Information Society Technologies (IST)

Programme Integration and Management Study

Supplementary Report

October - 1999

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1. Executive Summary

The PIM Supplementary Study mission to relate the 1st Call outcome with the ISTAG vision

This report summarises the conclusions of a two-day extension to the two-week Programme Integration and Management (PIM) study of the content of the 1st IST Call for proposals. The mission of this short supplementary study, requested at the ISTAG meeting of 17th September 1999, was to consider the extent to which proposals retained from the 1st Call align with the vision proposed by ISTAG, and to derive conclusions about how this alignment can be measured and improved in successive calls.

Results of the initial PIM study formed the basis of the new analysis

The group of five experts, all of whom participated in the original PIM study, analysed the ISTAG vision and compared its components to the categorisation in terms of technology, market and focus (including recommendations) adopted in the PIM study. The analysis and a summary of this comparison include an assessment of strengths, weaknesses, opportunities and threats.

Correspondence between retained projects and the ISTAG vision is good

The results of the analysis show that there is a good correspondence between the topics of work of the projects retained in the 1st Call and the ISTAG vision. The ISTAG vision provides a crucial strategic vision for the work of programme integration proposed by the PIM study.

Establishing metrics for the coverage of the ISTAG vision by the programme

An approach is proposed for establishing meaningful metrics of how the programme maps onto the vision. This involves agreeing a set of priority technologies for realising the vision and quantifying their relative importance to define a target technology profile for the programme. The actual profile could then be monitored after each call, in order to establish and maintain a close correlation between the work of the projects and the ISTAG vision.

Awareness creation and project participation is needed to implement the vision in the Programme

The projects are currently unaware of the ISTAG vision and need to be informed of its existence and importance. The projects should be invited to contribute to the articulation of the vision in their specific work. Specifically they should be invited to contribute to the integration of related work and address overlapping issues thereby optimising the contribution to the vision.

Clusters can be formed to act as foci for implementation of the vision

Forming clusters of projects is recommended as a means of achieving a common focus between projects and thus generating critical mass in the programme so that its results have a major impact on international technology development, standards and society in general. This applies, in particular, to the testbeds identified by ISTAG as of strategic importance for the establishment of seamless operation and ambient intelligence.

Work should start during 1999

The tuning of the work to the strategic vision formulated by ISTAG should start with the launching of the projects, i.e. at the formative stages before individual projects achieved their own momentum and independent directions. Established directions would hinder the focussing process.

2. Introduction

This supplementary PIM study follows on from the PIM evaluation of the 1st Call for proposals conducted between July 19 and August 2 1999 by a group of 17 experts. The results and conclusions of the evaluation were published as the IST report "Towards Programme Integration and Management" in September 1999.

The supplementary study, requested at the ISTAG meeting of 17th September 1999, was conducted between 5 and 6 October by a group consisting of five members of the original PIM team:

Mike Parr	-	SAQ Ltd.
Salah Al-Chalabi	-	S.A. Al-Chalabi
Hill Stewart	-	Italtel
Fiona Williams	-	Ericsson
David Lloyd - Williams	-	SOCRATES

The group was asked to consider the extent to which proposals retained from the 1st Call were already aligned with ISTAG vision and to derive conclusions about how this alignment can be measured and improved in successive calls.

The ISTAG vision is expressed in the report "Orientations for Workprogramme 2000 and beyond" published in September 1999. The reports from ISTAG and PIM were developed in parallel and independently.

This study is based on detailed comparison and analysis of material contained in the two reports and on residual knowledge and experience of the group gained during the original PIM evaluation of the retained proposals.

3. Outcome of the 1st Call in the Light of the ISTAG Report

The ISTAG vision was not available at the time of the 1st Call for proposals, so it is interesting to compare the extent to which the projects emerging from that call map onto the vision.

