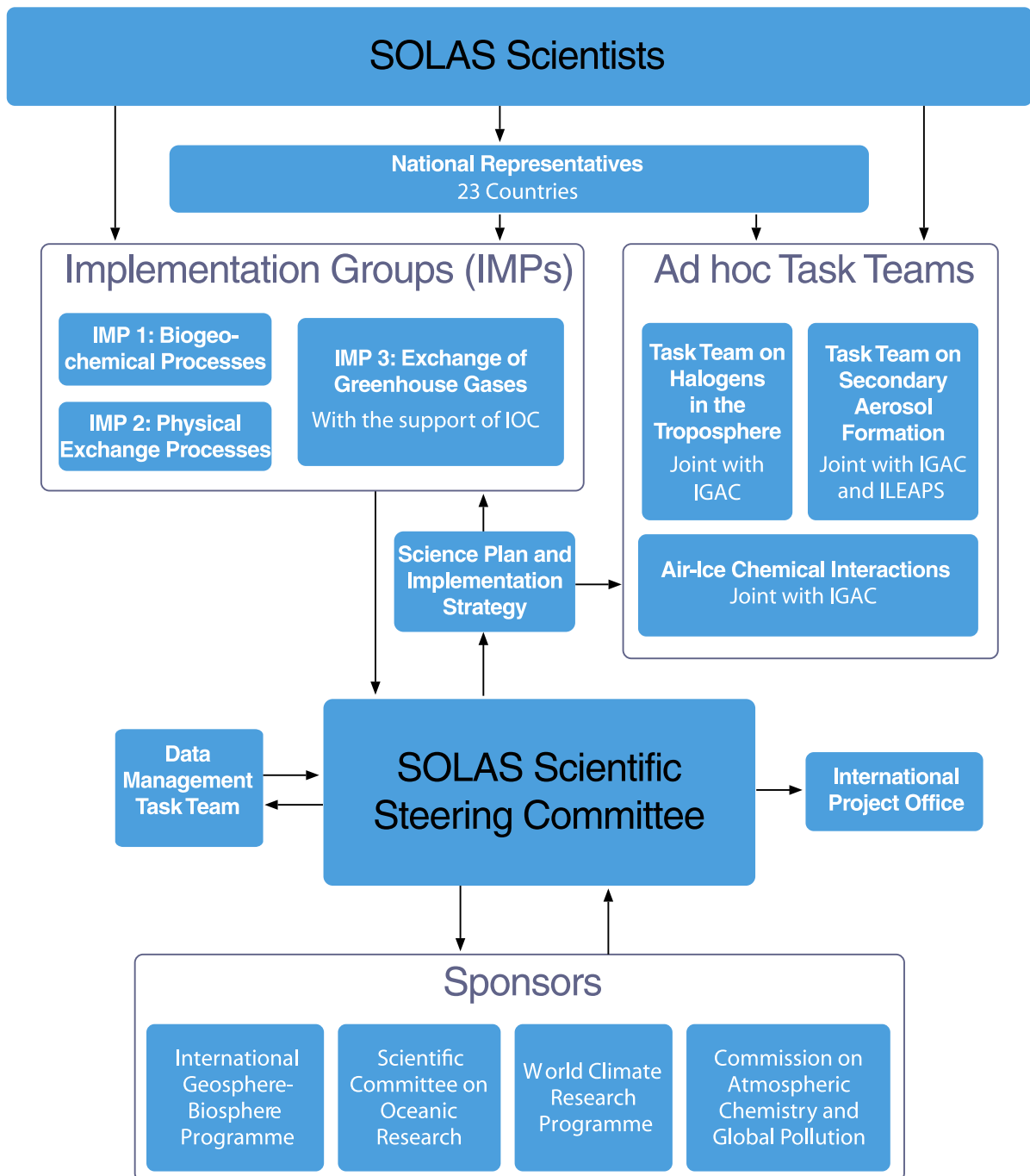


Project Organisation and Management

Organisational Structure of SOLAS

Figure 20. The organisational structure of SOLAS.



