and quality assurance systems and to realise traceability of chemical measurements to common references; support to member states in building up their own metrology systems;
- development and validation of analytical reference methods for elements and their chemical forms, radionuclides and organic constituents; research on radionuclide metrology for the preparation of primary standards, equipment calibrations and determination of trace elements.
- prenormative research and support to the development of measurement and testing standards for materials in emerging technologies such as nanotechnologies.

III.3 *Innovation and technology transfer*

It is universally acknowledged that innovation drives competitiveness and growth. JRC will support efforts to understand the processes that control the transfer of knowledge from the research sector to the private sector and take steps to maximise the benefit of its own technology to industry. The work includes:

- studies related to Europe's innovation system aiming at improving the exploitation of the Europe's scientific and technological potential. Particular attention will be given to the identification of best methods and practices for the creation, transfer and trading knowledge, organisation of enterprises, educational and training requirements and the specific needs of SMEs, developing the interface of JRC networks with the Enterprise Policy's networks;
- support to the development of a competitive and sustainable value-added Earth observation industry in Europe by identification of new users, development of new products and services and development of tools support customers of Earth observation data, information and services;
- exploitation of JRC results; studies to understand users' needs; selection of innovation and technology transfer projects for JRC-developed technologies; prototyping and demonstrations to users and potential investors. Priority will be given to collaboration with high technology SMEs.

III.4 *Enlargement, pre-accession and international co-operation*

The increased technology flows under the globalisation of markets, the current European Union external-policy objectives and the need for efficient protection of the financial interest of the European Union, call for strengthening dialogue and co-operation on science and technology issues with future partner countries. JRC will support the enlargement process by sharing its knowledge with scientists from future European Union Member States, hosting their scientists and encouraging them to use its facilities and join its networks. In particular JRC will:

- promote the association to international measurements evaluation programmes of relevant organisations in candidate countries to European Union enlargement and in other third countries; extension to industries and research institutions in these countries of the networks for advanced materials and standards;
- develop the co-operation with Southern and Eastern Mediterranean Partnership countries with a view to exchange best practices, scientific knowledge and produce techno-economic input to the objectives of the Barcelona process;
- a multidisciplinary database of harmonised and coherent geographical data for an enlarged European Union. JRC will provide the necessary technical co-ordination and will foster the development of standard for software and methods aiming at the complete interoperability of geographic information systems.

ANNEX III

SPECIFIC RULES FOR IMPLEMENTING THE DIRECT ACTIONS

1. The Commission shall implement the direct actions on the basis of the scientific objectives and contents described in Annex II. To this end, it is advised by the Board of Governors of the JRC. The activities relating to this action shall be performed in the relevant institutes of the Joint Research Centre (JRC).
2. In the implementation of its activities, the JRC will, whenever appropriate and feasible, participate in or organise networks of public and private laboratories in the Member States or European research consortia. Particular attention shall be paid to cooperation with industry, especially with small and medium-sized enterprises. Research bodies established in third countries may also cooperate on projects, in accordance with the relevant provisions of Article 9 and, where applicable, of agreements for S & T cooperation between the Community and the third countries concerned. Particular attention will be paid to cooperation with research laboratories and institutes in the countries of Central and Eastern Europe and the former Soviet Union.

The knowledge gained through implementation of the projects will be disseminated by the JRC itself (taking into account possible limitations due to confidentiality issues).

3. The accompanying measures shall include:
 - the organisation of visits to JRC institutes of grant holders, visiting scientists and seconded experts,
 - organisation of the secondment of JRC staff to national laboratories, industrial laboratories and universities,
 - specialised training in support of the elaboration or implementation of European policies and specialised training with emphasis on multidisciplinary,
 - systematic exchange of information, through *inter alia* the organisation of scientific seminars, workshops and colloquiums and scientific publications,
 - the independent scientific and strategic evaluation of the performance of the projects and programmes.
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ANNEX IV

LIST OF MAJOR TOOLS AND FACILITIES OF THE JRC

To carry out its mission JRC has a unique combination of facilities and expertise that draw strength from research performed in collaboration with bodies from the Member States and which, by their nature or cost, have to be set up at a European level.

