

**INTERCAI MONDIALE IN
TELECOMMUNICATIONS POLICY AND REGULATION**





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INTERCAI MONDIALE'S CAPABILITY

Intercai Mondiale is an internationally regarded specialist consultancy focusing on telecommunications and related industry sectors. Our clients include governments, regulators, start up and existing telecommunications and IT businesses, and financing organisations.

Multi-disciplinary skills and capability focused on ICT

Our consultants have strong industry experience combined with expertise in Business, Finance, Economics and Technology. Our breadth of experience allows us to contribute to landmark projects involving national policy, major privatisations, the development of new strategic directions and the implementation of large ICT networks in an increasingly volatile commercial and technical environment.

Our capability covers the array of business models, regulatory models, sector models and technologies that characterize the converging telecommunications environment. We have gained this capability through projects across Europe, the Middle East, Africa and Asia, experiencing markets at all stages of development.

Projects for all sector stakeholders

The nature of our projects reflects the needs of our clients and the broad range of skills of our consultants.

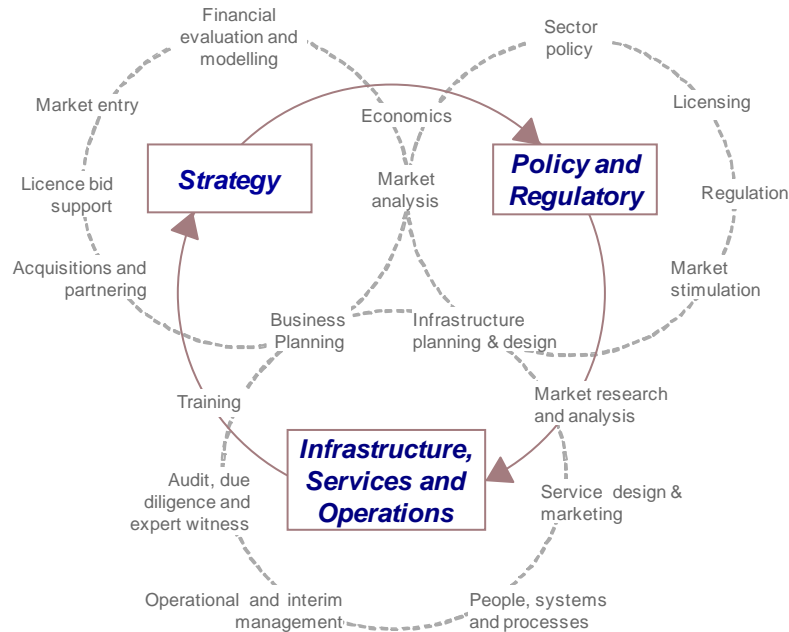
Telecommunications Operators and Service Providers	<ul style="list-style-type: none">➤ Business strategy, planning and market analysis➤ Product planning and service implementation➤ Business case development➤ Network planning, provisioning and implementation project management➤ Quality of Service and performance evaluation➤ Bid preparation and submission
Telecommunications Industry Regulators	<ul style="list-style-type: none">➤ Regulatory policy and strategy development➤ Economic analysis➤ Development of regulatory regimes in particular areas such as interconnect and USO
Government ICT Ministries	<ul style="list-style-type: none">➤ Development of policy and strategy for the telecommunications and IT sectors➤ Development of specific policy elements such as broadband stimulation and universal service obligations➤ Implementation of telecommunications industry regulator and performance of regulatory function
Financiers	<ul style="list-style-type: none">➤ Business case evaluation and financial modelling➤ Commercial and technical due diligence➤ Business valuation and funding strategies

We provide consulting services to stakeholders from the development of policy and strategy through to implementation and operation of services and infrastructure in the face of rapid technological development, liberalisation, regulatory change and increasing competition.

We adopt a pragmatic and flexible approach to staffing and running consultancy projects to provide the most appropriate expertise leading to successful customer specific solutions.



Practice areas orientated around our clients' business life cycles



Strategy & Planning

Within the Commercial sector, Intercai Mondiale has been involved in a wide variety of projects for clients ranging from Merchant Banks and Venture Capital organisations to major Fixed and Mobile Operators and market entrants. We combine our deep industry knowledge with strong quantitative analysis and leading-edge thinking to identify and assess new opportunities, and to assess the implications of changing business models, technologies and markets on business performance. Our consultants have experienced the unique circumstances and factors that govern business in developing economies, particularly those that are facing regulatory change.

We anticipate and take advantage of the wealth of opportunity and challenges available to our clients by working with them to reinvent their businesses with practical, well-conceived and flexible business designs.

We promote growth and shareholder value for our clients by harnessing our relationships, extensive industry knowledge and strategic expertise, together with our implementation and operational skills.

Policy, Regulation and Privatisation

We have carried out policy and strategy assignments for government clients, operators and service providers in countries in the Middle East, Africa and Eastern Europe as well as in Western Europe and North America. Our breadth of experience has allowed us to contribute to landmark projects involving market liberalisation, policy development, privatisation, and regulation of liberalised markets and has involved our consultants in operational roles in telecommunications regulators.

In the Kingdom of Bahrain, for example, we defined the strategy for liberalisation and then carried out the practical steps necessary to implement it. After an economic analysis based on a series of liberalisation options, we established the legal framework for liberalisation and set up the regulator, the Telecommunications Regulatory Authority. We went on to provide TRA's management team, undertaking licensing and market management as well as issuing consultations and determinations in areas as diverse as National number plan, cost of capital, price controls and spectrum allocation.