Scientific Steering Committee

The SOLAS Scientific Steering Committee (SSC) is responsible for providing scientific guidance to, and overseeing the development, planning and implementation of the SOLAS project, including communication of ongoing SOLAS activities and fostering the publication and dissemination of SOLAS results. The SOLAS SSC will encourage national governments, and regional and international funding agencies to support the implementation of core research and the achievement of SOLAS goals through the provision of adequate support at national, regional and international levels. The SSC will also encourage collaboration between SOLAS research and relevant activities of the sponsors and others, including integration with adjacent IGBP, SCOR, CACGP and WCRP projects.

International Project Office

The International Project Office (IPO) serves as the secretariat for SOLAS, and administers the project on a day to day basis. The IPO is responsible for assisting the SSC in all aspects of its work, and collates and communicates information related to national and international SOLAS research. The IPO works with the sponsors to secure resources for SOLAS as an umbrella organisation. It also ensures effective coordination with other activities of the sponsors and supports a data management and archiving system for the project. It is considering the possibility of a shared data management system with other projects.

The IPO will also keep a record of SOLAS products, namely:

- Synthesis and review papers
- Workshop reports
- Books
- Special journal editions
- Data and model output and code

These will be made freely available on the SOLAS website, wherever possible.

The IPO is located in the UK and is funded by the Natural Environment Research Council.

National Contacts and Committees

SOLAS National Contacts and Committees have an important role to play in planning and facilitating the research of the programme. They can coordinate the scientific and communication activities within their countries, as well as acting as the interface between the SOLAS SSC and the scientists and funders in individual nations. For example, a meeting of national representatives was held in Amsterdam 11-12 June 2002 to enable them to participate in the production of this SOLAS Science Plan and Implementation Strategy.

The meeting was attended by representatives of 19 countries, with each nation submitting a written report. Updated national reports are available on the SOLAS website. At the meeting, an informal questionnaire recorded each nation's level of interest in the various SOLAS Activities. The results for 19 country representatives are shown in Table 2. This information should be treated as indicative rather than conclusive, since it reflects the situation at that time and will go out of date rather rapidly, as well as being the assessment of only a small number of people (in some cases only one) from each nation. However, it proved useful at the meeting in identifying areas of SOLAS research where there was good potential coverage globally and, more importantly, activities where resources are currently lacking. It is the intention of the SOLAS SSC to encourage regular two way communication with national committees and contact information is provided on the SOLAS website.

SOLAS national representatives will be appointed in collaboration with the national committees of the sponsors, where appropriate. The IPO should be contacted for further details.

Implementation Groups and Task Teams

Implementation of much of the research described in this Plan will be done through a number of Task Teams and Implementation Groups, for shorter and longer-term activities, respectively.

Task teams will be established on particular topics for which there is a clear need for international coordination. They will often be established jointly with other projects to allow the full scope of the topic to be covered.

SOLAS Implementation Groups will be the key way in which SOLAS will coordinate and plan the implementation of the science described in this document. The Implementation Groups will produce detailed Implementation Plans that will be updated and revised periodically. Each group will work closely with the SOLAS Data Management Task Team (DMTT) to enunciate its needs in terms of data management and quality assurance and control. The membership of these groups will contain modelling and data management expertise, as well as links to partner projects of SOLAS.

SOLAS will also play a full role in the WCRP working group on surface fluxes (WGSF). This is in part a continuation of the previous SCOR/WCRP group on air-sea fluxes of physical quantities (energy, heat, momentum), but with the inclusion of mass fluxes (gases, sea salt, particles, precipitation). Its work will support the research in SOLAS Focus 2 particularly, but also in other parts of the programme, as well as several activities of WCRP.

Table 2. Nations' levels of interest in SOLAS activities in 2002. Higher numbers indicate a greater interest in the Activity.

