Feasibility Study for a direct

Europe Link with Latin America

Proposal acronym: ELLA

Type of funding scheme: Coordination and support actions (Coordinating)

Work programme topics addressed: INFRA-2011-3.4 (f) (ii)

Name of the coordinating person: Fernando Liello

List of participants:

Participant no.	Participant organisation name	Country
1 (Coord.)	GARR	Italy
2	CLARA	Uruguay
3	RNP	Brazil
4	FCCN	Portugal
5	Red.es	Spain
6	Innova-T	Argentina

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B.1. Scientific and/or technical quality, relevant to the topics addressed by the call

B.1.1. Concept and objectives

Communications between Europe (EU) and Latin America (LA) are subject to very high prices mainly due to the lack of competition amongst providers. Indeed only 2 modern submarine cables serve LA at present.. The objective of this proposal is to study alternatives to remedy this situation by promoting greater competition. Today, there is no efficient submarine cable providing communication between EU and LA. We intend to study the feasibility of providing such an alternative, which will increase competition between providers in this market. If current costs are high for research and education (R&E) users, then they also affect all other users. Thus the results of this study, which it is hoped will lead to the building of a new efficient cable, will have the social impact of benefiting all users of such services. It is also important to emphasize the timeliness of this project. Within the next six years, two very large, world-class sporting events will be held in Brazil: the FIFA World Cup in 2014 and the Olympic Games in 2016. These two events are expected to provoke a huge additional demand for international broadband and advanced Internet communications, and new capacity will need to be installed to meet this demand. There thus exists a unique window of opportunity to argue the public interest case for improved communications between EU and LA in time for these events, as a timely installation will be likely to generate a prompt return for the investment and, as a consequence, will be attractive to perspective commercial partners.

This proposal has been prepared by a consortium of Research and Education Networks (RENs) from Europe and Latin America, which have been working for several years to provide network support for e-Infrastructures used for scientific and technological collaboration between the two regions. This work became more intense, beginning in 2003 with the approval of the ALICE project, funded by DG-EuropeAid, which enabled the establishment of direct network links between GEANT in Europe and the RedCLARA network in Latin America.
The ALICE project has been highly successful in terms of its objectives of improving network support for EU-LA e-infrastructures, as can be attested by the increasing number of EU-LA scientific collaborations funded by the 6th and 7th Framework Programmes, and by the clear assumption that such network infrastructures will continue to be expanded to support an ever-increasing set of joint scientific objectives, especially noticeable in, although by no means limited to, the fields of astrophysics and high-energy physics. The ALICE2 Project, begun in December 2008, is taking intra LA connectivity to high standards by building a Dark Fiber and Optical links based network. Despite these advances, the limit of RedCLARA is now the high cost of the intercontinental connection to Europe, that is the real bottleneck to the integration between the European (GEANT) and Latin American (RedCLARA) backbones.

The current proposal seeks to examine the feasibility of improving current network connectivity between EU and LA by the creation of a new direct submarine link across the Atlantic Ocean; an infrastructure – as said before – of extreme relevance not only for the Research and Education community, but even more so, for the development of the commercial and social collaboration of both continents.

EU to LA links have existed since 1875, when the first telegraph cable was laid between Europe and Brazil, and several other cables have followed this short route EU-LA, such as Atlantis-II, built in 1998 mainly to support voice traffic.
However, there has been a revolution in submarine cable technology from the late 1990s, greatly expanding the capacity of these links, and providing support for the enormous increase in

international data communications. Old technology cables, like Atlantis-II, simply cannot handle this traffic. Instead, all current EU-LA data communications pass through the 2 submarine cables going though the USA, and cross the North Atlantic between Europe and North America, including the link between RedCLARA and GEANT.

There are several drawbacks to using the longer route via the USA. The most obvious one is cost, since more cable resources are used, due to the much greater distances involved. On the technical side, there is a large increase in end-to-end propagation delay, also due to the much longer cable distances. This has a direct negative effect on interactive traffic, and also affects high-volume data traffic in IP networks, which are highly susceptible to inefficient use of long-latency links.
There is also the question of unreliable third party intermediaries, which can interfere with traffic between the endpoints of a EU-LA connection, both by providing additional points of failure, or even interrupting cable traffic. The lack of alternative routes is a risk for the reliability of continued communication.

These drawbacks can be overcome by the creation of a modern cable link following the short route between Europe and Brazil. This would provide alternatives to the cables currently used, with improved performance characteristics. Other benefits include increasing global connectivity, particularly through new paths to communications systems connecting Europe to Africa and Asia and a more robust intercontinental infrastructure, with the two alternative routes providing backup one to the other.

The increased availability of alternative solutions will also have the advantage of lowering the costs of EU-LA communications either directly, or indirectly by increasing commercial competition. Currently, as all traffic is routed through the USA, it is obliged to use the services of the very few cable operators which offer high-capacity links between the USA and LA. Typically the cost of a 10 Gbps channel on one of these links is more than 20 times that of a link between the USA and Europe.

Another consequence of a new cable initiative, will be that the R&E communities of the two continents could accrue great advantages for future costs of connectivity between EU and LA by acquiring an “investor relationship” in a new cable initiative.

In the following paragraphs, we explore more the potential impact of a new submarine cable between EU and LA and, as a consequence, of the proposal for this feasibility study.