In addition we have developed a range of skills to support Government and Local Government initiatives in improving the supply of telecommunications services within disadvantaged regions of Europe. This work includes the UK Public Sector regarding the issues and provision of broadband



communications in rural areas. Intercai Mondiale has been involved across the UK and in some other European countries in broadband stimulation, the improvement of supply of broadband services, and in early aggregation schemes. We have designed national networks and provided specialist expertise to service providers in the areas of cost reduction, Quality of Service standards and Service Level Agreements for telecommunications networks.

Design & Integration

We specialise in IT and telecoms technology, mobile and fixed, wireless and wireline, within e-business and traditional environments. In particular we have advised in detail on the network infrastructures and technologies that could best be deployed by incumbent and new entrant operators in the Fixed and Mobile Telecommunications sectors.

We have experience in the complexities of large scale telecommunications systems. We design technology environments for mobile virtual network operators and communications networks including key areas of security, content management systems, network management systems and portal infrastructures for voice and web services.

We have assisted a major technology organisation that supplies strategic telecommunications network services to the UK Ministry of Defence (MoD). In the course of this, and similar projects we have developed a broad understanding of modern network infrastructures, including key aspects such as Operational Support Systems (OSS), interworking with other networks and evolution planning. In terms of technology, we have an established track record of designing large scale networks, including the selection of most appropriate switching/routing, long-haul transmission and local distribution options.

Our wide experience of developing and enforcing regulatory instruments has enabled us to provide relevant design and integration advice for market entrants in an evolving market and for established operators seeking to adjust to competition.

A wide range of ICT sector organisations

Our clients represent a mix of telecommunications operators and service providers, equipment and software vendors, venture capital and other financing organisations, national regulatory authorities and government ministries focused on the telecommunications sector. The following is a selected list of our clients.

AAM Management Info Consulting, Hungary	Holman Fenwick & Willan IIR	Orascom
Accelerator Management Company, Jordan	Inclarity International	Paradigm Services
Aepona	Telecommunications Union	Qtel
Alcatel Lucent	Jordan Telecom	Royalton Partners
Alten (UK)	Kent County Council (UK)	Rulespace
Ashford Borough Council (UK)	Kenya Power & Lighting Company	SCS
Astrium Limited	Kuwait Finance House	SEEDA
Atkins	Mazoon Mobile, Oman	Siemens Network Systems
Azerfon	MENATELECOM	Thales
Batelco	Ministry of Industry and Commerce, Bahrain	TRA, Bahrain
Bristol City	Ministry of ICT, Jordan	TRA, Lebanon
British Telecom	Ministry of ICT, Samoa	TRA, Oman
CITC, Saudi Arabia	mPunkt	TRA, UAE
Devoteam	National Telecommunications Commission, Thailand	TRC, Jordan
Digicel	Neutel Communications, Bahrain	Uganda UCC
Environment Agency (UK)	O2	Umniah
Etihad Etisalat	O2 Germany	UNDP, Lebanon
Economic Development Board, Bahrain	Omzest Group, Oman	Value Partners
FMN/Quintain		Wedlake Bell
Gamma		YFM Venture Finance
GSM Association		



INTERCAI MONDIALE'S TRACK RECORD

Our exceptional breadth of international experience has allowed us to contribute to landmark projects involving Strategy, Policy and Regulation, Business Planning and Networks, Services and Operations for communications providers in an increasingly volatile environment. The following are examples of projects that we have undertaken recently in the areas of policy, sector strategies for government and sector regulation.

Sector policy, strategy and regulatory framework projects



Technical, Economic and Regulatory Advisor to the Kingdom of Bahrain for the liberalisation of the telecommunications market

Intercai Mondiale was appointed by the Government of Bahrain to advise it on the strategy and approach it should adopt to liberalise its telecommunications market and support the preparation of the necessary legislative instruments. After gaining an in-depth understanding of the current market we identified a range of Market Structure Options (MSOs) that offered varying degrees of liberalisation. The economic impact on the sector and the effect on the incumbent were modelled for each MSO and a formal decision analysis process, involving the client, was undertaken to select the preferred option. We then drafted a National Plan to present the approved Government policy to the market and supported the legal team in the drafting of the necessary laws and licences.



Interim Telecommunications Regulator for Bahrain

For a period of two years, Intercai Mondiale supported the Government by fulfilling the functions of the newly created Telecommunications Regulatory Authority on an interim basis. This included the transition from our interim position to the establishment of a permanent team. As part of this role, the Intercai Mondiale Team undertook consultations on defining relevant markets, determinations of dominance and Significant Market Power (SMP), local loop unbundling and universal service provision. We also undertook analysis and implementation of rate rebalancing, interconnect / wholesale pricing, and Cost of Capital. We were also responsible for undertaking the selection and issuance of a second mobile licence. Further we had responsibility for type approval, quality standards, customer complaints and the general operation of the regulatory function. We assisted in the recruitment of permanent staff and participated in a programme for skills transfer and training.



Review of access to international capacity

In the light of a dispute between the dominant telecommunications provider and its major licensees the economic development board of a Middle East country asked us to provide an urgent assessment of the importance to the economic and social development of the country of access to a diverse international telecommunications capacity. We reviewed the relevant business models employed by the existing licensees, illustrated the nature and dynamics of the market for high-capacity international connectivity and the associated supply chain, and discussed the structural and scale disadvantages pertaining to the country. We offered a view on the extent to which structural change could affect the situation and discussed whether it was necessary to go beyond current legislation to effect it.



Development of a five year strategic plan for the telecoms market

For the TRA, United Arab Emirates, Intercai Mondiale carried out a detailed analysis of all regulatory functions and compared these with best practice as a basis for their recommended plan of action, including a road map of regulatory actions, principles and resources. The analysis included a study of network convergence (next generation network) and the impact of free trade agreements.