	1.1 Sea-salt Particle Formation and Transformations	1.2 Trace Gas Emissions	1.3 Dimethylsulphide and Climate	1.4 Iron and Marine Productivity	1.5 Cycling of Nitrogen	2.1 Air-Sea Interface	2.2 Oceanic Boundary Layer	2.3 Atmospheric Boundary Layer	3.1 Air-Sea CO ₂ Fluxes	3.2 Surface Layer Carbon	3.3 Air-Sea Flux of N ₂ O and CH ₄	Modelling	Remote Sensing	Time Series
Australia/NZ	1	1	3	3	1	3	3	1	3	2	2	3	2	3
Belgium	0	0	2	3	0	1	2	0	3	3	0	3	1	0
Brazil	1	1	1	1	1	3	3	3	3	1	1	3	1	3
Canada	3	3	3	3	2	3	3	2	3	1	1	3	3	3
Chile	0	0	0	0	2	0	3	2	3	0	2	0	0	0
China (Beijing)	3	3	3	3	1	3	2	2	3	2	3	3	2	3
China (Taipei)	0	2	0	3	0	3	3	1	3	0	0	3	3	3
France	1	2	3	3	2	1	2	1	3	3	1	3	3	3
Germany	2	3	2	3	3	2	1	2	2	3	2	3	3	2
Japan	2	2	3	3	3	2	1	1	2	2	3	2	2	3
Korea	1	1	2	3	2	1	2	1	2	2	1	2	3	1
Netherlands	3	1	3	3	1	3	1	2	3	1	1	1	3	1
Norway	2	2	3	3	2	3	3	3	3	3	1	3	3	3
Russia	2	0	2	1	0	3	3	3	2	2	1	2	1	3
Spain	1	1	3	3	3	1	1	1	3	2	1	1	2	3
Sweden	0	3	3	3	0	0	0	0	0	3	0	0	0	0
United Kingdom	2	3	3	3	2	2	2	2	3	2	1	3	1	1
United States	2	2	2	3	2	3	2	2	2	3	1	3	3	3
India	1	3	3	0	3	2	3	2	3	3	3	2	2	3
MODE	2	3	3	3	2	3	2.3	2	3	2	1	3	3	3

Data and Model Output Management

Background and Needs

The implementation of SOLAS will involve the collection of large quantities of environmental data by both nationally and internationally organised projects. These data will be collected from process studies and experiments (field and laboratory), time series studies, and large-scale surveys. Similarly, SOLAS will make use of a hierarchy of different modelling approaches. In most cases, the utility of the models and data involved in these projects will extend beyond the projects themselves and be of interest to other investigators. Further, many SOLAS data will be more useful when combined with, or compared against, other data and models, including non-SOLAS data. Scientific findings and conclusions derived from SOLAS projects should be available for assessment by independent scientists: this implies that the underlying data and/or models must be readily accessible.

Increasingly, key management issues are based on model results as well as data. Model-derived results are also used extensively as input for other models, for scientific planning and for policy decisions. SOLAS must therefore ensure that the models developed and/or used in SOLAS research, as well as the data collected, are documented sufficiently to allow independent evaluation and be readily accessible to the scientific community for assessment and interpretative purposes.

Data and model management are therefore critical logistical tasks for SOLAS and we recognise that there are significant challenges ahead: effective data management is a global problem and SOLAS will make strenuous efforts to adopt best practice and learn from past experiences (e.g. WOCE, JGOFS etc.).

SOLAS science will involve collection of complex and sophisticated data sets. This will include difficult, error-prone measurement of biological, physical and chemical parameters. Because SOLAS is an international, multi investigator programme, such measurements will be made all over the world, at different times, by different groups, often using different equipment and techniques.

Attention to data quality management will be critical for the scientific integrity and success of SOLAS.

Data Management Principles

Certain basic principles should guide the development of data management procedures in SOLAS:

- Do not 'reinvent the wheel'; use existing knowledge and infrastructure, wherever appropriate.
- Use internationally agreed standards and protocols (e.g. those of ISO, W3C, IOC/ICES), wherever possible.
- Work with other projects towards an integrated data management system and policy.
- Plan ahead for rapid data assembly.
- Data managers should support data gatherers.
- SOLAS should reward excellence in data collection and data release.
- Participation in SOLAS research requires submission of data to a SOLAS-approved database or centre.

Specific Steps Towards Data Management

SOLAS will establish an international data management task team with at least one staff member. This team should:

- Evaluate and document the likely data needs of SOLAS (data types, quantities and sources, metadata requirements).
- Conduct a review and have intense discussions with the WCRP (WOCE/CLIVAR) and IGBP/SCOR (JGOFS, IMBER, GLOBEC, LOICZ, GEOHAB) data management communities concerning lessons learned and present data management policies, problems and solutions. Identify the potential for SOLAS data management within existing structures and programmes.