- The ELSA (European Laboratory for Structural Assessment) is one of the world's largest reaction walls. It is 16 m high and 21 m wide and is designed to resist to forces necessary to deform and seriously damage full-scale test models of buildings and other large civil-engineering structures and historical monuments, to test methods for their strengthening and repair, and to conduct prenormative research on design and structure standards in the European Union.
- The LDTF (Large Dynamic Test Facility) is used for the characterisation of the mechanical properties of traditional and new structural materials (aluminium, concrete, steel, composites, etc) critical for safety (aerospace, automotive, energy, mechanical, off-shore industries). The facility allows dynamic testing of large specimens and enables precise measurement of the energy flow at the moment of an impact. The installation uses the elastic energy stored in 100 meter long cables, pre-loaded by two hydraulic pistons and held by explosive bolts, the rupture of which liberates the energy to the specimen.
- The LISA (transportable Linear Synthetic Aperture radar) is a high precision facility for the assessment of structural changes of large constructions, impact analysis of natural and man-made hazards on the environment (e.g. land sliding, industrial and military waste, etc.).
- The EMSL (European Microwave Signature Laboratory), a facility enabling new ground to be broken in the study of radar imaging. It consists of a domeshaped radio anechoic chamber with a radius of about 10 metres, which facilitates measurement of radio scattering parameters for natural sized objects. Movable and fixed antennae measure bistatic, polarimetric scattering parameters of a target mounted on a movable platform, e.g. enabling the measurement of the 'radar identity card' of cars which can then be used in automatic navigation systems.
- The EGO (European Optical Goniometer), a facility for the characterisation of natural and man-made targets by its optical and thermal properties. This facilities allows to analyse the spectral emission and scattering characteristics under controlled environmental conditions with both natural and artificial light sources. It provides a unique test and evaluation capability for the certification of optical sensors of the next generation (e.g. 'intelligent sensors').
- The Cyclotron particle accelerator (40 MeV Variable Energy) installation is used to produce medical radioisotopes. A very important project is PET (Positron Emission Tomography) in which regional authorities, local hospitals and the JRC work together to create new insights in this promising brain imagine technology. Another application creates radio-nuclides in the surface layer of samples by irradiation. This activated thin layer then provides information, through the gamma radiation it emits, on the material's behaviour under operational conditions like for the study of wear in car engines.
- The ESTI (European Solar Test Installation) is the European reference laboratory for photo-voltaic technology. It measures, tests and certifies photo-voltaic cells, modules and installations. It recently received its quality assurance accreditation. It provides support for a new and fast-developing technology in a sector where European industry and individual national laboratories have limited test facilities.
- The 150 MeV GELINA (Geel Electron Linear Accelerator) is one of the most powerful white spectrum neutron sources available in the world. It is unrivalled for the study of neutron-material interactions and in particular neutron cross-section measurements. Its European designation has made it the key facility for determining the high resolution neutron data requested.

- The 'INDOORTRON' laboratory, a 30 m³ volume walk in environmental chamber featuring controlled temperature, relative humidity, air-quality and exchange rate. By using this chamber, it is possible to perform emission testing of equipment, determine release dynamics of indoor materials, test models that predict indoor air pollutant concentrations, test efficiency of air-cleaning device, perform human exposure studies.
- The AMAL (Advanced Mobile Analytical Laboratory) allows to assess contamination of industrial sites and land-field, the control of waste-water, and more generally the on-site chemical analysis of organic and inorganic pollutants.
- The ultra-clean chemical laboratory has a surface of 120 m², providing 16 workplaces of which 6 or 8 can be occupied simultaneously. The laboratory has a 'class 10' status, meaning that less than 10 particles larger than 0,5 µm will be found in 1 cubic foot of air. The laboratory is used for all kinds of ultra clean manipulations such as the characterisation of ultra low concentrations of trace elements. There are only 5 laboratories of this kind world wide.
- The JRC has the largest European concentration of high performance mass spectrometers, used as analytical tools in many of its activities such as isotope measurements of highest accuracy as needed for nuclear and environmental reference measurements, certification of primary reference materials, validation of measurement procedures in medical diagnosis, achieving traceability of chemical measurements to the Systeme International, development of advanced methods for food authentication and determination of the origin of illicit drugs.
- Multi-functional and flexible laboratory for the production of environmental, biological, clinical, agricultural and industrial reference materials with Europe's most advanced facilities and technologies like clean chambers for handling of materials, cryo grinding, freeze drying, high purity milling and ultrafine classification, levitation melting.