NTC, Thailand - National strategy for telecom regulation

Intercai Mondiale provided technical and economic expertise and produced a range of regulatory instruments. Relevant areas of work included:

- Development of a regulatory strategy and plan for the NTC;
- A code of practice / set of guidelines for competition safeguards
- Development of a negotiating position for international trade agreement negotiations.
- Advice on interconnect regulations
- The preparation of USO strategic guidelines and action plan;
- Advice regarding USO regulations under preparation;
- Advice regarding estimation of the net cost of USO projects;
- A training course on the USO based on international best practice

This work required a detailed assessment of social and economic conditions, and a very detailed analysis of the telecommunications sector. This analysis included an assessment of the impact on government funds and each participant of changes to sector structure and ownership necessary to ensure market efficiency.



ICT and postal policy preparation

Intercai Mondiale assisted the Ministry of Information and Communications Technology (MoICT) in Jordan in the preparation of an overarching policy statement covering the postal, telecommunications and information technology sectors.

The MoICT is required to submit policy for these sectors to the Jordanian Council of Ministers. The policy statement was prepared taking account of the requirements of the World Trade Organisation (WTO), the Free Trade Agreement with the USA, other international treaties and Jordanian law. It was justified by assessing the impact of alternative policy options on economic and social development, the development of the individual sectors and the efficiency of the government machine.



ICT and postal sector national plan preparation

Following on from the preparation of Government policy for the ICT and postal sectors in Jordan, Intercai Mondiale assisted the Ministry of Information and Communications Technology (MoICT) in the preparation of the national strategic plan for posts, mobile and fixed telecommunications and for the information technology sectors.

The plan coordinated and consolidated the many initiatives that are being undertaken in Jordan by Government ministries, Government executive agencies and NGOs.



Development of a unified licensing regime and licence transitioning

Intercai Mondiale was asked by the TRC, Jordan to develop a framework for unified licensing and to support the TRC in transitioning existing licensees to the new licences. We reviewed the Telecoms Law and existing fixed and mobile licenses, and subsequently prepared a comprehensive plan for liberalisation of the fixed sub-sector, and the introduction of the unified licensing regime. This regime encompassed the many tasks required to introduce competition into the market, and detailing the body of regulation necessary in order to successfully implement the new regime.

The initial task was to develop the body of regulation. This encompassed mechanisms for dealing with service providers with significant market power, interconnection rules, tariff controls, access, accounting separation, universal service obligations and access deficit, managing scarce resources (spectrum, numbers, rights of way), quality of service, consumer protection, fixed wireless access and sanctions. In addition to our own team of economic and technical experts we managed the inputs of a team of lawyers and public relations experts.

Subsequently, we implemented an integrated licensing regime and supported the transition of existing licences to the new structure. In addition to the incumbent there were four independent mobile licensees to transition. Prior to undertaking extensive consultations with each, we prepared detailed economic models to support the position we had developed.

During the project, the mandate for issuing licences changed. Nevertheless, we were able to develop licences that proved fair and acceptable to all parties.



USO policy preparation

Intercai Mondiale prepared the USO policy and a proposal for a USO regime for the MoICT in Jordan. We assessed the success of the current USO and identified requirements for services that should be included in the USO through comprehensive market research covering rural and urban areas in all regions of Jordan. We assessed the law and licensing regime to determine what changes to the USO were possible, and assessed the extent and quality of network coverage. We evaluated the present cost of the USO and assessed claims made by the incumbent operator. Using international best practice as a guide, we prepared a statement of policy that included a definition of availability in terms of geography, affordability, and access for disabled people. The regime proposed a method of determining when the universal service provider should be compensated for the USO burden, and who should fund the compensation. We also made proposals for the selection of an alternative to the present universal service provider should that be required to maintain economic efficiency.



Telecommunications Regulatory Commission - USO regulatory regime preparation

Following on from the definition of a Universal Service Obligation (USO) Policy for the Government of Jordan, we were asked by the Telecommunications Regulatory Commission in Jordan to prepare the regulations for the USO Regime that was required before full liberalisation of the fixed services market. We worked within the procedure adopted by the TRC for consultations.

We prepared a consultation papers covering the USO regime and related areas including affordable tariffs, payphone services as a form of universal access and services for users with disabilities.

Following the consultation, we prepared regulations that covered the definition of the universal service, the selection of operators, a process for determining under what circumstances a universal service provider should be compensated, the evaluation of USO net costs, the determination of who should contribute to a universal service fund, and the size of contributions to the fund, and a draft bylaw for the setting up of the fund.



National e-commerce strategy

Intercai has recently completed the development of an e-commerce strategy for the Ministry of ICT. This wide ranging strategy is intended to encourage the adoption of e-commerce within the general industrial and services sectors of the economy. The strategy includes collaboration with the private sector, by taking action to create a legal framework for electronic transactions in Jordan, associated consumer protection, and, the discouragement of 'cyber-crime', developing services and infrastructure that will support e-commerce, and encouraging the preparation of advanced programs of education and training in telecommunications and information technology including e-commerce. The project included an assessment of the current position of e-commerce in Jordan, in comparison with other countries, a review of relevant law and regulation, interviews with stakeholders and others, and the development of strategy through a stakeholder workshop and analysis of Jordan's e-commerce strengths, weaknesses, opportunities and threats. A consultation was initiated based on the proposed strategy and the development of an action plan.



ICT sector policy, Lebanon

We were commissioned to develop an ICT sector policy proposal for Lebanon by UNDP who are providing capacity building expertise associated with ICT sector development to the Lebanese Government. The sector policy proposal primarily addressed the complex conditions in the telecommunications sector but also considered the wider ICT service sectors. The intention was to overcome the barriers to sector development so that Lebanon could achieve the level of investment and skills development needed to meet the requirements of the Lebanese economy. The policy proposal was circulated privately to the Lebanese Government by UNDP.



