

INTERNATIONAL ENERGY AGENCY

IMPLEMENTING AGREEMENT

FOR A PROGRAMME OF RESEARCH
AND DEVELOPMENT
ON ENERGY CONSERVATION
IN COMBUSTION

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TABLE OF CONTENTS

PREAMBLE	5
<i>Article 1</i>	
OBJECTIVES	6
<i>Article 2</i>	
THE EXECUTIVE COMMITTEE	6
<i>Article 3</i>	
THE OPERATING AGENT	8
<i>Article 4</i>	
ADMINISTRATION AND STAFF	9
<i>Article 5</i>	
FINANCE	9

Article 6

INFORMATION AND INTELLECTUAL PROPERTY 10

Article 7

LEGAL RESPONSIBILITY 12

Article 8

LEGISLATIVE PROVISIONS 13

Article 9

ADMISSION AND WITHDRAWAL OF CONTRACTING PARTIES 13

Article 10

FINAL PROVISIONS 15

ANNEX

ENERGY CONSERVATION IN COMBUSTION 17

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The Contracting Parties

CONSIDERING that the Contracting Parties, being either governments or international organisations or parties designated by their respective governments pursuant to Article III of the Guiding Principles for Co-operation in the Field of Energy Research and Development adopted by the Governing Board of the International Energy Agency (the "Agency") on 28th July, 1975, wish to take part in the establishment and operation of a Programme of Research and Development on Energy Conservation in Combustion (the "Programme") as provided in this Agreement;

CONSIDERING that the Contracting Parties which are governments and the governments of the other Contracting Parties (referred to collectively as the "Governments") participate in the Agency and have agreed in Article 41 of the Agreement on an International Energy Program (the "I.E.P. Agreement") to undertake national programmes in the areas set out in Article 42 of the I.E.P. Agreement, including research and development on energy conservation in which field the Programme will be carried out;

CONSIDERING that in the Governing Board of the Agency on 16th March, 1977, the Governments approved the Programme as a special activity under Article 65 of the I.E.P. Agreement;

CONSIDERING that the Agency has recognised the establishment of the Programme as an important component of international co-operation in the field of energy conservation research and development;

HAVE AGREED as follows:

Article 1

OBJECTIVES

- (a) *Scope of Activity.* The Programme to be carried out by the Contracting Parties within the framework of this Agreement shall consist of co-operative research, development, demonstrations and exchanges of information regarding combustion.
- (b) *Method of Implementation.* Each Contracting Party shall implement the Programme by undertaking one or more Tasks as provided in the attached Annex.
- (c) *Task Co-ordination and Co-operation.* The Contracting Parties shall co-operate in co-ordinating the work of the various Tasks in the attached Annex and in advancing the research and development activities of all Contracting Parties in the field of energy conservation.
- (d) *Additional Tasks.* Additional Tasks may be joined to the Programme by amendment of the attached Annex to this Agreement as provided in Article 10 (c) hereto.

Article 2

THE EXECUTIVE COMMITTEE

- (a) *Supervisory Control.* Control of the Programme shall be vested in the Executive Committee constituted under this Article.
- (b) *Membership.* The Executive Committee shall consist of one member designated by each Contracting Party; each Contracting Party shall also designate an alternate member to serve on the Executive Committee in the event that its designated member is unable to do so.
- (c) *Responsibilities.* The Executive Committee shall:
 - (1) Adopt for each year, acting by unanimity, the Programme of Work for the Tasks of the attached Annex, together with an indicative programme of work for the following two years; the Executive Committee may, as

required, make adjustments within the framework of the Programme of Work;

- (2) Make such rules and regulations as may be required for the sound management of the Tasks;
- (3) Carry out the other functions conferred upon it by this Agreement and the Annex hereto; and
- (4) Consider any matters submitted to it by the Operating Agent or by any Contracting Party.