1.1.1. Synergies between Europe and Latin America in S&T

Latin America is a special region from the point of view of Europe, since two European languages – Spanish and Portuguese – are dominant. These two closely related languages confer to the region a homogeneity, which can be very representative in the information society world – the Latin American region – where the vast majority of the population of around 580 million (8.4% of the world population) speaks at least one of these two languages.

In addition, international cooperation in science and technology (S&T) has been well established for many years within Latin America, with the participation of Latin countries in Europe. The principal objective of CYTED (Programa IberoAmericano de Ciencia y Tecnologia para el Desarrollo / Ibero American Science & Technology Development Programme) is to contribute to harmonious and sustainable development in Latin America, through cooperation in science, technology and innovation (STI). Another function of the CYTED Programme is to enable inter-regional cooperation in S&T between the European Union and Latin America.

The European Commission has launched initiatives like @LIS (Alliance for the Information Society) in 2002, that gave a significant boost to the cooperation between Europe and Latin America. This programme has funded the ALICE Project and its extension, @LISII is funding the ALICE2 Project.

The 7th Framework Programme for Research and Technological Development (FP7) is the main financial instrument for support of research and development in the EU which covers almost all scientific disciplines. This programme is open to the participation of third countries and, due to its relevance for this proposal, we recall the significant participation of Latin American countries.

A number of FP6 and FP7 grid computing projects, past and present, count on, or have counted on, participation by both EU and LA institutions, as well as significant network links between EU and LA provided by the EU-funded RedCLARA network. These include the EU funded projects EGEE, EGI, EELA, EELA2, RinGRID and GISELA.

There are scientific instruments located in South America that are of great relevance for the European scientific community. One such equipment is the Very Large Telescope array (VLT), a flagship facility for European ground-based astronomy, located in Chile. It is the world's most advanced optical instrument and remote access to this installation from Europe will require robust and high-performance network facilities. Other related projects with significant European participation include the Atacama Large Millimeter/submillimeter Array (ALMA), also in Chile, and the Pierre Auger southern cosmic ray observatory, in Argentina.
At the same time, there are many scientific instruments and facilities in Europe, which are used intensively by Latin American researchers. These include, but are not limited to, the Large Hadron Collider (LHC) at CERN, the European Molecular Biology Organisation (EMBO) and its associated laboratories, and the European Space Agency (ESA).
The globalisation of research poses new demands for facilities that allow access to European scientific resources by Latin American scientific communities. for instance, a specific project exists to interconnect open scientific repositories of the Portuguese and Brazilian communities. More recently, the LA community has succesfully obtained funding from IADB to setup the basis for the interconnection of LA scientific repositories and have also joined the EU lead Confederation of Open Access Repositories (COAR) initiative. Such projects are making additional requirements for advanced communications in the latter region and, of course, will heavily depend on the transatlantic link.

1.1.2. More robust connectivity

An analysis of submarine optical cables in the world shows a non-uniform layout of these cables throughout the world. In the specific case of cables connecting both sides of the Atlantic, i.e. cables going from Europe to North and South America and cables from Africa to South America, there is a non-uniform distribution of these cables in relation to the population of these territories (see Fig. 1).

Most cables have been installed as a response of the market needs of traditional communications services. With the economic crisis in the beginning of the century and the present financial and economic crisis operators have been slow in the installation of new high-capacity optical cables that can respond in a timely way to demand when these crises have passed.

Demand for higher communications capacity between EU and LA continues to increase, as this latter region has been less affected by the above-mentioned economic slowdowns. Moreover, in the specific case of Brazil, the two major international sporting events, already mentioned above, that will soon take place in this country are expected to provoke a huge additional demand for broadband and

advanced Internet communications to Europe: new capacity will need to be installed to meet this demand.