- Host a workshop for the modelling community in order to develop and write a practical model management and documentation plan.
- Evaluate together with other programmes the feasibility and benefits of establishing a peer reviewed 'Journal of Global Change Data' and participate in constructing the IGBP Global Change Atlas.
- Write a detailed SOLAS data management policy. This policy is to include time limits, enforcement procedures, access rights, meta-data requirements, reporting requirements and procedures, data quality and archiving, and linkages to data agencies. Potentially, this document will include guides to model description and data organisation.
- Initiate negotiations with data centres about possibilities for their direct support of individual PIs with respect to data management procedures and tools.

Data Quality Management

In addition to establishing clear guidelines for data management, SOLAS must also establish procedures for assessing and controlling data quality. Once again, lessons learned during WOCE and JGOFS can be used to help address such issues.

Data quality management should be addressed by the Data Management Task Team by:

- establishing clear quality targets for SOLAS data;
- documenting recommended protocols for 'standard' SOLAS measurements;
- providing support for technical workshops, training sessions and calibration and intercalibration activities.

Recognition of Research by SOLAS

The aim of SOLAS is to provide a framework to encourage the fullest participation of multi national, regional, and national efforts in its scientific activities. It does not impose a rigid template on the nature of these efforts. However, some recognition procedure (often called “endorsement”) is necessary so that (1) the SOLAS SSC knows what research is being conducted under the SOLAS label, (2) research carrying the SOLAS label is within the science areas defined in the SOLAS Science Plan and Implementation Strategy, and (3) such research conforms to the scientific principles outlined in this plan.

Principle Investigators and national/regional groups can submit their projects for approval by the SOLAS SSC on the SOLAS website.

Flowing from recognition as a SOLAS project are the following benefits and responsibilities; they are only intended as a guide and are not a set of regulations. They have been adapted from the practice of the GLOBEC SSC.

Benefits

- Provides the opportunity for participation in the development, planning and implementation of a collaborative international science programme.
- Adds to the scientific value of planned work by providing complementary information; for example, by widening the range of studies and extending their spatial and temporal coverage.
- Promotes rapid communication of ideas and results through meetings and publications.
- Develops and tests standard methods and protocols for measuring variables, thereby facilitating quality control and meaningful data sharing.
- Makes available data sets collected in component studies and develops a common data policy.
- Enables close working links with other relevant international programmes and studies.
- Gives the opportunity for participation in model intercomparisons.

Responsibilities

- Acceptance of general principles and goals outlined in the SOLAS Science Plan and Implementation Strategy.
- Carry out a programme in general accordance with relevant aspects of the SOLAS Science Plan and Implementation Strategy.
- Participation in the activities of the programme through its management bodies, and by assisting in its planning and development as a whole.
- Make data collected within the programme available to the wider community, in accordance with the SOLAS data policy.
- Acknowledge links with SOLAS in the products of the project (e.g. acknowledgment in scientific papers).