(d) *Procedure.* The Executive Committee shall carry out its responsibilities in accordance with the following procedures:

- (1) The Executive Committee shall each year elect a Chairman and one or more Vice-Chairmen;
- (2) The Executive Committee may establish such subsidiary bodies and rules of procedure as are required for its proper functioning. A representative of the Agency may attend meetings of the Executive Committee and its subsidiary bodies in an advisory capacity;
- (3) The Executive Committee shall meet in regular session twice each year; a special meeting shall be convened upon the request of any Contracting Party which can demonstrate the need therefor;
- (4) Meetings of the Executive Committee shall be held at such time and in such office or offices as may be designated by the Committee;
- (5) At least twenty-eight days before each meeting of the Executive Committee, notice of the time, place and purpose of the meeting shall be given to each Contracting Party and to other persons or entities entitled to attend the meeting; notice need not be given to any person or entity otherwise entitled thereto if notice is waived before or after the meeting;
- (6) The quorum for the transaction of business in meetings of the Executive Committee shall be one-half of the members plus one (less any resulting fraction).

(e) *Voting.*

- (1) Where this Agreement requires the Executive Committee to act by unanimity, this shall require the agreement of each member or alternate member present and voting at the meeting at which the decision is taken. The Executive Committee shall adopt decisions and recommendations, for which no express voting provision is made in this Agreement, by majority vote of the members or alternate members present and voting;

(2) With the agreement of each Contracting Party a decision or recommendation may be made by telex or cable without the necessity for calling a meeting. The Chairman of the Executive Committee shall have the responsibility of ensuring that all Contracting Parties are informed of each decision or recommendation made pursuant to this paragraph.

(f) *Reports.* The Executive Committee shall, at least annually, provide the Agency with periodic reports on the progress of the Programme.

Article 3

THE OPERATING AGENT

(a) *Designation.* An Operating Agent is designated in the Annex hereto.

(b) *Scope of Authority to Act on Behalf of Contracting Parties.* Subject to the provisions of Article 6 hereof, the Operating Agent shall perform all legal acts required to carry out its functions as defined in the Annex hereto.

(c) *Replacement.* A Contracting Party may, with the consent of the Executive Committee, acting by unanimity, designate another entity as Operating Agent in place of the Contracting Party or other Operating Agent designated by it. The adoption of any consequential amendments to this Agreement and the Annex hereto as well as the arrangements for transfer of the Operating Agent's responsibilities shall require a decision of the Executive Committee, acting by unanimity.

(d) *Resignation.* The Operating Agent shall have the right to resign at any time, by giving six months written notice to that effect to the Executive Committee, provided that:

- (1) A Contracting Party, or entity designated by a Contracting Party, is at such time willing to assume the duties and obligations of the Operating Agent and so notifies the Executive Committee and the other Contracting Parties to that effect, in writing, not less than three months in advance of the effective date of such resignation; and
- (2) Such Contracting Party or entity is approved by the Executive Committee, acting by unanimity.

Article 4

ADMINISTRATION AND STAFF

(a) *Administration of Tasks.* The Operating Agent shall be responsible to the Executive Committee for implementing its responsibilities in accordance with this Agreement, the Annex hereto and the decisions of the Executive Committee.

(b) *Information and Reports.* The Operating Agent shall furnish to the Executive Committee such information concerning the Annex hereto as the Committee may request and shall each year submit, not later than two months after the end of the financial year, a report on the status of the Annex hereto.

(c) *Staff.* It shall be the responsibility of the Operating Agent to retain such staff as may be required to carry out its responsibilities in accordance with rules determined by the Executive Committee. The Operating Agent may also, as required, utilise the services of personnel employed by other Contracting Parties (or organisations or other entities designated by Contracting Parties) and made available to the Operating Agent by secondment or otherwise, subject to arrangements to be agreed between the Contracting Party and the employer of such personnel.