List of major offices and reference laboratories

The JRC has constituted and operates a number of offices, bureaux and reference laboratories in support of different European Union-policies:

- The Centre for earth Observation (CEO), the aim of the CEO is to grow the customers and market for Earth Observation (EO) data, information and services
(Communication from the Commission to the Council and the European Parliament, COM(96)617 final);
- European Office for Wine, Alcohol and Spirit Drinks (BEVABS) in support of the European Union legislation on the quality and origin of products in the sector.
(Communication from the Commission to the Council and the European Parliament COM(93) 360 final);
- European Centre for the Validation of Alternative Methods (ECVAM) to support the European Union legislation on protection of animals used in toxicological tests and other scientific experiments
(Communication from the Commission to the Council and the European Parliament SEC(91) 1794 final);
- European chemicals Bureau (ECB) to support the European Union legislation on the control and management of existing and new chemicals
(Communication from the Commission to the Council and the European Parliament OJ C1, 5.1.1993, p. 3);
- European Reference Laboratory for Air Pollution (ERLAP) and Radioactive Environmental Monitoring (REM) to support the European Union legislation on air quality and radiative environmental monitoring;
- European Soil Bureau (ESB), a platform allowing Member States organisations producing soil maps to harmonise their work in order to better answer the technical challenges required to fulfil the needs of the European Union policies;
- Alps Observation and Information System ('Alps Observatory') to support, within the frame of the Alpine Convention, the Alpine countries in the management and sustainable development of the rural Alpine space
(Communication from the Commission to the Council and the European Parliament COM(93) 713 final);

- The Tropical Forest Information System (TFIS), a major source of data and information on the tropical forest cover in the world. It provides accurate and updated information on the state of the tropical forest ecosystems and on the forest fires;
 - The Biotechnology Information System (BIOSAFE), to support European Union legislation on the contained use, deliberate release into the environment, and risk assessment of genetically modified organisms;
 - European Integrated Pollution Prevention and Control Bureau (EIPPCB), to support European Union legislation for the integrated prevention and control of pollution from major industrial facilities based on the 'best available techniques' concept
(Communication from the Commission to the Council and European Parliament, COM(97) 733 final);
 - The Major Accidents Hazards Bureau (MAHB), dedicated to scientific and technical support for the control of major industrial hazards and the prevention and mitigation of major accidents, and including the Major Accident Reporting System database and the Community Documentation Centre on Industrial Risk
(Communication from the Commission to the Council and European Parliament, COM(96) 7 final);
 - Monitoring of Agriculture with Remote Sensing (MARS), to support the Common Agriculture Policy with a set of statistical methods adapted to various objectives at European Union level, as well as verification and control of farmer's declarations implemented in the Member States
(Council Decision of 14.11.1997, 94/753/EC);
 - JRC Reference Laboratory for Neutron Data, dedicated to performing very high resolution neutron reference measurements, radionuclide metrology and low level γ -spectrometry, and the preparation and certification of primary radioactivity standards for research, medicine and industry;
 - JRC Reference Laboratory for Isotopic Measurements, dedicated to performing primary isotopic measurements and the production of isotopic reference materials, metrology in chemistry, quality control for nuclear and environmental safeguards, international measurement evaluation programmes (IMEP, REIMEP), validation of instruments for medical diagnosis and authenticity of food, origin of illicit drugs;
 - JRC Centre for Reference Materials, dedicated to the production of highest quality chemical, biological, clinical, industrial, environmental and nuclear Certified Reference Materials (CRMs), storage and marketing of CRMs, and the development of analytical reference methods for elements and their chemical forms, radionuclides and organic constituents.
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