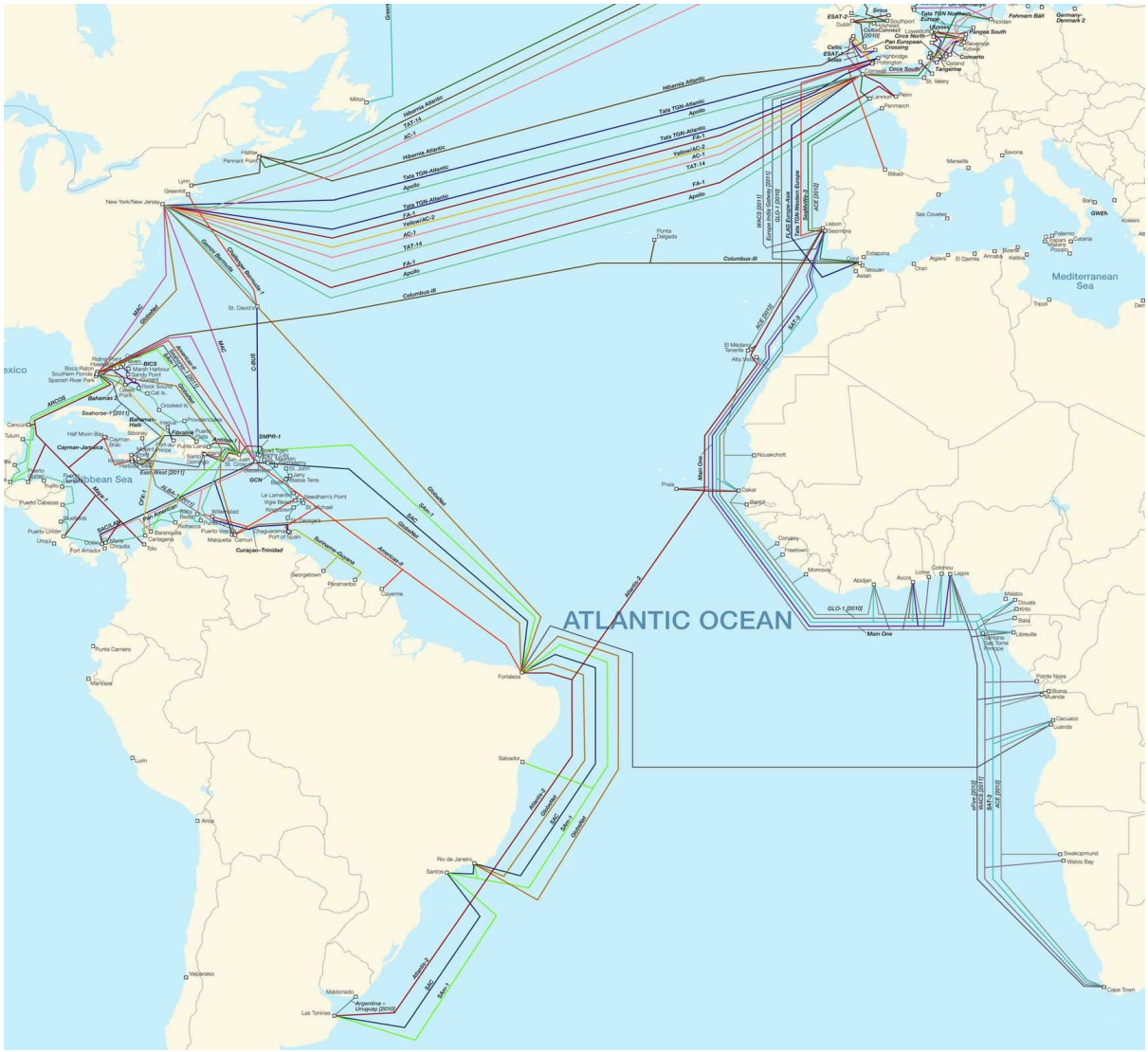

Fig. 1 – Current and forecast submarine optical cables in the Atlantic Ocean (updated September 2010)
(from www.telegeography.com/product-info/map_cable/index.php)

Another consequence of the unbalanced distribution of the undersea optical cable capacity is, as seen before, is that it represents a significant limitation to the resilience of the world Internet infrastructure, affecting the part that connects Latin America to Europe. In fact, all of EU-LA Internet communications currently use cables that pass through North America, and this constitutes a risk of failure to the connectivity between Latin America and Europe.

If new submarine optical cables are laid down between Europe and South America, crossing the Mid- or South Atlantic, it is technically reasonable for them to pass along at least part of the West African coast. The deployment layout can be chosen so that they also serve some countries or territories along this path, such as the Canary Islands (of Spain), Cape Verde or other countries. Such a layout can

allow the inclusion of additional landing stations, that can serve as technical premises for optical signal regeneration, and also to connect local communities. A further possibility is to connect to other cables following the West African coast, linking to other African countries both to the north and to the south. This would also simplify and be beneficial for future traffic increase between Latin America, Africa and Europe and make for greater economic opportunities and, as a consequence, feasibility.

Finally, the use of modern very long-haul optical technologies, combined with well-located landing stations, may even make it possible to avoid the use of undersea signal regenerators, increasing the technical flexibility for maintenance and future expansion of the cable system.

1.1.3. Increased competition

A greater abundance of communications infrastructures is expected to make for increased competition among telecommunications operators and, thus, improve the technical quality of broadband offerings for EU-LA communications and, as a consequence, within Latin American countries. Additionally, it is expected that increased competition to offer higher quality services will help to drive prices down, in a market where buyers can choose more freely.

1.1.4. Beneficial effects on EU/LA/Africa cooperation

The deployment of new submarine optical infrastructures in the Mid- and South Atlantic, if carefully planned with respect to connection locations and to the West African coast countries and territories served, can give a boost to increase the availability, technical upgrade and cost reduction in broadband connections in those places.

It is expected that the introduction of these new infrastructures in those countries and territories can have a significant impact on Internet usage within and among them. This can be a significant contribution to the social objectives included in the Tunis Agenda of the United Nations Forum on Internet Governance:

> *14. We are greatly encouraged by the fact that advances in communication technology and high-speed data networks are continuously increasing the possibilities for developing countries, and countries with economies in transition, to participate in the global market for ICT-enabled services on the basis of their comparative advantage. These emerging opportunities provide a powerful commercial basis for ICT infrastructural investment in these countries. Therefore, governments should take action, in the framework of national development policies, in order to support an enabling and competitive environment for the necessary investment in ICT infrastructure and for the development of new services. At the same time, countries should pursue policies and measures that would not discourage, impede or prevent the continued participation of these countries in the global market for ICT-enabled services.*

1.1.5. Create new opportunities for cooperation

Since the launch of the RedCLARA network in 2004, there has been a continuous increase in the volume of EU-LA R&E traffic, brought about by institutions on both sides of the Atlantic taking a increasing interest in the available network facilities and new funding opportunities. Some of the pacesetters are scientific collaborations built around the large instruments (telescopes, cosmic ray detectors, particle accelerators) both in LA and EU. But new areas of cooperation between EU and