3.1. The ISTAG Vision

The vision of ambient intelligence based on ubiquitous computing, ubiquitous communications and intelligent user friendly interfaces provides an exciting perspective for the development of communicating embedded systems. *Taking this rather narrow interpretation of the vision, there are few projects from the 1st Call for proposals that address the vision directly.* This interpretation indicates strongly that further research in the area of embedded systems with a maturity horizon in the timeframe 2005 to 2010 should be the subject of future calls for proposals.

However, the broader interpretation of the vision given in the section of the ISTAG report on applying the vision covers the topics of work of the majority of the projects retained after the 1st Call. This suggests that there is a very good general correspondence between the general topics of work in the projects and this broader interpretation of the ISTAG vision.

Although it is encouraging that the results of the 1st Call address appropriate areas of technology, future calls should pay more attention to the explicit integration of the technology in order to realise the ISTAG vision.

The PIM study provides a basis for application of the ISTAG vision at three levels:

1) how the 1st Call projects cover the areas of technology needed to realise the ISTAG vision,
2) how some of the larger clusters or links identified in the PIM study, map onto the ISTAG vision
3) how the recommendations of the (bottom-up) PIM analysis of the 1st Call align with the recommendations of the (top down) ISTAG study.

3.2. Coverage of the ISTAG Vision by 1st Call Projects

The PIM study classified proposals into 24 technology categories. About three-quarters of these categories relate to technologies that are needed to realise the ISTAG vision. A simple count of these projects would produce an unrealistically optimistic view of the coverage of the vision by the 1st Call. However such a "project count" offers some encouragement, because it suggests that, following the 1st Call, the IST programme has broad, if as yet unfocussed, coverage of the technologies needed to realise the ISTAG vision.

The 1st Call proposals were developed without exposure to the ISTAG vision. It was therefore necessary to revisit the original PIM analysis of what was actually proposed, and to make an assessment of how each proposal mapped onto one or other of the three key precursor technologies of ISTAG's vision:

- ubiquitous computing,
- ubiquitous communication,
- intelligent user-friendly interfaces.

The 1st Call projects listed in annex 7 of the PIM report were reviewed and reclassified in terms of their potential for contributing to these precursor technologies of the ISTAG vision. This analysis suggested that:

- 9% of the projects address ubiquitous computing.
- 9% of the projects address ubiquitous communications.
- 11.5% of the projects address intelligent user friendly interfaces.

This suggests that up to 30% of the 1st Call projects are therefore potentially relevant (with their centre of gravity lying close) to the ISTAG vision. However it would be naive to think that all these projects are well targeted on the vision, because the proposals were developed before the vision was formulated.

To quantify how well the programme is targeted on the vision, it is important to agree a set of priority technologies within ubiquitous computing, ubiquitous communication and intelligent user friendly interfaces and rank each project for its relevance to one or more of these technology areas. Such a ranking should ideally be based on the actual workplans agreed after contract negotiation, rather than the project proposals. .

Although considerable effort would be needed to produce such a ranking, it would offer a meaningful measurement of not only how well the programme is targeted on the vision but also

how well the programme covers each of the priority technology areas. A radar diagram (such as that shown in figure 1) could be used to compare the actual technology profile of the programme following each call with a target profile agreed by ISTAG, the Commission, industry and academia.

Some of the priority technologies can already be seen in ISTAG's observations on how to apply the vision to the work programme.

Ubiquitous Computing:

- embedded intelligence
- distributed systems
- software portability and reuse
- seamless integration of applications

Ubiquitous Communication:

- mobile IP
- home networks
- interworking and interoperability
- multidomain network management

Intelligent User friendly Interfaces:

- multimodal and multilingual interfaces
- adaptive interfaces
- virtual reality
- dialogue modes

The choice of priority technologies will obviously require more careful study. However, to illustrate the potential value of the radar diagram, a mapping of the 1st Call proposals onto this set of technologies is presented in figure-1.