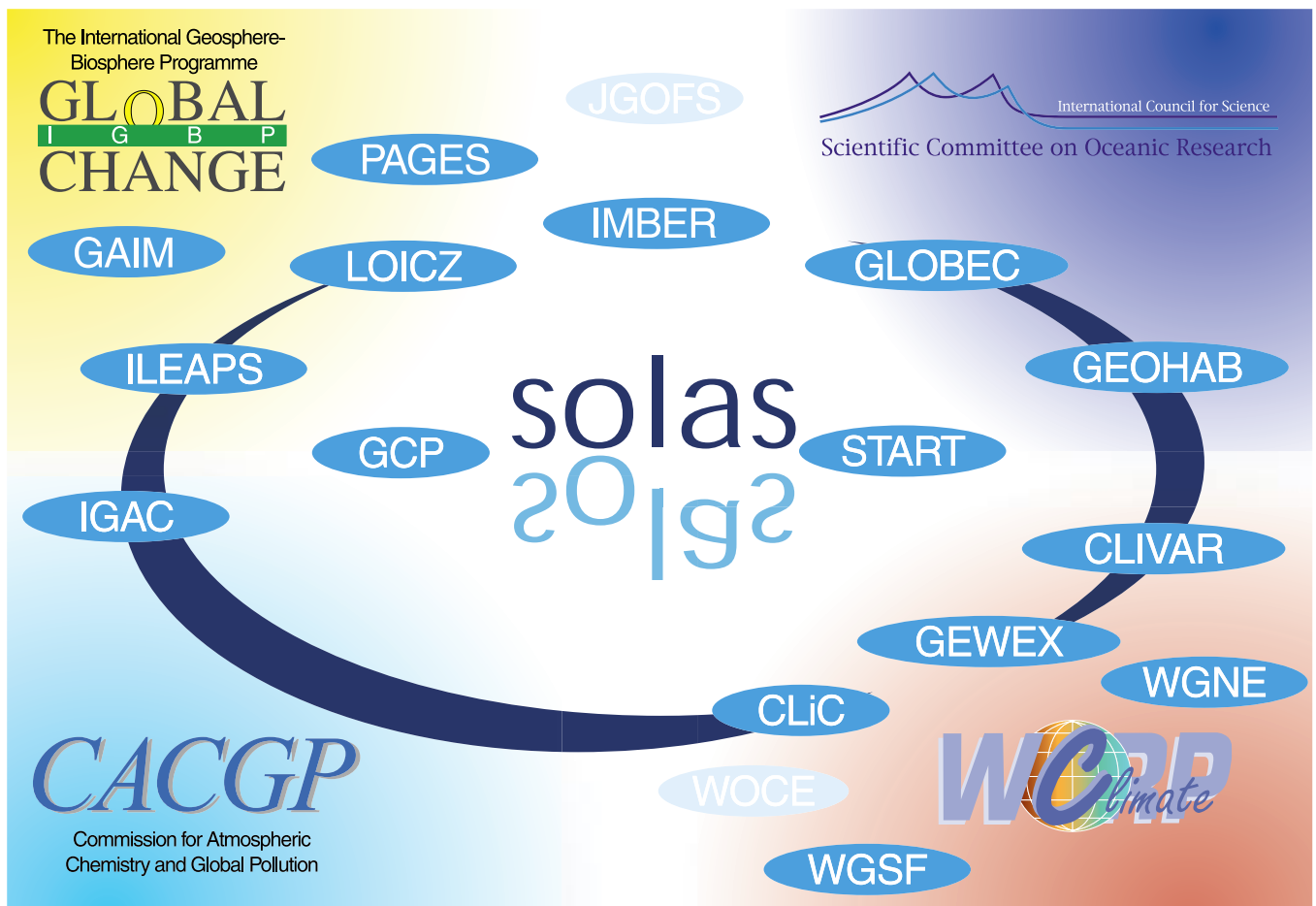
Linkages to Related Programmes and Activities

SOLAS is presently sponsored by IGBP, SCOR, CACGP and WCRP. It is being conducted in the context of ongoing and new projects sponsored by these organisations, within which SOLAS will develop cooperative activities to take advantage of the unique expertise of the different groups and to avoid unnecessary duplication. SOLAS will collaborate with other projects focussing on ocean, atmosphere, and land subsystems and their interfaces, as well as the whole Earth System.

In the area of biogeochemistry, the activities of SOLAS will be coordinated, and wherever appropriate, integrated with the activities of IGAC-II, ILEAPS, the new

IGBP LAND project, GLOBEC, IMBER and LOICZ. It will also participate in the IGBP Fast Track projects (e.g. on Iron and Nitrogen). In the physical aspects of its work, SOLAS will collaborate and integrate with CliC, CLIVAR, GEWEX and WGSE. SOLAS will also collaborate with PAGES (especially IMAGES) in the use of palaeoceanographic records. SOLAS will contribute to Earth System modelling in collaboration with GAIM. The Global Carbon Project will promote the coordination and synthesis of carbon research and results between SOLAS and other relevant projects of IGBP, IHDP and WCRP, to address questions of global sustainability related to carbon. With respect to plan-

Figure 21. Links between SOLAS and other projects of its sponsors. Links to operational programmes are not shown. An explanation of the acronyms can be found in the acronym list.



ning remote sensing and observing systems, SOLAS will work with CEOS, GOOS, GCOS, GAW, WWW and JCOMM. SOLAS will also work with START, IAI and APN to involve broad participation in its activities and develop the capacity of scientists within all regions to carry out research within the scope of SOLAS. In this the National Committees of the sponsors will also have a role to play. Societal impacts of SOLAS will be dealt with in collaboration with IHDP (see “Societal Relevance” section in Introduction).