LA are already appearing in other areas, including ICT (especially data infrastructures, and research involving experimentation in Future Internet), health and culture (involving high-performance digital media), all of which require significant high-capacity connectivity to facilitate effective collaboration. The new connectivity proposed here will make such collaborations easier to support adequately, as well as opening up the possibilities for more elaborate means of carrying them out.
As these activities become every day more global in scope, we can also expect that such future collaborations will not only be bilateral, between EU and LA, but will extend to include partners from Africa and Asia. The new connectivity we propose to study here will go some way towards making this easier, and more robust, by increasing the number of alternative paths made available for their communication. We believe that making it possible for such global research collaborations to be carried out will be beneficial.

B.1.2. Contribution to the co-ordination of high quality research

This project proposes to examine how to improve international network connectivity between Europe and Latin America, through a specific improvement in general communications connectivity, which has the side effect of also bringing great benefit to those international research communities which include participants in EU and LA. The proposal brings together NRENs from Italy, Portugal and Spain in Europe, and from Argentina and Brazil, as well as the RedCLARA regional REN in Latin America. This collaboration builds on previous collaboration in the ALICE and ALICE2 projects, in which the proposal members have participated since 2003, and seeks to turn its scope more tuned to promoting significant improvements in the provision of network support for research users.
FP7's efforts to disseminate research oportunities by means of the establishment of National Contact Points (NCPs) in all of LA and the support of RedCLARA through the organization of Virtual Information Days is aimed at boosting the number and quality of Joint research proposals between LA and EU. These new projects will create additional demands on connectivity that current infrastructure will not be able to support. The proposed new cable and the implied reduction of the cost of badwidth will be able to satisfy this new demand and increase further oportunities to establish real Joint Virtual Research which will make real the EU-LA Research Area.

B.1.3. Quality and effectiveness of the co-ordination mechanisms, and associated work plan

Feasibility studies of such ambitious infrastructures as intercontinental cables require by themselves a substantial amount of work and a set of competences that is extremely difficult to find in a single organization. This specific feasibility study adds to the above mentioned difficulties the need to integrate funds from very different sources that have to be motivated by different and somewhat orthogonal arguments.
The technical feasibility of laying and operating a telecommunications cable between Europe and Latin America with current technology is beyond any doubt. The real point is to understand the reasons that have prevented commercial operators from doing so in the last years and find ways to overcome them.
The political and strategic reasons that justify such an enterprise have been already illustrated in 1.1; it is however evident that would be unreasonable to expect that a new cable between Europe and Latin America could be built with just public funding. By necessity the majority of funding has to come from private investors and commercial operators, with a contribution of public funds to achieve two objectives:

- Catalyze the interest of the private market
- Guarantee that the R&E community has enough access to the infrastructure to overcome the rationing that has been necessary to apply to the Europe to Latin America communications

As a direct consequence of the reasons mentioned above the WPs of this Study can be divided in four classes

1. Technical feasibility study: NA-3
2. Assessment of the market and of its perspectives
    a. From the commercial point of view: NA-2
    b. From the strategic point of view: NA-5
3. Clarification of the financial framework
    a. Elaborate different business models: NA-4
    b. Examine different financial options: NA-6
    c. Try and consolidate the offer of seed funds: NA-7
4. "Public relations" activities
    a. Maintain the interest in the project high: NA-8
    b. Try and create a kernel for the consortium that will have to build and operate the cable: NA-9

The proposers' experience is mainly based on large REN activities; this implies that they have already good experience of telecommunications service provision; moreover some valuable experience of commercial provision of telecommunications services is available in-house. The necessary expertise in fields like deployment and operation of submarine cables or marketing analysis and forecast, will have to be complemented from external sources. This will be achieved in two ways:

- A number of commercial operators have committed themselves to give support to the project "at cost", providing expertise and information
- A limited number of private consultants will be hired to produce reports on specific items
- Expertise on economics and marketing analysis will be obtained from university departments and other academic sources via the participants' contacts.

B.1.3.1. Timing of the WPs and their components

WP n.	WP Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
NA-1	Project Management	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
NA-2	Assess the market for a EU-LA connection	■	■	■	■	■	■	■	■										
NA-3	Study the technical options	■	■	■	■	■	■	■	■	■	■	■	■						
NA-4	Alternative business models / commercial options						■	■	■	■	■	■	■	■	■	■	■	■	■
NA-5	Study potential Impact and Benefits	■	■	■	■	■	■	■	■	■	■	■	■						
NA-6	Study the financial options																		
NA-7	Availability and Level of public financial support	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
NA-8	Reassess the political willingness	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
NA-9	Trigger the creation of a Consortium to build the cable											■	■	■	■	■	■	■	■

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B.1.3.2. Work package list; Table 1.3 a

Work Package No	Work package title	Type of activity[1]	Lead Participant No[2]	Lead participant short name	Person-months[3]	Start month[4]	End month
NA-1	Project Management	MGT	1	GARR	4	1	15
NA-2	Assess the market for a EU-LA connection	COORD	2	CLARA	6	1	7
NA-3	Study the technical options	COORD	1	GARR	8.5	1	11
NA-4	Alternative business models / commercial options	COORD	3	RNP	5	4	12
NA-5	Study potential Impact and Benefits	COORD	4	FCCN	5.5	1	11
NA-6	Study the financial options	COORD	2	CLARA	5	8	12
NA-7	Availability and Level of public financial support	COORD	3	RNP	6	1	15
NA-8	Reassess the political willingness	COORD	3	RNP	4	1	15
NA-9	Trigger the creation of a Consortium to build the cable	COORD	1	GARR	3	11	15
				Total	47		

[1] COORD = Coordination activities); MGT = Management of the consortium; OTHER =Other specific activities
[2] Number of the participant leading the work in this work package.
[3] The total number of person-months allocated to each work package.
[4] Measured in months from the project start date (month 1).

