



Call for Expressions of Interest

Exploration Technologies

- Hydrocarbon Mapping through Integrated Geophysics -

Operating oil and gas companies have identified key business needs within the area of **Exploration Technologies** and, through ITF, they would like to promote development of collaborative, world-class solutions to these needs.

This call for Expressions of Interest is the first step in identifying consortia to undertake funded research & development work in this area.

1. About the Proposed Programme

Key to this Programme is that it should provide innovative solutions with the potential for major impact on oil exploration and production operations. Input is encouraged from across the R&D community and, where appropriate, drawing on expertise from non-oil technology sectors. It is envisaged that within the overall Programme, there will be a number of inter-related projects undertaken by different R&D consortia.

The operators have identified one main area they would like to invite ideas - **Hydrocarbon Mapping through Integrated Geophysics** – and within this there are two areas where technology advances are sought,

- The joint acquisition, processing and integration of seismic and non seismic methods
- Improved Acquisition and Processing of Shear Waves

On the following pages are given the key business needs, as defined by the operators. The format used is intended to encourage innovative solutions and researchers are asked to address as many of the issues as they feel appropriate.

It is expected that the Programme will be up to three years in duration and will produce clear, tangible outputs. Consideration of routes to implementation should form part of each submission. In addition, significant deliverables will be expected throughout each project.

2. About ITF

ITF is a not-for-profit organisation owned and supported by major oil operating and service companies. It is the vehicle through which these companies fund joint industry projects that meet the technology needs of the upstream oil and gas industry. ITF has the remit to facilitate the development of new, high impact technologies that will increase hydrocarbon recovery from mature basins and frontier exploration areas. Further information about ITF can be found at www.oil-itf.com.

One of ITF's principal activities is to identify technology needs through consultation with its member companies and then work with the R&D community to develop proposals for innovative solutions to these needs.

3. Call for Proposal Dates

Deadline for Expressions of Interest	30 April 2007
Request for Submission of Full Proposal	Mid June 2007
Deadline for Submissions of Full Proposal	Mid August 2007
Sanction / Start Date	End 2007

4. Key Business Needs

With the increased focus on security of hydrocarbon supplies, more effort is being devoted to exploration for new hydrocarbon reserves, both in the UK and in other basins around the world. Exploration in this context covers the range from new basin investigation to rim development within well established territories. In a UK context examples of these would be West of Scotland and infill development within the central North Sea respectively.

Whilst the exploration for hydrocarbons in these types of plays differ in many respects, the ability to use advanced imaging technologies and processing to focus identification of the presence of hydrocarbons and thus to reduce the risk of drilling dry holes is common. It is towards this end that this Call for Proposals is directed.

The challenge which ITF is issuing on behalf of its member companies is,

We are striving for the ultimate goal of fully integrating seismic and non-seismic methods to produce a hydrocarbon map of the area of interest.

It is recognised that much work is being undertaken in this area and that many valuable developments are being worked on around the world. The purpose of this call is to add to this body of work by challenging researchers to think beyond current limits and to propose projects which will significantly change the industry's ability to 'see' hydrocarbon reserves.

5. Issues Identified by the Operators – The Call

a) Integration of Seismic and Non Seismic Methods

Research groups around the world are working on merging different aspects of acoustic with potential field and electric measurements to improve the industry's capability to define the structure of the subsurface and particularly identification of hydrocarbon. While these have the potential to significantly improve the imaging of the reservoir/basin, the ultimate capability of these techniques will be the full integration (not merging) of them across the whole campaign – from joint acquisition through joint processing to final display of the hydrocarbon reserve(s) on multi-dataset workstations. Within this process the rock properties must also be incorporated.

While seismic is currently the most broadly applied technique for subsurface definition, the desire in this integration process is, wherever possible, to reach a point where no single method is dominant and the optimum value from each method is achieved.

Operators are interested in application of this fully integrated process in all areas of exploration, but particularly those where current single method surveys struggle – especially sub-basalt, sub-salt and areas of complex geology.