ICT sector plan, Bahrain

We were commissioned by the TRA in Bahrain to develop a third ICT sector plan. This work is one of a series of projects that we have conducted for Bahraini government agencies to develop policy and planning proposals in the ICT sector, starting with the first ICT national plan in 2003 which resulted in highly successful sector liberalisation that has in turn resulted in a market comprising three mobile operators and three fixed infrastructure providers, an Internet Exchange, competition in international telecommunications and many ISPs and other service providers and one of the highest levels of household broadband penetration anywhere in the world. The new sector plan was intended to enhance Bahrain's position as one of the leading ICT service providers in the region to the benefit of other sectors of the economy, particularly the major value creating finance sector. The development of this plan comprised an analysis of the present state of the ICT sectors, a gap analysis, identification and evaluation of a set of developmental options, and development of a strategic plan to implement these options. Key issues were the development of a strategy for next generation broadband and universal access to such services, and spectrum refarming for LTE.



Regulatory economics, licensing and financial studies



Telecommunications licensing framework, Oman

For the TRA, Oman we are currently developing a new telecommunications licensing framework. The telecommunications sector in the Sultanate of Oman has achieved a significant degree of maturity, with competition in fixed and mobile infrastructure and services, under the current, open, licensing framework. The objectives of this study are to assess the suitability of the current licensing framework, to evaluate the options for alternative frameworks, and to prepare a proposed licensing framework which meets the requirements of the TRA. This framework has to address the future development of the market in Oman, particularly taking account of the key changes, technological and otherwise, that are impacting the telecommunications industry worldwide. The licensing framework will include licenses, application forms, criteria and processes, draft legal instruments and a draft position paper that will explain the framework to stakeholders.



Regulatory process development

For the TRA, in Lebanon, we developed processes for regulatory functions and communications functions in the Authority. This project was intended to ensure that the TRA is able to operate effectively immediately the Lebanese telecommunications market is liberalised. This project draws on our extensive experience first in setting up and running the TRA in Bahrain in its first years, and secondly in our work in regulators throughout the Arab region and in Eastern and Western Europe. The processes developed were based on identified best practice amongst regulators, of course tailored to meet the TRA's specific requirements and conditions. Processes were developed in workshops and meetings with the TRA's staff and Board members. Following on from the development of processes the project team advised on the migration of the processes to an online environment including the preparation of a detailed RFP for an online document management and workflow application. The project team also advised on knowledge management, performance management and the organisation structure.



Expert advice regarding the technical and economic aspects of interconnect, universal service and cost of capital in Macedonia

Intercai Mondiale acted as the external expert advising on the technical and economic aspects of interconnect, universal service and cost of capital in Macedonia.

Our client, the regulator of an emerging east European country, required a cost of capital assessment performed as part of an interconnect pricing initiative. We undertook the analysis of raw data, calculated a supportable cost of capital and drafted a consultation document. We then supported the client during the consultation process, including attending a public hearing and subsequently refined the calculation and advised the client on an appropriate WACC determination.

We also developed and ran a training programme on "Accounting and Costing of telecommunication services". The objective was to provide the foundations for understanding the models and instruments available to ensure a fair and competitive market which would promote growth and consumer benefits.



Technical advisor for the licensing of new operators

For the CITC, Saudi Arabia, Intercai Mondiale was the Technical and Economic Advisor to a multi disciplinary project team comprised Goldman Sachs, EFG Hermes, Riyadh Bank, Alliance and Allen and Overy. Intercai's roles included licence drafting, development of the bid process, and assessing and scoring technical bids for new licences.

Prior to this, we advised on Interconnection Guidelines and documents related to Number Portability, Number Planning, Roaming, Quality of Service. We also ran a series of Technical workshops covering mobile network technologies (2G & 3G); data network technologies and standard and Interconnection.



Unified licensing for a broadband wireless service

For the Omani regulator, we managed the development and award of a unified licence for broadband wireless access. We defined the socio-economic rationale underpinning the division of licences, the wireless spectrum to be assigned and the technical standards appropriate for fixed and mobile services. We developed the licensing conditions and the supporting regulations such as interconnect rules. Finally we determined the process to be employed for the selection of licensees and supported the evaluation of the bids received.



Teleport, Submarine landing & encryption

For the Omani regulator, we prepared briefing papers on three planned licences, (i) the landing of submarine cables, (ii) Teleport and VSAT, (iii) Private Networks. In each case we identified the options on the structure and content of the licence and provided the rules and procedures of the accompanying regulation. We also prepared a paper outlining the options and issues surrounding the regulation of encryption.



Market definitions and market power

We advised a Middle East mobile services operator on its responses to consultation papers issued by its national regulator. Of particular concern were the actions of, and our client's relationship with, the dominant service provider, its Reference Interconnect Offer and modifications to the terms of our client's licence.



Evaluation of Interconnect Costing Models, MCIT

We were asked by the national regulator in Samoa to undertake an evaluation of the Interconnection costing models supplied by operators and make recommendations on their suitability, the WACCs employed and the levels of proposed interconnection rates.



Regulatory workshops on interconnect, on pricing and on universal service obligations

Intercai Mondiale developed and presented a number of technical and economic sessions for the ITU on current and future regulatory standards and practices, including workshops in Syria (USO), Oman (interconnect and price regulations), Morocco, Jordan (USO), Sudan (USO and the use of wireless technology), and Kenya (interconnect and price regulations).



International roaming

The GSMA was seeking to address the issue of price controls for international roaming services in the Arab World. We were retained to advise it on the structure of the regulatory environments throughout the Arab region. In particular we were asked to comment on the anticipated positioning of the various regulators with regard to the introduction of roaming regulations.