B.1.3.3. Deliverables List; Table 1.3 b

Deliv. No[5]	Deliverable name	WP No.	Nature[6]	Dissemination Level[7]	Delivery Date[8]
2.1	**Report on market evolution**	**NA-2**	**R**	**CO**	**8**
2.2	**Report on roadmaps of ongoing infrastructure development**	**NA-2**	**R**	**CO**	**8**
3.1	**Report on existing cables and upgrade possibilities**	**NA-3**	**R**	**CO**	**4**
3.2	**Report on analysis of alternative solutions**	**NA-3**	**R**	**RE**	**11**
4.1	**Market study and potential opportunities**	**NA-4**	**R**	**CO**	**8**
4.2	**Business plans including alternative scenarios**	**NA-4**	**R**	**CO**	**11**
4.3	**Synergies and possible funding models**	**NA-4**	**R**	**RE**	**12**
5.1	**White Paper on potential impact benefits**	**NA-5**	**R**	**PU**	**9**
5.2	**Competition and Opportunities study**	**NA-5**	**R**	**CO**	**11**
6.1	**Information Package for Investors**	**NA-6**	**R**	**RE**	**12**
7.1	**Communication and marketing material**	**NA-7**	**R**	**PU**	**12**
7.2	**Report on availability and level of public financial support**	**NA-7**	**R**	**RE**	**12**
7.3	**Statements of support from funding agencies and regional/national banks.**	**NA-7**	**R**	**PU**	**15**
7.4	**Report on Workshops and dissemination activities**	**NA-7**	**R**	**PU**	**15**
8.1	**Collection of supporting papers**	**NA-8**	**R**	**PU**	**15**
8.2	**Organisation and results of the high-level event**	**NA-8**	**R**	**PU**	**15**
9.1	**Report on the activities performed and results obtained including recommendations on the consortium structure**	**NA-9**	**R**	**CO**	**15**

[5] Deliverable numbers in order of delivery dates. Please use the numbering convention <WP number>.<number of deliverable within that WP>. For example, deliverable 4.2 would be the second deliverable from work package 4.

[6] Please indicate the nature of the deliverable using one of the following codes: **R** = Report, **P** = Prototype, **D** = Demonstrator, **O** = Other

[7] Please indicate the dissemination level using one of the following codes: **PU** = Public; **PP** = Restricted to other programme participants (including the Commission Services).; **RE** = Restricted to a group specified by the consortium (including the Commission Services).; **CO** = Confidential, only for members of the consortium (including the Commission Services).

[8] Measured in months from the project start date (month 1).

B.1.3.4. List of milestones; Table 1.3 c

Milestone No	Milestone name	WP(s) Involved	Expected Date[9]	Means of Verification
1	**Completion of the Feasibility Study**	**ALL**	**18**	**Delivery of the Study**

[9] Measured in months from the project start date (month 1).

B.1.3.5. Work package descriptions

B.1.3.5.1. NA-1: Project Management

Work package number	**NA-1**		**Start date:**		**1**
Work package title	**Project Management**				
Activity Type	**MGT**				
Participant number	**1**				
Participant short name	**GARR**				
Person-months per participant	**4**				

Objectives

Coordinate the different work packages
Seek additional funding and support
Procure sponsorships for the events planned

Description of work

The co-ordination of the different WPs will not create problems, as many of them are fairly independent and require only loose coordination.
A kickoff meeting in person will be held will all project partners and also with collaborating companies in order to adequately programme the tasks and prepare the follow up of all the activities.
Regular video-conference meetings will be held with the WP leaders, mainly with the objective of exchanging views and communicating intermediate results. This will be particularly important for NA-3 and NA-4, that will have to be informed continuously of the state of each other's work.
One mid term in person meeting with all project partners will be held to improve the feedback and discuss the execution of the tasks.
The co-ordination will be made simpler as the key persons of the three organizations that will take the leading role in all the WPs have a long and successful track record for collaboration in previous projects funded by the EC.
As the reduction of funding could put in danger the success of the project, special effort will be put in seeking further funding for the project, especially to support the expenses for external consultancy that could be needed by some WPs.

Deliverables

Reports on kickoff and mid term meetings.

Asynchronous reports on external funding and grants obtained

Reports on grants and sponsorship agreements will be included in the Event Reports of the different WPs

B.1.3.5.2. NA-2: Assess the market for a EU-LA connection

Work package number	NA-2		Start date:		1
Work package title	Assess the market for a EU-LA connection				
Activity Type	COORD				
Participant number	2	3	1		
Participant short name	CLARA	RNP	GARR		
Person-months per participant	2	2	2		

Objectives

This WP seeks to make an estimation of future traffic patterns, which will be an important element in assessing the utility of a direct cable connecting LA to Europe. This information will be used by the other WPs as input to estimate technical, economic and commercial impacts.