SCOR currently sponsors several activities that are relevant to SOLAS implementation, including the SCOR-IOC Advisory Panel on Ocean Carbon Dioxide, SCOR Working Group 120 on Marine Phytoplankton and Global Climate Regulation, and the SCOR-IOC Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) programme. Relevant collaboration will be established with these groups. IOC also has a declared interest in SOLAS research, in particular the CO₂ studies being conducted in Focus 3.

SOLAS may form joint activities with related projects and activities of the sponsors and others to support implementation of SOLAS research. Specific potential interactions with other projects are detailed under the implementation strategy sections for individual Activities.

Communication

Communication within the SOLAS scientific community and to other groups, both scientific and beyond, will be an important aspect of SOLAS. The international SOLAS website (www.solas-int.org) will be a central source of information, including the Science Plan and Implementation Strategy, science highlights, publications, contacts, internal SOLAS documentation and details of activities. The site will also be a gateway to national SOLAS websites and data centres. Communication within the international SOLAS community and interested scientists will be facilitated through email bulletins and newsletters.

Planning, implementation and synthesis of SOLAS research will be carried out through workshops, field studies and scientific symposia worldwide. The philosophy of SOLAS is to encourage broad national representation in all activities, and to hold its meetings within the regions that contribute to SOLAS, to enable wide participation. National Committees and regional networks will be a vital component of the communication effort.

The results of SOLAS will primarily be published as scientific papers in international journals. In addition to the scientific literature, synthesis documents, including visually rich, easy to understand reports, will be produced periodically and widely distributed. Thus, SOLAS research output will be accessible to a broad audience, in particular the policy and resource management communities, as well as to interested members of the public. Other outreach activities (e.g. press releases, publications in the popular press, contributions to the public understanding of science, educational activities, etc.) will be encouraged.

Education and Capacity Building

As remarked elsewhere in the document, SOLAS has a particular educational role to play in that it not only brings together a range of academic disciplines (e.g. chemistry, biology, physics, etc.), but must also involve scientists working in both atmospheric and oceanic domains in integrated studies. Such multi/interdisciplinarity provides large educational challenges. The communication strategy outlined above will play an important role in this educational process.

Capacity building will be initiated in developing regions through a variety of workshops, both actual and virtual. The SOLAS SSC will strongly encourage intensive courses for graduate students and other younger workers, taught by world experts and held worldwide. Specific initiatives such as the SOLAS Summer School are already in place. The Summer School took place for the first time in summer 2003 in Corsica (further details on the SOLAS website). It is intended for Ph.D. students from any country working on specialised topics of SOLAS science, with the aim of providing a comprehensive overview of air-sea interactive biogeochemistry. This enables them to appreciate how their doctoral work fits into the larger canvas of SOLAS science. We will collaborate with START, IAI, and APN, so that their Fellowship schemes and other mechanisms can be used for capacity development, as well as with similar programmes of the National Committees of the sponsors.

The SSC will encourage workshop and other training approaches, including distance learning (via the World Wide Web), for the introduction of new technologies and techniques valuable for SOLAS research to the widest possible audience of relevant scientists.

Funding will be sought from a wide range of sources to maximise participation from across the globe in these activities.