Microwave Spectrum Pricing

Our client believed that it was paying an unreasonably high charge for microwave links and asked us to provide data from other markets that would support this view. We reviewed international benchmark rates for the price of microwave link spectrum and developed arguments to support an appropriate calculation mechanism for the charges for such spectrum.



Development of regulatory standards for emerging members of the European Union

For the European Commission, Intercai Mondiale acted as the external expert advising on the technical and economic aspects of interconnect, universal service and cost of capital



Telecoms tariff policy, Latvia

Intercai Mondiale assisted Latt Telekom by benchmarking their national and international telecoms tariffs with respect to comparably sized west European countries, including a view on trends in both national and international tariffs. After this, Intercai Mondiale developed a migration strategy for Latt Telekom's tariffs when it became known that their national market would be liberalised on a much faster timescale than originally planned.



Regulatory affairs related projects for operators

Spectrum pricing

For a full service telecommunications operator in the Middle East, Intercai prepared the response to a consultation regarding the introduction of a Radio Spectrum Licensing Framework. Following an information gathering exercise to understand the operator's full use of radio spectrum to support fixed, mobile, satellite and maritime services, the response was drafted to support the continued access to spectrum on the most favourable terms. Further, a benchmarking exercise was undertaken to assess and compare the Spectrum Pricing in regional and other international markets. A report was produced outlining the current position in respect to these benchmarks and arguments developed to justify positions to be taken in a further anticipated consultation.



Valuation of a Strategic Partner Stake in the 3rd Mobile Operator in Kuwait

For a Bahraini telecommunications company, we conducted a business planning and valuation assessment of the Client's position within a consortium bidding in the 3rd mobile licence opportunity in Kuwait. Specific focus was given to the Return on Equity analysis for the Client stake in the consortium.

The project required Intercai to:

- Model the Kuwaiti mobile market
- Prepare and cost a network roll-out plan
- Prepare and cost a services framework including security, digital rights management, lawful interception and data retention
- Develop an enterprise valuation model that took account of the differing membership conditions and objectives of the various consortium members.



Bid for a national fixed wireless network licence

For a Middle Eastern investment vehicle, Intercai Mondiale was responsible for bidding for a fixed wireless network licence to provide telephony and broadband services in Bahrain. The work involved building a business plan and valuing spectrum for a WiMAX network. The work included an assessment of the potential market, definition of services and specification of the necessary technology, interfaces and standards, as well as developing a business model and financial plan, and determining the value of the licence. The bid was successful and the service is to be launched at the end of November 2008.



Bid for third 3G mobile licence in Bahrain

For the same Middle Eastern investment vehicle, Intercai Mondiale was responsible for a bid for a 3G mobile licence in Bahrain. The work involved identification and negotiation with potential partners to provide operational experience, development of a business plan and a valuation of the licence. Business plan development required us to undertake primary market research particularly in innovative services – content and data applications – as well as market analysis using existing sources, development of a marketing and distribution plan, development of a product portfolio and pricing, tendering for a network and services infrastructure and development of a market model, business model and valuation of the licence.



Bid for a mobile licence in Egypt

Intercai Mondiale provided the technical input to a bid by a major regional telecommunications operator for a mobile licence in Egypt. Our prime responsibility was the accuracy of the bid, including conformance to standards and credibility of deployment plans.



Regulatory affairs support for KSA operator

Intercai Mondiale provides regulatory support to a major mobile operator in the Kingdom of Saudi Arabia. The support covers all aspects of regulatory affairs from a regulatory related strategy issues to support with negotiations with the NRA over individual consultations. This long term project has enabled Intercai to advise on the designation of relevant markets, USF, Reference Interconnect Offer, guidelines for exposure to EMF, Disaster Recovery and many other areas.



Rights of way and collocation

We prepared a position paper, for a Middle Eastern mobile operator, responding to its national regulator's proposal on Rights of Way and Collocation. We demonstrated that the proposals could be detrimental if our client planned to build its own ducts and, in such an event, they should be challenged.



Numbering position paper

We provided support to an incumbent that was developing its response to the newly established national regulator in relation to the development of a new national numbering plan. Our objective was to position our client so that the new numbering plan could most easily be absorbed by the infrastructure and ensure that future plans were accommodated. To this end we proposed and implemented strategies relating to numbering, number portability, equal access and the use of Easy to Remember numbers. We also established a formal dialogue process with the new regulator so that documentation and disclosures could be formally tracked and managed.



Implementation of number portability

Intercai Mondiale was the technical lead on mobile number portability implementation in India, examining the various options open to the operator, based on international best practice.



LRIC Model Evaluation

A mobile operator in a major ME country retained us to evaluate the national regulator's model for Long Term Incremental Costs, a major driver for the establishment of interconnection and termination rates. We identified several issues that we were unable to reconcile with our own model. These may have been errors or an overriding of the operator's assumptions by the regulator. Given that, if it were the latter, there was no source data to justify it, we argued that a case could be made to challenge the model used by the regulator and we consequently prepared a case for its review.



WACC consultation review, Jordan

We provided financial consultancy support to a fixed and mobile operator in Jordan in developing its response to a WACC consultation issued by the TRC.



Regulatory support, Jordan

We have been providing regulatory support to a fixed and mobile operator in Jordan. This support has included the preparation of a responses to the TRC's consultations covering fixed broadband internet access markets and mobile telecommunications markets.



Content management and security



Content filtering

A leading mobile network operator wanted to provide a URL filtering capability to meet regulatory requirements. The project was showing considerable delay Intercai Mondiale was asked to provide expert technical help and to assist with the supplier selection process. We proposed and ran the supplier evaluation process and were the primary point for supplier liaison. We provided assistance in many areas, including project planning, contract drafting and financial modelling. On the technical side we initially assumed the role of Technical Design Authority but that role later gained a much broader focus, involving discussions with other parts of the client's business and looking at the development of a content filtering strategy.