Description of work

The Research and Education (R&E) traffic matrix and its evolution will be easily collected from internal consortium sources, while the corresponding data for commercial providers will have to be obtained under non-disclosure agreements as this is sensitive commercial information. In particular we will analyze current traffic between South America and Europe as the part that could be re-routed over the new cable, as well as Africa-North and South America and Asia to America through South Africa. Using these data, as well as traffic evolution estimates from different sources, we will estimate the evolution in the coming years.

The data will be treated statistically and sanitized in order to guarantee the confidentiality of the sources and the best possible statistical results.

The data collected could refer to different kinds of activity:

- **IP traffic (both corporate and home users)**
- **Traditional telephony**
- **VPNs**
- **Clear or transparent channels**

It will be necessary to reconcile the metrics and categorizations used by different sources, in order to combine them. This is usually the most difficult element in the process of statistical treatment of traffic.

Extrapolated data from different sources will be likely to contain different assumptions, that will have to be taken into account when merging these data into a global scenario. From these data we will extract by standard statistical methods a model to extrapolate a reasonable predictor of the traffic needs in the coming years. This prediction will have to be adjusted and corrected on the basis of other less objective elements that will be contributed by different sources:

- **Economic evolution**
- **Social evolution**
- **User base evolution**

It is expected that the user base evolution will have different behaviours with respect to the user category (end users, telecom operators, broadcasters, corporations, research, etc.).

This kind of information is usually available from a number of both public and private

sources like:

- **central national statistical organizations**
- **industrial associations**
- **economics fora**
- **international institutions**
- **publicly available papers**
- **consultancy firms**
- **etc.**

The support of highly respected institutions specializing in social and/or economic studies will be obtained through academic channels, easily accessed by the consortium members. In this respect some subcontracting for consulting is expected and reasonable.

Publicly available and confidential information on infrastructure evolution and roadmaps will be obtained with the support of a number of a major players of the international communications industry. Some of these actors have already accepted to share with the ELLA consortium their information, as clearly shown by the support letters attached to this proposal, but we expect that others will follow this example and accept to share their information under non-disclosure agreements.
This WP will also have to take into account information on infrastructure plans for other continents (such as Africa) that can have a direct influence on the main objective of this feasibility study.

Deliverables

Report on Market Evolution

Report on roadmaps of ongoing infrastructure development

B.1.3.5.3. NA-3: Study the technical options

Work package number	**NA-3**		**Start date:**		**1**
Work package title	**Study the technical options**				
Activity Type	**COORD**				
Participant number	**1**	**3**	**5**	**4**	**2**
Participant short name	**GARR**	**RNP**	**Red.es**	**FCCN**	**CLARA**
Person-months per participant	**3**	**4**	**0.5**	**0.5**	**0.5**

Objectives

This WP aims at identifying the alternatives for providing a large-capacity direct link between LA and Europe. The costs of the different options will be estimated and this information will be used to rank them.

Description of work

Information on previous feasibility or engineering studies for the same or similar objectives will be collected. This information will help us to address specifically the points that have convinced the telecommunication companies not to start the deployment

of this new cable up to now. Other WPs will also use information derived from this activity.

One possible means of increasing the available bandwidth between Brazil and Europe would be to upgrade the existing Atlantis 2 cable infrastructure, currently limited to 20 Gbps by the original design options. It is not so far known whether the cable owners are prepared to carry out this upgrade, or if it would be cost-effective when compared with launching a new cable. The feasibility of upgrading the existing cable will be discussed in detail with the owners of this cable.

The different topological options for laying down a new cable will be discussed with firms specializing in marine cable deployment, cable owners and telecommunication operators in the light of:

- Geographical options
- Marine engineering constraints
- Technological options

The shortest route between Brazil and Europe is the route from northeast Brazil passing by Cape Verde and the Canary Islands to reach SW Europe (Portugal or Spain). This is the historical route used by the first telegraph cable completed in 1875 and copied by the Atlantis 2 cable of 1998.

Possible synergies with other projects under development or already established infrastructures will have to be taken into account and evaluated (strictly as an example, the creation of a landing station in Cape Verde or the Canary Islands would potentially allow to have substantial savings in a coordinated effort with a cable along the west coast of Africa). A number of other possibilities and synergies arise from projects in preparation or in development. The proposers are aware of these possibilities and will examine them in detail in this WP.

The geographical options will have to be studied in strict coordination with the firms specializing in cable deployment and maintenance. Different landing points will be considered, taking into account the existing land infrastructures, economic factors, and possible synergies.

Current long distance submarine cables generally use DWDM transmission systems with underwater repeaters/regenerators included in the original project (as is the case, for example, of the Atlantis 2 cable). Such as choice generally limits future upgrade of the cable system, as the maximum capacity is determined by the size of the (electronic) components in the underwater repeaters/regenerators. A possible alternative is to use an architecture where the repeaters/regenerators are onshore, and can more readily and cheaply be upgraded, confining the undersea equipment to broadband amplifiers. It is understood that current WDM and fibre technologies are already capable of very long distance transmission without regeneration, up to several thousand km. On the direct route between Brazil and Europe, the longest submarine section is between northeast Brazil and Cape Verde, about 3000 km. It is thus feasible to consider modern WDM transmission systems, possibly supporting 40 or even 100 Gbps over very long distances.