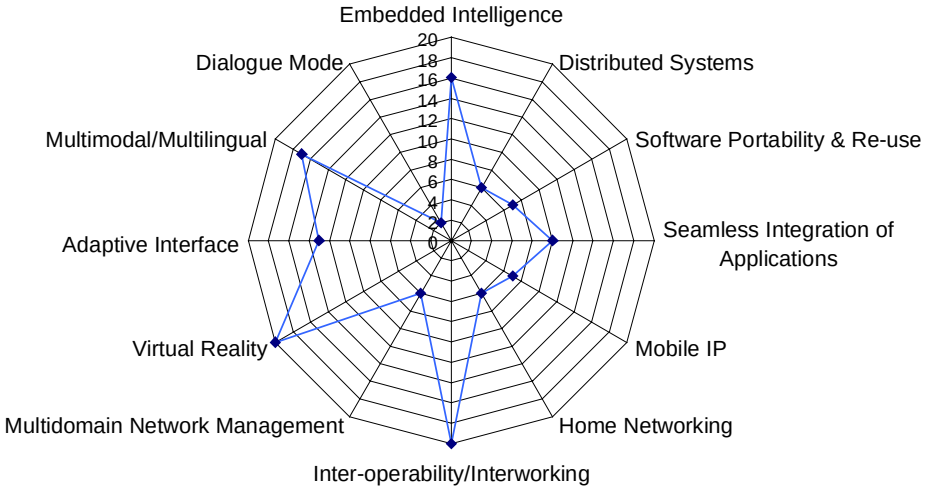

Figure 1: Coverage of ISTAG vision by 1st Call projects (up to 30% of projects seen as relevant)

3.3. Clusters

In the coming months, the ISTAG vision can be refined to generate foci for clusters of projects addressing particular aspects of that vision. The PIM study has already identified a significant number of potential clusters of projects from the 1st Call, together with links between groups of projects working on complementary technologies.

Given the large number of projects resulting from the 1st Call and the number of potential clusters identified in the original PIM study, five "starter clusters" have been identified in this supplementary study. These correspond well with core elements of the ISTAG vision and could be used as a "proof of concept". A visible success of such clusters would generate a "push" amongst other projects for cluster formation/participation, as distinct from a Commission "pull".

The five high potential clusters selected are:

- Service platforms (PIM report Annex 6 section 7.2.7),
- Human interfaces and virtual reality (PIM report Annex 6 section 7.2.8),
- e-commerce and smart cards (PIM report Annex.6 section 7.3.2 and 7.3.3),
- Mobile - IP integration (PIM report Annex 5 section 3.2.1),
- Home environments (PIM report Annex 6 section 7.3.4).

The IST '99 conference in Helsinki in November, might provide a timely opportunity for starting the process of programme integration, based on these clusters.

3.4. Focussing the PIM findings on ISTAG's Vision

Although the perspectives of ISTAG (strategic orientations for IST workprogramme) and PIM (overview of response to 1st call) are very different, their conclusions on the implementation of an integrated IST programme are remarkably consistent.

Mobilising key players:

ISTAG suggests mobilising a critical mass of key players who are committed to the ISTAG vision and are willing to work together to apply it. Critical mass and synchronisation of work are needed so that, collectively, the results of individual projects make an impact on global markets, international standards, technological progress and the needs of society.

The PIM study recommends that critical mass be achieved through the development of clusters which implement links between projects investigating different aspects of a subject. This corresponds closely to the first action proposed by ISTAG for the evolution of the IST Programme.

The topics proposed for the implementation of the ISTAG vision would form a solid basis for the formation of a cluster related to each topic. The topics proposed by ISTAG for the implementation of an ***ambient intelligence landscape*** are:

- Human interfaces and natural interaction,
- Mobile Webtone and Next Generation Internet,
- Network Technology and System Architectures.