Content filtering strategy

Following a previous assignment to support the selection of a content filtering solution provider we were asked to support the client's marketing department in preparing a technical and outline financial justification for a strategic, group-based approach to providing content management capability across a range of mobile and broadband services in the UK and four other European countries. The project involved extensive interviews with senior client staff, a market review and the development of a simple cost model. The report was used by the client as the basis of a presentation to the CIO.



CITC - non HTTP filtering

CITC in the Kingdom of Saudi Arabia is responsible for Internet traffic filtering in Saudi Arabia. It provides the necessary technical and legal coverage to ensure objectionable contents that violate religious, social, and political values of the Kingdom are filtered properly. Currently, only the HTTP protocol, typically used in browsing the Internet, is filtered. However, CITC had acknowledged the importance of providing a technical and legal solution to address other protocols, such as Peer to Peer (P2P) as they present another medium of exchanging objectionable contents.

The CITC initiated a project to address the technical feasibility and legal aspects of filtering non-HTTP protocols in order to achieve the objective of providing clean Internet to Saudi society. They requested Intercai to undertake a technical feasibility study. We reviewed traffic assessment measurements conducted in Saudi Arabia and demonstrated that at least 50% of unfiltered traffic is distributed between P2P, Streaming, VOIP, and other non HTTP protocols. This gave a clear justification to the need to find a technical solution to this problem. During our subsequent technical research and benchmarking, we showed that there were products based on the latest generation of firewalls and using Deep Packet Inspection (DPI) technology that were capable of providing sufficiently advanced filtration to meet most of the CITC's requirements for protecting Saudi society. The CITC is currently planning to use Intercai's work as the basis of a development contract for a technical solution.



Electronic Certification for E-Commerce Websites

For the Ministry of Industry & Commerce, Bahrain, we evaluated options for improving confidence in Bahraini ecommerce websites amongst consumers. We focused on the protection that could be provided by ecommerce law and the certification of ecommerce websites. We considered criteria in areas such as consumer protection, privacy and protection of personal data, information disclosure, misleading content, fair contract terms, sale of goods protection, dispute resolution, child safety, and product safety. We evaluated Bahraini law against model law in these areas and law in other countries, and proposed options for certifying websites that extended protection of consumers and others to standards of model law and best practice.



Bahrain Economic Development Board

Intercai provided advisory services for protection of critical national infrastructure from:

- Attack by large text messaging frauds
- Trojans aimed at mining personal data
- Distributed denial of service attacks



Bahrain security agency

Intercai provided regulatory support for a policy covering Lawful Interception and protection of critical national infrastructure from illegal network activity.



Security policy guidelines and technical solutions

The Sultanate of Oman required to implement a new framework for Legal Interception by Law Enforcement Agencies to meet the needs of the Agencies for interception of current and future communications networks and services, Intercai was selected as Technical Advisor, based on its considerable experience in these areas, both in the Middle East and in other regions of the world.

For the ISP technical framework for Legal Interception by Law Enforcement Agencies Intercai first produced a document specifying objectives for the framework (the extent to which it was advisory, punitive etc.) and the principles of application as a regulatory instrument. The document also stated how the framework would be applied and defined the responsibilities of network operator and telecommunications regulator. It made clear the principles being applied by the regulator in measuring network operator conformance.

Secondly, we defined the technical activities to allow measurement of network operator performance on a service by service basis and the actions to be taken in the case of performance deficiency. .

Finally, we produced a 'scope of work' statement for the supply of "provisioning and implementation of interception mediation facility for IP based communications for Law Enforcement Agencies". This included the process for periodic review of actions and mechanisms for audit of services and performance, restorative action in the event of non-performance including network operator penalties and data retention.

The Oman TRA has now published and brought into operation an LI Framework, based on the documentation we produced.



Oman TRA - Control of Encryption products

The Oman TRA was tasked with developing a national policy for the control of encryption products, based on international standards. They chose Intercai to assist them with this because of Intercai's in-depth understanding of digital networking, encryption policy and technology.

The project consisted of two parts. The first part produced a reference model for the use of network encryption products, showing how various types of products can be connected to the Internet and the relationship to technical standards. The second part added procedural steps to the reference model with the relevant international standards that apply, an explanation of its application along with an enforcement plan, indicating what the regulator expects of business and how these expectations can be adjusted.



Oman TRA – Control of Unsolicited Messaging

The Regulating of unsolicited commercial messaging (spamming) addresses key issues such as privacy, illegal/offensive contents, misleading and deceptive trade practises and so on. Initially Intercai scoped the type of messaging to be considered. We then assessed how the flow of these messages could be used for assisting Law Enforcement Agencies with profiling, with the collateral benefit of helping network operators build up their customer relationship management systems with nodes, relays and super relays. The final piece of work we undertook was to define the procedures for the eradication of hostile types of messages once they had been identified.

In addition to these projects for regulators and to implement regulatory policy, we have carried out a number of projects associated with network security for public sector organisations. These projects include the following two projects that demonstrate our wide ranging experience in complex environments.



China State Lottery

We carried out a security audit of the China state lottery telecommunications infrastructure and facilities.

Crypto-key management

As one project amongst a large number of projects for a defence network services and equipment provider, we undertook a project to improve the distribution of crypto keys over a very large scale defence network. Our client, a provider of military communications services, wished to improve its distribution of crypto keys by replacing its courier system with an Over-the-Air (OTA) method. We reviewed the technical and cost implications of various key management systems and categorised the different crypto equipment in use in our client's networks, including its future plans. For each category we assessed the implications of OTA key management and recommended actions to be taken.