Article 5

FINANCE

(a) *Research Costs.*

(1) Each Contracting Party shall be responsible for providing the financial resources necessary to carry out its research responsibilities under the Annex hereto. It is anticipated that the total funds expended in support of such research shall approximate \$1,800,000, based on March, 1977 price levels and exchange rates, for the three year period. The Contracting Parties' minimum contributions to research under the Programme shall be as follows:

	First Year (CY 1977)	Second Year (CY 1978)	Third Year (CY 1979)
NE	SwK 50,000	SwK 100,000	SwK 120,000
UKAEA	£55,000	£77,000	£110,000
USERDA	\$300,000	\$420,000	\$600,000

- (2) The Executive Committee, acting by unanimity, shall adjust the figures referred to in this paragraph at half-yearly intervals to take account of changing price levels in the country of each Contracting Party to ensure that the necessary real resources will continue to be available to conduct the work called for. If significant changes in such price levels occur, the Executive Committee, acting by unanimity, shall consider whether to adjust the Programme of Work to the available funds;
- (3) After the initial three-year period and any succeeding three-year period, the Executive Committee shall, acting by unanimity, agree upon the levels of expenditure referred to in sub-paragraph (1) above for each succeeding three-year period.

(b) *Other Costs.* Each Contracting Party shall also bear all other costs it incurs in carrying out this Agreement, including the costs of formulating or transmitting reports and of reimbursing its employees for travel and other per diem expenses incurred in connection with work carried out on the respective Tasks.

(c) *Financial Statement.* Not later than three months after the close of each financial year each Contracting Party shall submit to the Executive Committee a detailed financial statement concerning expenditure for the Task during the financial year. Each Contracting Party shall make available such additional financial information on expenditure for the Task as the Executive Committee may reasonably request in order to ensure that each Task is being carried out in accordance with this Agreement.

Article 6

INFORMATION AND INTELLECTUAL PROPERTY

(a) *Executive Committee's Powers.* The publication, distribution, handling, protection and ownership of information and intellectual property arising from activities conducted under this Agreement shall be determined by the Executive Committee, acting by unanimity, in conformity with this Agreement.

(b) *Right to Publish.* Subject only to patents and copyright restrictions of this Agreement, the Contracting Parties shall have the right to publish all information provided to or arising from the Programme except proprietary information, but they shall not publish it with a view to profit except as the Executive Committee, acting by unanimity, may agree or provide by rule. All that information shall be available without charge to the Contracting Parties.

(c) *Proprietary Information.* The Contracting Parties shall take all necessary measures in accordance with this Article, the laws of their respective countries and international law to protect proprietary information. For the purposes of this Agreement, proprietary information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programmes, design procedures and

techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) which is appropriately marked, provided such information:

- (1) Is not generally known or publicly available from other sources;
- (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
- (3) Is not already in the possession of the recipient Contracting Parties without obligation concerning its confidentiality.

It shall be the responsibility of each Contracting Party supplying proprietary information to identify the information as such and to ensure that it is appropriately marked.

(d) *Production of Relevant Information by Governments.* The Operating Agent should encourage the governments of all Agency Participating Countries to make available or to identify to the Operating Agent all published or otherwise freely available information known to them that is relevant to the Tasks in the attached Annex. The Contracting Parties should notify the Operating Agent of all pre-existing information, and information developed independently of the Tasks known to them which is relevant to the Tasks and which can be made available to the Tasks without contractual or legal limitations.

(e) *Reports on Programme Work.* Reports containing arising information and pre-existing information necessary for and used in each Task, including proprietary information, shall be provided to each Contracting Party by the Contracting Party performing the Task. It shall be the responsibility of each Contracting Party to identify information which qualifies as proprietary information under this Article and ensure that it is appropriately marked. The Operating Agent shall provide summary reports of work performed under the Annex hereto and the results thereof (arising information), other than proprietary information, to the Executive Committee.

(f) *License of Proprietary Information.* Each Contracting Party agrees to license all pre-existing proprietary information necessary for and used in its own Task which it owns or controls and all arising proprietary information to the Contracting Parties, their governments, and the nationals of their respective countries designated by them:

- (1) Royalty-free for use in their country only; and
- (2) On reasonable terms and conditions for use in all other countries.

Each Contracting Party agrees to license all such arising proprietary information to all Agency Participating Countries on reasonable terms and conditions for use in their own country in order to meet their energy needs.