Reviewing the clusters identified in the PIM study, those with the most immediate contribution to the ISTAG vision appear to be:

- Service platforms (PIM report Annex 6 section 7.2.7),
- Human interfaces and virtual reality (PIM report Annex 6 section 7.2.8),
- e-commerce and smart cards (PIM report Annex 6 section 7.3.2 and 7.3.3),
- Mobile - IP integration (PIM report Annex 5 section 3.2.1),
- Home environments (PIM report Annex 6 section 7.3.4).

These clusters relate to both the ISTAG vision and the major market battlegrounds of the coming years.

Ensuring widespread awareness at local level (the need for critical mass and clusters) as recommended in the ISTAG report:

To ensure support amongst projects for working in clusters, an active communication and promotional effort needs to be launched to ensure that a maximum number of projects and other interested parties "buy into" the vision. Events such as the Helsinki conference in November 1999 provide an opportunity to start this process.

Developing appropriate inter-programme links in the 5th Framework Programme:

The ISTAG report section "Driving Forces, Markets and Opportunities" highlights the interrelationships between technological, economic, social and personal progress, and points towards the need for interaction amongst these areas. In concrete terms, technology projects (or clusters) need to inform and exchange results with other areas of the 5th Framework programme.

Providing extra support for projects offering "high potential":

ISTAG recommends the seeding of the work programme with problem oriented testbeds and the establishment of a European network of usability test laboratories. Such projects could be considered as concrete examples of high potential areas, which could be a focus for future work programme calls.

Actively managing risks at programme and project level:

Individual projects have their own level of risk related to the particular technology they are developing and the market in which it will be used. This risk has been managed traditionally by the project and the associated project officer. Clusters require active management at both project and programme levels.

Maintaining the flow of technology in the 2005 to 2010 timeframe

The ISTAG recommendation to focus on the vision of the ambient intelligence landscape reinforces the need to maintain the flow of technology within the timeframe 2005 to 2010. Many of the technologies and applications needed to implement the vision have yet to be invented and yet should mature in the 2005 to 2010 timeframe. This means that there must be a continuing flow of projects with output in the medium term. The current projects take only the first steps towards realising the vision.

3.5. SWOT Analysis of the 1st Call projects in the light of the PIM and ISTAG Reports

3.5.1. Strengths

- A large number of project proposals are already aligned with the key elements of the ISTAG vision, and their application topics.

3.5.2. Weaknesses

- It is very difficult at this stage to quantify the effectiveness of the alignment without knowledge of the final content of projects, and a further elaboration of the vision.
- The proposals for both 1st and 2nd Calls will not in themselves have taken this alignment into account. Some additional actions are necessary to correct this.
- The proposals, though broadly aligned, are not yet well focussed on specific issues either in terms of the ISTAG vision, or in terms of programme integration.

3.5.3. Opportunities

- The potential for effective alignment will be greatly increased once the vision can be further refined and expressed in more practical terms, to which proposal consortia can immediately relate.
- It is timely to launch an immediate measure of awareness creation within the IST community, to explain the value and the importance of both the ISTAG vision and the integration of IST.
- The approach of selecting a small number of aligned clusters can allow proof of concept, and evidence of the IST commitment to integration.
- Both ISTAG and PIM could make important contributions to the integration of the IST programme, ISTAG by helping to prioritise and quantify the vision for integration and PIM by monitoring the progressive alignment of the programme with the vision.

3.5.4. Threats

- The long planning timescales already foreseen may preclude effective alignment of actions in the short term.
- The window of opportunity to initiate action is a matter of months, since individual projects will soon acquire their own momentum. Delays will increase, at a compound rate, the difficulty and effectiveness of integration.

4. How to Make it Happen?

Section (3) identifies a number of ways in which the PIM recommendations could be used to integrate the IST programme in line with the ISTAG vision. However, urgent action is required to implement them. This section suggests how an Action Plan can be initiated without disturbance to the current IST activities.