In addition to this specific requirement, we advised more generally on security issues associated with the provision of secure network services. This advice covered many different aspects of service delivery from physical security upwards.



Quality of service



Quality of service and national standards policy

The Omani regulator retained us to develop a quality of service framework and set of national network standards. We defined the QoS framework by identifying the range of basic measurements that should be taken on a telecommunications network and showed how these should be used to assess the quality of a specific service. Key performance indicators, based on international best practice, were included for all service types. We then established a set of network interconnection standards appropriate to the operators in the country and designed a forum in which those standards would be further developed by the industry and the regulator.



Billing audit

As part of a project on QoS for a Middle East TRA we were asked to conduct a comprehensive billing audit on the three main operators. The audit involved an initial request for information followed by visits to operators to see evidence of checks and measures within the metering and billing processes. We subsequently produced individual audit summaries on each operator and an overall audit report. The report provided background on billing architectures in telecommunications operators and an analysis of points of vulnerability. We made a number of recommendations to the TRA on actions it should take and provided further implementation assistance.



Service Level Agreements training

Intercai Mondiale developed and presented a two day course at the Etisalat Academy on service level agreements. This covered the basis for setting and measuring quality of service standards as well as practical issues in the composition and management of an SLA. This is an example of a course that we run from time to time for interested communications providers.



Technology studies for an NRA



Finer digits analysis

We were retained by an NRA to assess the technical implications to operators if they were asked to carry out finer digit analysis, thereby allowing geographical numbers to be allocated in smaller blocks. We established that, although possible, the different decode limitations of installed switches meant that finer digit analysis would be limited in extent. The finite provision of decode resource on some switches would constrain the number of areas in which blocks of 1000 (as opposed to the current standard of 10,000) could be allocated.



Number translation service

An NRA wished to understand the types of cost that are faced by a telecommunications operator when a customer changed its Number Translation Service (NTS) number from one range to another. The rationale behind the study was that the regulator wished to understand the implications of reallocating special service numbers within the National Numbering Plan. Our study was undertaken in the light of this rationale and focussed on the technical and consequential costs that would be incurred by a service provider in those circumstances.



Geographic numbering

An NRA was facing unprecedented demand for blocks of telephone numbers from operators and ISPs. We were asked to determine why this was and to develop a model to predict areas where there would be a shortfall in geographic number blocks. We surveyed operators and service providers that were requesting number blocks and developed a demand model that projected demand forward by area code based on historical data. We used a Monte Carlo simulation to determine the probability that there would be a shortage of numbers in any one year in each area code. This analysis identified area codes where there was likely to be pressure on numbers and by varying the parameters of the model were able to investigate different scenarios. This model formed an input into at least one of consultation that the NRA undertook in numbering during 2006.



Numbering for VoIP

In order to decide how best to regulate emerging Voice over IP (VoIP) services, an NRA wanted to assess the impact of setting conditions of supply. In particular, the NRA wanted to determine the cost to operators of providing emergency service access and the consequential cost of assuring the network over which the emergency calls would be carried.

Our role in this project was to engage with a wide range (10-20) of operators in order to understand exactly what would be involved in the provision of emergency service access for VoIP services and how much it would cost. Our work was presented to policy makers in the regulator and forms the basis of proportionate regulation for this emerging technology.



Mobile Number Portability

We were retained by a European national regulator to provide a consolidated view of Mobile Number Portability (MNP) - both the way that it had been introduced in different markets and the effect that it had had - as a benchmark for future regulatory decisions in this area. On delivery of the MNP results, the investigation was extended to include Fixed Number Portability (FNP) and the final deliverable covered both MNP and FNP.



BSS/OSS Separation

Under the agreement that the NRA had reached with BT resulting in the creation of Openreach, there was a need to create functional separation in the businesses. This included the separation of BSS and OSS systems and processes so that the retail divisions of BT and independent communications providers had equivalence of inputs. An NRA needed to monitor the separation process and asked Intercai Mondiale to help.

Our role was to establish and maintain a clear understanding of the planning and management of the separation process. This entailed a detailed analysis of the incumbent's current and planned OSS and BSS and ongoing monitoring of the evolution from the former to the latter. As well as working closely with the systems, IT and operations teams in the incumbent, we regularly briefed the client on status to provide early visibility of any risks to the achievement of the objectives so that corrective actions could be identified.



VoIP Emergency Calls

We were retained by An NRA to assess the implications on operators offering voice over IP service of providing access to emergency services. The particular issue in the investigation was that provision of emergency service access causes an operator previously classified as offering an Electronic Communication Service (ECS) to be reclassified as a provider of Public Access Telephony Service (PATS). A PATS provider is bound by several General Conditions of Operation (notably regarding network integrity) that do not apply to the ECS provider.



Next generation access intervention in the UK



Next Generation Access for the Kent and Medway Economic Board

On behalf of the Kent & Medway Economic Board, we reviewed options to stimulate the supply of next generation access for the Kent and Medway Region in the South East of England. Large parts of this region are to be redeveloped as part of the Thames Gateway Development Area project and major redevelopment of the town of Ashford in Kent. There are plans for over 150,000 new houses to be built in these two areas over the next ten years, with additional commercial, retail infrastructure and infrastructure for public services. The issue for the Board was to provide suitable access infrastructure for the region, particularly in areas of new build, in the medium term. The Board was keen to understand what commercial and investment models would stimulate the supply of such infrastructure in a competitive market, including the potential for municipal funding of such networks within European Union state aid constraints.

After extensive consultation with policy makers, property developers and network operators in the region, we developed financial models of the principal commercial models that we identified. These financial models were used to evaluate the feasibility of infrastructure competition and service based competition in new build areas and in existing population centres, to evaluate the commercial feasibility of FTTH and local loop unbundling, and to evaluate the degree of subsidy if any required to provide a competitive infrastructure in new build and other areas.