(g) *License of Patents Needed for Task.* Patents solely owned or controlled by a Contracting Party which are needed for use in each Task shall be licensed to the Task Contracting Party for use in the Task only at no cost to such Contracting Party. If such patents are partially owned or controlled by a Contracting Party, then efforts shall

be made by the Contracting Party to reduce or eliminate as possible the benefit that might accrue to it.

(h) *Arising Inventions.* Inventions made or conceived in the course of or under any Task (arising inventions) shall be owned in all countries by the inventing Contracting Party. Information regarding inventions on which patent protection is to be obtained by the Contracting Party shall not be published or publicly disclosed by the other Contracting Parties until a patent application has been filed, provided, however, that this restriction on publication or disclosure shall not extend beyond six months from the date of receipt of such information. It shall be the responsibility of the inventing Contracting Party to appropriately mark reports which disclose inventions that have not been appropriately protected by the filing of a patent application.

(i) *License of Inventions.* Each Contracting Party agrees to license all pre-existing inventions covered by patents owned or controlled by it which are necessary for practising the results of its Task and which have been utilised in the Task, and all arising inventions to the Contracting Parties, their governments and the nationals of their respective countries designated by them:

- (1) Royalty-free for use in their country only; and
- (2) On reasonable terms and conditions for use in all other countries.

Each Contracting Party agrees to license all such arising inventions to all Agency Participating Countries on reasonable terms and conditions for use in their own country in order to meet their energy needs.

(j) *Copyright.* The Operating Agent or each Contracting Party for its own Task results may take appropriate measures necessary to protect copyrightable material generated under any Task. Copyrights obtained shall be the property of that Contracting Party or the Operating Agent, provided, however, that Contracting Parties may reproduce and distribute such material, but shall not publish it with a view to profit.

(k) *Inventors and Authors.* Each Contracting Party will, without prejudice to any rights of inventors or authors under its national laws, take all necessary steps to provide the co-operation from its authors and inventors required to carry out the provisions of this Article. Each Contracting Party will assume the responsibility to pay awards or compensation required to be paid to its employees according to the laws of its country.

(l) *Determination of "National".* The Contracting Parties may establish guidelines to determine what constitutes a "national" of a Contracting Party. Disputes that cannot be settled by the Contracting Parties shall be settled under Article 8 (d) of this Implementing Agreement.

Article 7

LEGAL RESPONSIBILITY

No Contracting Party shall be liable to compensate or contribute to any other Contracting Party for any loss or damage suffered in the course of carrying out the Programme.

Article 8

LEGISLATIVE PROVISIONS

(a) *Accomplishment of Formalities.* Each Contracting Party shall, within the framework of applicable legislation, use its best endeavours to facilitate the accomplishment of formalities involved in the movement of persons, the importation of materials and equipment and the transfer of currency which shall be required to conduct any Task or Tasks in which it is engaged.

(b) *Applicable Laws.* In carrying out this Agreement and the various Tasks in the Annex hereto, the Contracting Parties shall be subject to the appropriation of funds by the appropriate governmental authority, where necessary, and to the constitution, laws and regulations applicable to the respective Contracting Parties, including, but not limited to, laws establishing prohibitions upon the payment of commissions, percentages, brokerage or contingent fees to persons retained to solicit governmental contracts and upon any share of such contracts accruing to government officials.

(c) *Decisions of Agency Governing Board.* The Contracting Parties shall take account, as appropriate, of the Guiding Principles for Co-operation in the Field of Energy Research and Development, and any modification thereof, as well as other decisions of the Governing Board of the Agency in that field. The termination of the Guiding Principles shall not affect this Agreement, which shall remain in force in accordance with the terms hereof.

(d) *Settlement of Disputes.* Any dispute among the Contracting Parties concerning the interpretation or the application of this Agreement which is not settled by negotiation or other agreed mode of settlement, shall be referred to a tribunal of three arbitrators to be chosen by the Contracting Parties concerned who shall also choose the Chairman of the tribunal. Should the Contracting Parties concerned fail to agree upon the composition of the tribunal or the selection of its Chairman, the President of the International Court of Justice shall, at the request of any of the Contracting Parties concerned, exercise those responsibilities. The tribunal shall decide any such dispute by reference to the terms of this Agreement and any applicable laws and regulations, and its decision on a question of fact shall be final and binding on the Contracting Parties.