Many of the projects now being negotiated will work on topics related to the vision proposed by ISTAG. As yet, the projects are unaware of the existence of the ISTAG vision. The key strength

of the IST Programme is its breadth of scope but, for lack of a shared vision and sense of purpose, projects may not achieve the critical mass needed to significantly affect international standards and technology development.

The potential of the ISTAG Vision to be a starting point for creating critical mass and focus

The Vision of the Ambient Intelligence Landscape relates well to many of the proposals retained after the 1st Call for proposals. It offers an excellent starting point for launching of clusters of projects. In turn this will help the technology emerging from such clusters achieve a critical mass of support in global markets.

Creating awareness of the vision and elaborating the vision

The projects now being negotiated, **and** the consortia preparing proposals for future calls, all need to be made aware of ISTAG's vision and IST's commitment to an integrated programme. They should be offered opportunities to contribute to the elaboration of the vision for the subject area in which they have expertise.

They could be briefed through workshops or special sessions at the IST '99 Conference (November 22 to 24, 1999 in Helsinki) and at follow up workshops held in Brussels in the following months. Invited speakers could present their interpretation of the vision to provide stimuli for discussion and to create an awareness of the type of input requested from projects.

The opportunity to contribute to the elaboration of the vision should be offered in several ways, including:

- Inviting projects to join clusters and to consolidate their views through workshops,
- Launching a general appeal for contributions to the vision at the Helsinki conference and through the IST Programme web site,
- Encouraging ISTAG to further elaborate their vision.

Elaboration of the vision to provide a focus for future IST calls

An elaborated version of the vision could be developed through consultation. This should identify a set of priority technologies for its realisation and an 'ideal' profile for these priorities within the IST programme. This could be used to focus future calls for proposals for the IST programme. There are identified gaps in coverage of the workplan for projects generating results, which will mature in the 2005 to 2010 timeframe. The timing of input to future call workprogramme texts is critical as highlighted in figure-2.

Measurement of progress

The radar diagram presented in figure-1 in section (3.2) offers a metric for defining a target technology profile for the IST programme and measuring the convergence of the programme with that profile after each successive call. A set of technology priorities should be defined as soon as possible, even if the relative weighting of these within the programme is still unclear. This would make it possible for future PIM studies, such as that following the 2nd Call, to make more meaningful measurements. Once a target technology profile is agreed, such measurements can also be used to focus future calls on identified areas of weakness.

Timing

Several activities (figure-2) are being undertaken to ensure that the proposed areas of work are of maximum benefit to the European economy and citizens. The main activities are:

- ISTAG advice to the Commission and IST-C on the IST Workprogramme
- Consultation to ensure that the workprogramme continues to reflect the aspirations and work areas of the different stakeholders
- Workprogramme revision and formal adoption process
- The cycle of call preparation, proposal evaluation, contract negotiation and project launch

Careful synchronisation of these activities is essential for achieving effective programme integration and alignment of the work with the vision.