Evidently, such alternatives will need to be discussed with manufacturers of such cable systems.

Joint work will be made with the development departments of the submarine cable companies that have accepted to share their information with us. Further information will be obtained from the optical equipment providers with whom the proposers have an ongoing and fruitful collaboration. Another source of information will be the companies specializing in cable deployment.

On the basis of all this information a compilation will be made of the different alternatives for which budget estimates will have to be produced.

The budget and technical specifications of the different alternatives will allow us to rank them and will be the necessary input for NA-6 activities.

The work on NA-3 and NA-4 will have necessarily to be strictly coordinated and the exchange of information within the two WPs will have to be continuous. This will be achieved having people in common in the two working groups.

Deliverables

Report on existing cables and upgrade possibilities

Report on analysis of alternatives solutions

B.1.3.5.4. NA-4: Alternative business models / commercial options

Work package number	**NA-4**		**Start date:**		**4**
Work package title	**Alternative business models / commercial options**				
Activity Type	**COORD**				
Participant number	**3**	**2**	**1**		
Participant short name	**RNP**	**CLARA**	**GARR**		
Person-months per participant	**2**	**2**	**1**		

Objectives

Analyse alternative business models for the creation of the new intercontinental infrastructure and collect information to be used in NA-6 and 7.

Description of work

A survey will be carried out in order to detect new service opportunities, such as:

- private ICT-based services for companies established in both sides of the Atlantic,
- support for sensor networks for monitoring seismic activity or atmospheric/oceanic dynamics,
- high-definition multimedia transmission, transcontinental cloud computing to serve EU and LA,

- bandwidth needed to broadcast special events such as the Olimpic Games,
- etc.

We will perform an analysis of the market structure in LA that will include the following points, and will have an impact on pricing:

a. The current and foreseen offer of telecommunications cables connecting America (North and South) to Europe and those interconnecting the Americas, since these infrastructures are the ones presently serving the needs for all communications between Europe and Latin America and will become alternatives to the new infrastructure being proposed.
b. A survey of the current pricing of different service offerings, in order to estimate on the one side the current limits of pricing, and on the other the impact of this new offer on the pricing of LA-US-EU links.

Alternative business models will be analyzed, among which the possibilities of establishing separate fibre networks for large telecom providers, the selling of IRUs of wavelengths to telcos and large companies and even the possibility of sale of smaller capacities such as SDH circuits or IP Transit.
For each of these business models we will also analyze:

- Market acceptability
- Technical requirements to implement the model
- Regulatory acceptability.
- Commercial and channel-policy alignment with operator values and their business model.

Jointly with different business models and according to the corresponding risk analysis we will study alternatives for funding cable deployment and operation. The alternatives could be:

a. Fully private financing in case that the Investment Recovery Period (IRP) and the Internal Rate of Return (IRR) show that this is a compelling business opportunity;
b. Private-public financing with most of the investment being provided by private actors, with public institutions from both continents providing seed funds motivated by strategic reasons. This seed funding can be seen as an opportunity for the non-profit sector, or may have to be provided in order to make the business case interesting to the private sector.

Possible technical synergies with other projects will be analyzed in NA-3, while commercial implications of these synergies will be taken into account in this WP. This will include possible cross funding with other national on international plans like the proposed continental NAP in the Canary Islands.

The work on NA-3 and NA-4 will have necessarily to be strictly coordinated and the exchange of information within the two WPs will have to be continuous. This will be achieved having people in common in the two working groups.

Deliverables

Market study and potential opportunities
Business plans including alternative scenarios
Synergies and possible funding models

B.1.3.5.5. NA-5: Study potential Impact and Benefits

Work package number	**NA-5**			**Start date:**		**1**
Work package title	**Study potential Impact and Benefits**					
Activity Type	**COORD**					
Participant number	**4**	**5**	**3**	**6**	**2**	**1**
Participant short name	**FCCN**	**Red.es**	**RNP**	**Innova-T**	**CLARA**	**GARR**
Person-months per participant	**1.5**	**1**	**0.5**	**1**	**1**	**0.5**

Objectives

Beyond the economic profitability of the creation of a direct link LA-EU, there are a number of potential benefits in term of social impact, new opportunities and cost benefits for the users. The results of this WP will be included in the packages produced in other WPs.

Description of work

A study of the academic benefits in the middle and long terms is already being carried out by the EC-funded ALICE2 project, and will be used here.
Agencies like CEPAL (UN's Economic Commission for Latin America and the Caribbean) in LA and similar EU agencies will be contacted to make contributions on cultural and social networking aspects.
Preliminary results of these activities will be the input for an event organised by this project to which relevant actors from national and international agencies will be invited. A possible coordination with CEPAL lead "Broadband Forum" of recent creation and where CLARA already participates, will be sought.
The outcome of this event will be a White Paper on the potential impact and benefits of the new cable.
A structural analysis of the global communications offerings will allow us to study the potential economic impact of having an alternative direct connection that will change the pattern of service distribution and backup across the Atlantic. Here again the contribution of the service providers will be an element of absolute importance.
The previous mentioned analysis will also allow us to estimate the impact that the creation of the new route will have on tariffs and competition in LA. Again the support and experience of the service providers will be used, but external consultancy and available studies will be used to provide a different perspective.
To do this, we will, in particular:

- Use results from NA-2
- Identify major peering points of interest.
- Take into account existing initiatives of Latin American governments to reduce tariffs.
- Identify and assess the potential reduction on wholesale tariffs and impact on broadband

final services by region.
In case a synergy with West Africa initiatives will be foreseen as possible within NA-3 and 4, the activities of this WP will also take into account the above mentioned elements for Africa/LA and Africa/Europe interactions using the data available from the synergic activities.