Article 9

ADMISSION AND WITHDRAWAL OF CONTRACTING PARTIES

(a) *Admission of New Contracting Parties: Agency Countries.* Upon the invitation of the Executive Committee, acting by unanimity, admission to the Agreement shall be open to the government of any Agency Participating Country (or a national agency, public organisation, private corporation, company or other entity designated by such government), which signs or accedes to this Agreement, accepts the rights and obligations of a

Contracting Party and agrees to carry out at least one Task defined in the Annex hereto. Such admission of a Contracting Party shall become effective upon the signature of this Agreement by the new Contracting Party or its accession thereto and the adoption of any consequential amendments thereto.

(b) *Admission of New Contracting Parties: Other OECD Countries.* The government of any Member of the Organisation for Economic Co-operation and Development which does not participate in the Agency may, on the proposal of the Executive Committee, acting by unanimity, be invited by the Governing Board of the Agency to become a Contracting Party to this Agreement (or to designate a national agency, public organisation, private corporation, company, or other entity to do so), under the conditions stated in paragraph (a) above.

(c) *Participation by the European Communities.* The European Communities may participate in this Agreement in accordance with arrangements to be made by the Executive Committee, acting by unanimity.

(d) *Contributions.* The Executive Committee may require, as a condition to admission to participation, that the new Contracting Party accept obligations which are designed to compensate the Contracting Parties as appropriate for their prior contributions to the Programme.

(e) *Replacement of Contracting Parties.* With the agreement of the Executive Committee, acting by unanimity, and upon the request of a government, a Contracting Party designated by that government may be replaced by another party. In the event of such replacement, the replacement party shall assume the rights and obligations of a Contracting Party as provided in paragraph (a) above and in accordance with the procedure provided therein.

(f) *Withdrawal.* Any Contracting Party may withdraw from this Agreement either with the agreement of the Executive Committee, acting by unanimity, or by giving twelve months written Notice of Withdrawal to the Executive Director of the Agency, such Notice to be given not less than two years after the date hereof. The withdrawal of a Contracting Party under this paragraph shall not affect the rights and obligations of the other Contracting Parties.

(g) *Change of Status of Contracting Party.* A Contracting Party other than a government or an international organisation shall forthwith notify the Executive Committee of any significant change in its status or ownership, or of its becoming bankrupt or entering into liquidation. The Executive Committee shall determine whether any such change in status of a Contracting Party significantly affects the interests of the other Contracting Parties; if the Executive Committee so determines, then, unless the Executive Committee, acting upon the unanimous decision of the other Contracting Parties, otherwise agrees:

- (1) That Contracting Party shall be deemed to have withdrawn from the Agreement under paragraph (f) above on a date to be fixed by the Executive Committee; and
- (2) The Executive Committee shall invite the government which designated that Contracting Party to designate, within a period of three months of the withdrawal of that Contracting Party, a different entity to become

a Contracting Party; if approved by the Executive Committee, acting by unanimity, such entity shall become a Contracting Party with effect from the date on which it signs or accedes to this Agreement.

(h) *Failure to Fulfil Contractual Obligations.* Any Contracting Party which fails to fulfil its obligations under this Agreement within sixty days after its receipt of notice specifying the nature of such failure and invoking this paragraph, may be deemed by the Executive Committee, acting by unanimity, to have withdrawn from this Agreement.

Article 10

FINAL PROVISIONS

(a) *Term of Agreement.* This Agreement shall remain in force for an initial period of three years from the date hereof, and shall continue in force thereafter unless and until the Executive Committee, acting by unanimity, decides on its termination.

(b) *Legal Relationship of Contracting Parties.* Nothing in this Agreement shall be regarded as constituting a partnership between any of the Contracting Parties.

(c) *Amendment.* This Agreement and the Annex hereto may be amended at any time by the Executive Committee, acting by unanimity. Such amendments shall come into force in a manner determined by the Executive Committee, acting by unanimity.