Acronym List

ACE 1,2	Aerosol Characterization Experiments	DYCOMS-II	The Dynamics and Chemistry of Marine Stratocumulus. Phase II: Entrainment Studies
AGCM	Atmospheric General Circulation Model	ENSO	El Niño-Southern Oscillation
APN	The Asia- Pacific Network for Global Change Research	ERS1,2	European Remote Sensing Satellite
ASTEX	Atlantic Stratocumulus Transition Experiment	FRRF	Fast Repetition Rate Fluorometer
CACGP	Commission on Atmospheric Chemistry and Global Pollution	GAIM	Global Analysis, Integration and Modelling Task Force
CBLM	Coupled Boundary Layer Model	GCOS	Global Climate Observing System
CCC	Canadian Climate Centre	GCP	Global Carbon Project
CCN	Cloud Condensation Nuclei	GEOHAB	Global Ecology and Oceanography of Harmful Algal Blooms
CDN	Cloud Droplet Number	GLOBEC	Global Ocean Ecosystem Dynamics Project
CDOM	Chromophoric (Coloured) Dissolved Organic Matter	GEWEX	Global Energy and Water Cycle Experiment
CEOS	Committee on Earth Observing Satellites	GOME	Global Ozone Monitoring Experiment
CFC	Chlorofluorocarbon	GODAE	Global Ocean Data Assimilation Experiment
CLAW	Charlson, Lovelock, Andreae, Warren	GOOS	Global Ocean Observing System
CliC	Climate and Cryosphere	GOTM	General Ocean Turbulence Model
CLIVAR	Climate Variability and Prediction Research Programme	HEXOS	Humidity Exchange Over the Sea
CN	Condensation Nuclei	HNLC	High Nutrient - Low Chlorophyll
DIC	Dissolved Inorganic Carbon	IAI	Inter-American Institute for Global Change Research
DMS	Dimethylsulphide	ICES	International Council for the Exploration of the Sea
DMSP	Dimethylsulphoniopropionate	ICSU	International Council for Science
DMTT	Data Management Task Team	IGAC	International Global Atmospheric Chemistry Project
DNA	Deoxyribonucleic Acid	IGBP	International Geosphere-Biosphere Programme
DOAS	Differential Optical Absorption Spectrometry	IGOS	Integrated Global Observing System
DOC	Dissolved Organic Carbon		

INDOEX	Indian Ocean Experiment	PAGES	Past Global Changes Project
IHDP	International Human Dimensions Programme on Global Environmental Change	PI	Principle Investigator
ILEAPS	Integrated Land Ecosystem - Atmosphere Processes Study	PgC	Petagrams of Carbon
IMAGES	International Marine Global Changes Study	POC	Particulate Organic Carbon
IMBER	Integrated Marine Biogeochemistry and Ecosystem Research Project	PIC	Particulate Inorganic Carbon
IOC	Intergovernmental Oceanographic Commission	POP	Persistent Organic Pollutant
ISO	International Organization for Standardization	ppmv	Parts per million by volume
IPCC	Intergovernmental Panel for Climate Change	SAR	Synthetic Aperture Radar
IPO	International Project Office	SCCM	Single-column Community Climate Model
IR	Infrared	SSC	Scientific Steering Committee
JCOMM	The Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology	SCOR	Scientific Committee on Oceanic Research
JGOFS	Joint Global Ocean Flux Study	SOIREE	Southern Ocean Iron Enrichment Experiment
LIDAR	Light Detection and Ranging	SOLAS	Surface Ocean - Lower Atmosphere Study
LOICZ	Land-Ocean Interactions in the Coastal Zone Project	SST	Sea Surface Temperature
MABL	Marine Atmospheric Boundary Layer	START	Global Change System for Analysis, Research and Training
MLD	Mixed Layer Depth	TOC	Total Organic Carbon
M-O	Monin-Obukhov	UV	Ultra Violet
MSA	Methane Sulphonic Acid	VOC	Volatile Organic Compound
NASA	National Aeronautics and Space Administration (USA)	WCRP	World Climate Research Programme
NCAR CCM	National Center for Atmospheric Research Community Climate Model	TOPEX	Ocean Surface Topography Satellite
NSS Sulphate	Non-Sea-Salt Sulphate	USGS	US Geological Survey
NERC	Natural Environment Research Council (UK)	W3C	World Wide Web Consortium
NSF	National Science Foundation (USA)	WGCM	JSC/CLIVAR Working Group on Coupled Modelling
NWP	Numerical Weather Prediction	WGNE	Working Group on Numerical Experimentation
OCMIP	Ocean Carbon Model Intercomparison Project	WGSF	Working Group on Surface Fluxes
		WMO	World Meteorological Organization
		WOCE	World Ocean Circulation Experiment
		WWW	World Weather Watch

Appendices

I - The International SOLAS website

The international SOLAS website (www.solas-int.org) contains, *inter alia*, pages on:

- The structure of SOLAS and its various groups and committees
- SOLAS research (provides the ability to submit research for SOLAS endorsement)
- Upcoming meetings and other events that are relevant to SOLAS
- How to get involved with SOLAS (including joining the email list, nominating a member of a group or task team)
- The latest news and progress of SOLAS
- Science highlights
- National contacts and reports
- The SOLAS Science Plan & Implementation Strategy
- Products that can be downloaded (SOLAS poster, graphics, presentation, etc.)
- Links to related projects and organisations

II - National Representatives

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