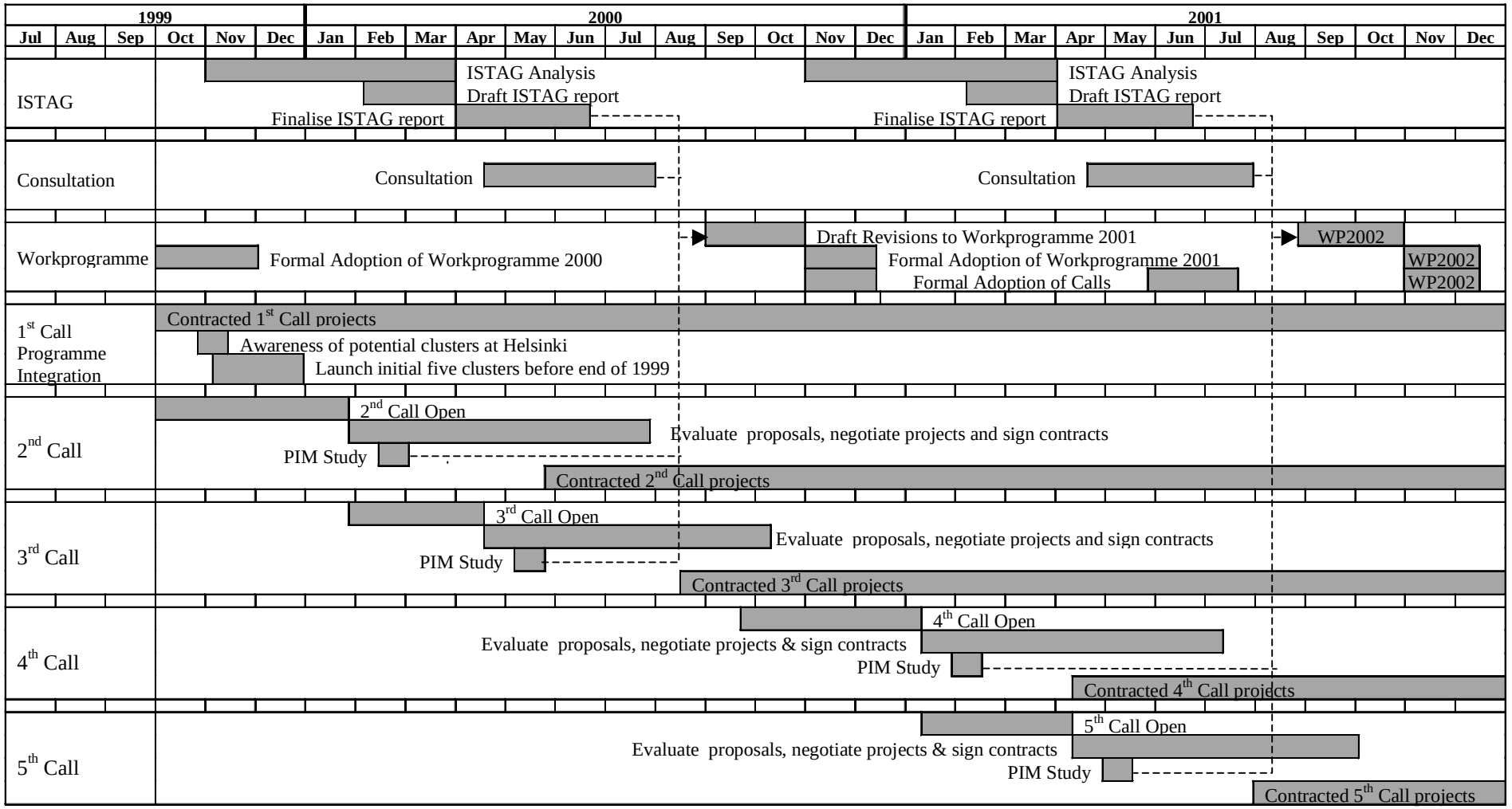

Figure 2: IST Programme timing

5. Conclusions

The areas of work proposed by 1st Call projects are in general alignment with the ISTAG vision but they are probably not well focussed on it. Projects are unaware of the ISTAG vision and need to be informed of its existence. They should also be given the opportunity to participate in the elaboration of the vision in their individual areas of technical expertise.

The formation of clusters of projects is recommended as a means of achieving a common focus and thus of developing critical mass in the programme, so that IST results can have a major impact on international technology development, standards and society in general.

The work of creating awareness of the vision and of focusing the retained projects needs to start immediately; otherwise individual projects will achieve their own momentum and independent directions. Such progressive loss of flexibility would hinder the focussing process.

In order to produce meaningful metrics of how the programme maps onto the vision, the various stakeholders in the IST programme should rapidly identify a set of priority technologies for realising ISTAG's vision and eventually balance these within a target technology profile for the programme. The resulting profile should be monitored after each call, in order to fine tune future calls on areas of weakness.