(d) *Deposit.* The original of this Agreement shall be deposited with the Executive Director of the Agency and a certified copy thereof shall be furnished to each Contracting Party. A copy of this Agreement shall be furnished to each Agency Participating Country, to each Member country of the Organisation for Economic Co-operation and Development and to the European Communities.

Done in Paris, this 16th day of March, 1977.

For the NATIONAL SWEDISH BOARD
FOR ENERGY SOURCE DEVELOPMENT
(NE)
(designated by the Government of Sweden):

For the UNITED KINGDOM ATOMIC
ENERGY AUTHORITY (UKAEA)
(designated by the Government of
the United Kingdom of Great Britain
and Northern Ireland):

For the UNITED STATES ENERGY RESEARCH
AND DEVELOPMENT ADMINISTRATION (USERDA)
for and on behalf of the Government
of the United States of America:

ANNEX

ENERGY CONSERVATION IN COMBUSTION

1. Objectives

(a) General Objectives

This programme has been planned to improve the information, instrumentation, and calculating procedures which are available for use by the designers, users and fabricators of combustion equipment. The ultimate benefits will be combustion equipment which is more efficient and capable of utilising alternate fuels. This co-operative project is intended to achieve the above objectives while minimising duplication of research effort.

(b) Specific Objectives

The objectives of the work in the three areas of investigation are as follows:

(1) Combustion System Modelling

The objective of this work is the joint development of combustion technology, both analytical and experimental, which is directed toward providing predictive design capabilities for internal combustion engines and for furnaces. The long range programmes on engines (in the United States) and furnaces (in the United Kingdom) will be co-ordinated to provide maximum communication of achievements and minimum duplication of effort.

(2) Instrumentation and Studies of Fundamental Processes in Combustion

The first objective of this work is to develop instruments and experimental techniques for the measurement of fundamental parameters and properties of combustion systems. The second objective is to carry out theoretical investigations of the fundamental physical phenomena of direct relevance to the combustion process. Both the experimental and theoretical work will address topics which will assist the progress of the Combustion System Modelling work described in (1) above.

(3) Resource Exchange

The objective of this work is to provide for exchanges among the Contracting Parties of resources necessary for effective implementation of combustion research programmes. Resources shall include information on objectives and results of current and past programmes, numerical analysis methods, laboratory apparatus and experimental test facilities.

2. *Means*

The Contracting Parties will undertake a joint research programme as defined in paragraph 3 of this Annex, involving three major areas of co-operation: Combustion System Modelling; Instrumentation and Studies of Fundamental Processes in Combustion; and Resource Exchange.

3. *Responsibilities of Contracting Parties or Participants in the Tasks*

The Tasks to be performed and the Responsible Participants in each area of investigation are as follows:

Area (1) *Combustion System Modelling*

Task (1) A: DEVELOP AND APPLY EXPERIMENTAL METHODS FOR MEASUREMENTS IN INTERNAL COMBUSTION ENGINES

In this Task, new experimental methods will be developed and applied to measure turbulence, velocity fields, fuel-air distribution and temperature within the combustion chamber of operating engines. The USERDA is the principal contributor, providing diagnostic development in laser raman spectroscopy and laser doppler anemometry. The UKAEA will provide USERDA with special methods for laser anemometry.

Responsible Participant: USERDA

Task 1 (B): DEVELOP AND APPLY NUMERICAL MODEL OF INTERNAL COMBUSTION ENGINE PERFORMANCE

In this Task, a predictive numerical model will be developed which will allow for two space dimensions and time variation. Subprocess models for turbulence, droplet combustion, chemical kinetics and ignition will be provided. This model will provide predictive capability for open chamber stratified charge and diesel engines

Responsible Participant: USERDA

Task 1 (C): DEVELOP AND APPLY SYSTEM TO MEASURE FURNACE TURBULENCE AND VELOCITY FIELDS

In this Task, a laser doppler anemometry system, with a water cooled probe, will be developed and used to measure turbulence and velocity fields in an experimental furnace. A droplet measurement system will be applied to oil-fired furnace measurements.