Specifically there is an interest in,

- forward modelling in 3D to allow the ability to test ideas as you progress
- an ability to ground truth data by linking back to the rock properties
- seeking an improved understanding of the underlying workflows
- how depth control is obtained

Integration:

Merging/joint processing of seismic with non-seismic techniques, particularly gravity and magnetics, is already being done to some extent with beneficial results. However operators would like to encourage developments in this area to full integration of all techniques. By integration, operators would like developers to be bold and propose full, or components of, integration from planning through acquisition and processing to final display of hydrocarbon reserve(s) on multi-dataset workstations.

The greatest gain is considered to be when EM technologies can be integrated, but it is also recognised that these will pose the greatest challenges.

It is recognised that specialist skills are required for each of the methods above and, through integration of them, this could add levels of complexity which will challenge the end-user skill base. The need for highly specialised experts will inevitably limit the uptake of any development and so researchers are encouraged to give thought to how developed products/processes can give maximum value to the end user without the need for potentially hard-to-find skills.

EM Technologies:

Because of the potential of EM technologies in providing direct hydrocarbon identification, it is generally recognised that integration of these with acoustic and potential field methods has the highest chance of generating a step change in the industry's ability to 'see' hydrocarbon reserves.

However the application of EM technologies to the identification of HC accumulations is very young in comparison with the others. Even within EM there are many developments to be made and operators would like to hear of proposals to advance our understanding of issues such as,

- What is the minimum accuracy achievable on the resistivity parameter
- what are the limits of spatial resolution
- what produces anomalies and what can we learn from them – e.g. in cases where hydrocarbons are found not to be present
- It is a hydrocarbons map, not a resistivity map, the industry is interested in – how do we achieve this

b) **Improved Acquisition & Processing of Shear Waves**

Currently the seismic industry works primarily with the compression (P) wave and for this the technology for extracting vast amounts of information is very advanced. Additional complimentary information is available through acquisition and analysis of the shear (S) wave – both mode-converted and pure S waves – but this technology is much less well developed.

Operators would like to encourage novel and innovative ideas being brought to bear to the acquisition and processing of S waves. These should contribute to a new understanding of the subsurface, especially around prediction of porosity and permeability.

As part of this consideration, questions such as ‘can we enhance the capability to invert S waves’ and ‘how long do the offsets need to be’ arise. Also, to maximise the true S wave potential for the offshore industry, are there cost-effective ways of generating and acquiring shear waves on the seabed? Many components of the toolkit are currently available but the frequency of use of shear wave data suggests that uptake is not as great as it should be.

As a general point ***if software is to be proposed as a deliverable it must be capable of being integrated with existing industry standard software platforms.***

6. Expression of Interest - Issues to be Addressed

Using the attached form, the Expression of Interest should detail the innovation proposed. In addition, it should address some or all of the following questions plus any other information considered relevant. Proposers are requested to limit submissions to the three A4 pages provided.

- i. How does the proposed contribution fit with the overall theme of this Call?
- ii. What collaborations have been established, or will be established, to fulfil delivery of the proposed contribution?
- iii. What are the track records of researchers in this or related areas, such as technology transfer between industrial sectors?
- iv. What is the proposed route to delivery/implementation of outputs?
- v. Does the submission contain confidential information? If so, you can complete the Confidentiality Agreement available on www.oil-itf.com/downloadarea/index.htm.
- vi. What steps have been taken to protect/exploit intellectual property arising?

7. Next Steps

Expressions of Interest should be submitted to Duncan Anderson, ITF Subsurface Technology Manager. Contact details are given below.

After the 30 April closing date, a panel of experts will review the submissions. These will be judged on their relevance to the overall Programme and to the issues detailed on previous pages, the track record of the researchers in developing practical, innovative solutions and the potential impact of outputs from the proposal on the exploration activity in the North Sea and other basins around the world.

Following this review, successful consortia will be invited to submit full proposals according to the timetable summarised on page 2.

8. ITF Contacts

If you would like to discuss any matters related to this programme or any other issue related to ITF, please contact either Duncan Anderson or Colin Sanderson.

Contact	E-mail	Telephone
Duncan Anderson	d.anderson@oil-itf.com	+44.(0)1224.853405
Colin Sanderson	c.sanderson@oil-itf.com	+44.(0)1224.853408