We found that in general, service based competition where the infrastructure provider was regulated to provide at or near long run incremental costs was likely to provide the best returns. We also found that a fibre infrastructure was feasible in new areas and that competition could be provided over such an infrastructure with the possibility of multiple services from multiple service providers – eg HDTV, telephony, broadband internet access, security services and many others. In areas where copper infrastructure was available, LLU and DSL was the best approach, replaced by Fibre to the Curb when speed became a constraint on broadband service delivery.

In the UK, it is possible for a local authority to place obligations on a property developer that are financed by the capital gains in land arising from rezoning for residential or commercial development. We considered using such 'planning gain' for the provision of telecommunications infrastructure. Apart from public subsidies of telecommunications infrastructure, we considered other activities that the local authorities could undertake to stimulate supply of broadband. These included coordination of requirements and supply.

The project was concluded with a workshop bringing together interested parties from the local authorities concerned, the Office of the Deputy Prime Minister who is responsible for the development projects concerned, the Regional Development Agency for the South East of England, property developers, and telecommunications operators. The deliverables included a report, a presentation for use by the Board, a response to a relevant OFCOM consultation and briefing papers for local politicians.



Next Generation Access for the Ashford, UK

Our client, a Public Private Partnership responsible for Ashford's Future, one of the principal growth areas in the South East of England, wanted to ensure that Ashford would be an attractive location to live and for business. One attribute of concern was the availability of state of the art broadband. We were asked to establish whether intervention was necessary to ensure that broadband services in its area were adequate to meet its economic development objectives for the first part of the 21st Century, and if intervention was necessary, what form it should take. We reviewed current service provision, assessed expected developments in technology and explored anticipated demand. After taking into account of legislation relevant to government intervention and exploring a range of actions that would ensure the competitive supply of broadband services, we identified a number of intervention options that would ensure that the borough remained an attractive location. We assessed the various options and made recommendations that minimised the cost to the local authority while at the same time overcoming major cost elements that operators interested in providing a state of the art infrastructure would face. By making this step, we were able, also, to ensure that the local authority itself could provide state of the art broadband services at the minimum cost, should no commercial operator choose to do so. This was done within the complex state aid rules that apply to intervention in this area.

Following on from this first project, we prepared an implementation guide to cover the laying of ducts and fibre within and between neighbourhoods and potential points of presence owned by communications providers. The purpose of the guide was to inform developers of the practical arrangement of ducts that would be of value to prospective communications providers.

Propel Northants

We were engaged by the Atkins Group, the official engineering design services provider for the 2012 Olympic games, to provide specialist broadband expertise for a project to determine the next generation communications strategy for Northamptonshire. Our task, a significant part of the project, was to establish a detailed understanding of the established communications infrastructure and broadband availability across the county. During the project, we examined the installed transmission capacity and points of network presence from over a dozen operators and prepared a number of case studies (both UK and international) on next generation access. In addition, we undertook a post-code level survey of fixed line, cable and mobile broadband availability (in this instance, about 15,000 individual post codes). The survey resulted in detailed maps of the county showing geographic broadband performance. As expected, the results showed that the major conurbations were well served with rural areas less so, though there were some exceptions. Propel Northants is a body with local government, academic and development agency representation.

Broadband Bedford

This project undertaken with Atkins was largely a repeat of the work for Propel Northants but covering Bedfordshire, Luton and Milton Keynes. The project was commissioned by Propel Northants but financed by the East of England Development Agency (EEDA).



Broadband market stimulation

Intercai Mondiale has been the technical and economic advisor to a number of UK government agencies and local government authorities on the development of strategies to spread broadband network access in rural areas. This work involved the use of web based tools to determine broadband availability and likely performance down to an individual post code, yielding performance for groups of up to about 30 buildings. This was done typically for counties but was also done for the whole of the South East of England involving collection of data from hundreds of thousands of postcodes. This data was then analysed using cluster analysis techniques to automatically identify clusters of postcodes where performance was poor, and then to estimate the cost of delivering broadband services to those clusters based on a proforma cost model.

Cable upgrade options

We were asked by an NRA to assess the feasibility and timing for the next generation of services from the country's Cable Operators. In particular we examined their ability to provide the majority of their customers with services that used data rates one or two orders of magnitude greater than today's norm. The target was to see if and when the vision of widespread high bandwidth connection might become a practical and affordable reality and to identify how it would be achieved. The report to the client consisted of a detailed analysis of the current cable market (its history, evolution and current status), an explanation of the relevant technology (its status, potential and limitations) and an assessment of the capabilities of the cable operators to deliver 'broaderband' services.

South Yorkshire next generation access demand model

A major European telecommunications equipment manufacturer retained us to produce a demand model for next generation access in support of its bid to provide a next generation access infrastructure in South Yorkshire in the UK. The model took demographic data from the region and merged it with predicted demand data from other research sources to provide an overall demand prediction for the network. The bid was successful and implementation of a Fibre to the Kerb infrastructure is imminent.

Fibre network in North Wales

For a major European telecommunications equipment manufacturer and service provider, we provided business modelling, market analysis and marketing planning support in association with a bid for a broadband network in a disadvantaged European region. We developed a demand model for business and household broadband and leased line services for each local exchange in the area to be covered and a capacity model for the backbone network. We estimated, with the client's staff, the cost of the backbone network and the access network. We prepared a business model that was used to estimate the subsidy required to provide a commercial return on investment. We developed a marketing plan for the organisation that was intended to run the broadband network. We also provided advice about the regulatory position of the service provider and state aid implications in the EU context.