Responsible Participant: UKAEA

Area (2) *Instrumentation and Studies of Fundamental Processes in Combustion*

Task 2 (A): MULTIPOINT THREE CO-ORDINATE LASER DOPPLER ANEMOMETER (LDA) DEVELOPMENT

In this Task, a laser anemometer system will be developed for the study of turbulent flows which will simultaneously measure three orthogonal velocities at multiple locations and record the data for further processing. The system will initially be used to study structure phenomena in turbulent boundary layers of importance in heat transfer. Thereby, important information will be obtained about turbulent phenomena such as bursts and sweeps and the influence of such mechanisms on turbulent convection.

Responsible Participant: NE

Task 2 (B): FLOW BOUNDARY CONDITION EFFECT IN TURBULENT FLOWS

This Task will provide data to quantify the influence of boundary conditions in turbulent flow fields and to investigate the sensitivity of turbulence and combustion models to the choice of boundary conditions. A correlation procedure will be constructed for the description of flow boundary conditions from overall flow parameters for use with approximate turbulence models.

Responsible Participant: UKAEA

Task 2 (C): SIMULTANEOUS MEASUREMENT OF DROPLET SIZE AND VELOCITY IN FUEL SPRAYS

In this Task, a laser doppler anemometer system will be developed for measurement of droplet and gas velocity and droplet size in turbulent multiphase flows, suitable for application to the study of oil spray combustion.

Responsible Participant: UKAEA

Task 2 (D): LDA MEASUREMENTS OF VELOCITIES IN TIME VARYING FLOWS

In this Task, a laser doppler anemometer system will be developed for the measurement of turbulent velocity fields with time-varying mean properties in the presence of combustion. On-line data processing will be provided to give velocity correlations as a function of time.

Responsible Participant: USERDA

Task 2 (E): RAMAN SPECTROSCOPY FOR REMOTE MEASUREMENT OF TEMPERATURE AND CONCENTRATION

In this Task, a laser raman spectroscopy system will be developed for the measurement of local temperature and concentration in burning systems with and without time variation of mean properties. This includes the development of special high power laser systems and multidimensional detection equipment with time resolution adequate for turbulence measurements.

Responsible Participant: USERDA

Task 2 (F): STANDARD EXPERIMENTS

This Task is to establish a series of standard experiments against which new experimental methods and prediction models can be compared. The first phase is to identify a specific experimental configuration for turbulent diffusion flow experiments. A test procedure will be devised and utilised to assure that each experimental facility conforms to the standard.

Responsible Participants: NE, UKAEA, USERDA (Task co-ordinated by Operating Agent)

Area (3) *Resource Exchange*

Task 3 (A): COMBUSTION ABSTRACTS

The purpose of this Task is to establish an abstracting service for information on combustion research projects. To accomplish this purpose, the following steps will be required:

1. Definition of scope of information coverage.
2. Preparation of an abstract format.
3. Development of a collection procedure.
4. Development of a publication format.
5. Implementation of the service.
6. Evaluation of the initial output.

Responsible Participants: UKAEA, USERDA

Task 3 (B): FACILITY INVENTORY

The purpose of this Task is to develop an inventory of facilities which can be made available to support combustion research programmes. Facilities shall include computers, combustion equipment, instruments and special test apparatus existing in countries of the Contracting Parties. The inventory shall include facility description, availability limitations and cost of use. The inventory shall be published as a document with provision for periodic updating, and shall be distributed to all Contracting Parties.

Responsible Participants: UKAEA, USERDA

4. *Responsibilities of the Operating Agent*

Co-ordination among Tasks within each area of investigation and overall co-ordination of work between the three areas of investigation will be assured by the Operating Agent.

The Operating Agent shall be responsible for :

- (a) Preparing the detailed work plans for each Task in collaboration with each Responsible Participant;

- (b) Ensuring that duplication of research effort is minimised;
- (c) Co-ordinating the exchange of information through publications, reports, meetings and conferences; and
- (d) Reporting the progress of the work under the Annex to the Executive Committee.

5. *Operating Agent*

United States Energy Research and Development Administration.

6. *Funding*

Funding shall be borne by the Contracting Parties in accordance with Article 5 (a) (1) of this Agreement.