Deliverables

White Paper on potential impact benefits

Competition and Opportunities study

B.1.3.5.6. NA-6: Study the financial options

Work package number	**NA-6**		**Start date:**		**8**
Work package title	**Study the financial options**				
Activity Type	**COORD**				
Participant number	**2**	**1**	**3**		
Participant short name	**CLARA**	**GARR**	**RNP**		
Person-months per participant	**3**	**1**	**1**		

Objectives

To prepare an Information Package for potential members of the future Cable Consortium

To identify potential funding mechanisms for building the cable

Description of work

As soon as the different options with attached budgeting information will emerge from the activity of NA-3 and 4, a study on the different possibilities to raise the necessary financing will be carried out.

This will include an analysis of the possible options provided by the regional development banks and a compilation (necessarily not exhaustive) of possible private contributors.

Financing mechanisms that will be taken into account will include:

- Development Finance Banks
- Commercial Banks, Investment Banks
- Corporate Financing and Venture Capitalists
- Project Finance
- Private equity
- Government grants and R&D funds
- RENs
- Telecommunications companies

One of the mechanisms that could be applied to the project is the use of Project Finance.

Project finance may be defined as the raising of funds to finance an economically capital investment project in which the providers of the funds, Sponsors and Financiers, look

primarily to the cash flow from the project as the source to service their investment and provide the required rate of return.

In order to build a first draft list of potential investors, a programme of visits to the potential financial institutions, both governmental and private, will be made. With their input the Investor Package will be tested and improved

Deliverables

Information Package for Investors

B.1.3.5.7. NA-7: Availability and Level of public financial support

Work package number	**NA-7**		**Start date:**		**1**
Work package title	**Availability and Level of public financial support**				
Activity Type	**COORD**				
Participant number	**3**	**2**	**1**	**4**	**5**
Participant short name	**RNP**	**CLARA**	**GARR**	**FCCN**	**Red.es**
Person-months per participant	**2**	**1**	**2**	**0.5**	**0.5**

Objectives

To ascertain quantitatively the financial support that can be provided for the deployment of the future intercontinental cable from public sources, either in the form of direct seed funding, or in the form of access to special lines of funding, such as those available from public sources (like, but not limited to, the EDB, the IADB and the Brazilian BNDES).

Description of work

In order to assess the availability and amount of financial support for building the new intercontinental infrastructure, a number of packages of information materials need to be created, updated during the project and distributed. A large part of this material will be produced by other WPs of this project.

The targets of these packages will be

(a) Governments:

This package of dissemination material will emphasize the perspectives of STI (Science, Technology, Innovation), economic impact and social inclusion. This material will identify barriers, point out possibilities for integration, point out synergies with Africa, structure dialogues on theme-based interconnection (e.g. health, education, research, weather/climate, environment), and identify mechanisms for funding/support of STI.

(b) National/Regional Agencies and their Instruments:

Examples of such agencies are national and regional development banks, STI funding/support agencies, and regional development agencies. The emphasis of this package will be on regional policies for integration of infrastructures and of STI

systems, policies for finance of industry and of STI organisations.

This activity will lead to the assessment of the seed funding available for the project of building a new intercontinental cable. This funding will make participation in this project more attractive to potential commercial partners; at the same time it will guarantee that the R&E communities will have rights of access to the future infrastructure at such a level to satisfy their long-term needs and to justify the public investment.

To raise awareness among potential supporting agencies, presentation of the project outcomes and results of the business and marketing researches will be done to multilateral institutions, stakeholders, governments and funding agencies.
A process for regular information exchange with the Commission about the project's progress will be established. The details will be defined in close co-operation with the Commission. Relevant results related to regulatory issues will be immediately documented in reports and presented to the Commission.

A complementary dissemination strategy will be developed through workshops that will gather experts in the different business and technological fields to discuss the requirements of the sector under consideration and provide recommendations for future actions – which may or may not be covered by the project – tailored for the specific sector. Two workshops are planned for the project, including one with Government bodies and NRENs and a second one with telecom and media operators. The workshops and other dissemination activities will be documented as a report. This deliverable will be handed in at the end of the project.

Deliverables

Communication and marketing material

Report on availability and level of public financial support

Statements of support from funding agencies and regional/national banks.

Report on Workshops and Dissemination activities

B.1.3.5.8. NA-8: Reassess the political willingness

Work package number	**NA-8**			**Start date:**		**1**
Work package title	**Reassess the political willingness**					
Activity Type	**COORD**					
Participant number	**3**	**6**	**4**	**5**	**1**	**2**
Participant short name	**RNP**	**Innova-T**	**FCCN**	**Red.es**	**GARR**	**CLARA**
Person-months per participant	**1**	**1**	**0.5**	**0.5**	**0.5**	**0.5**

Objectives

To maintain the issue of a direct transatlantic cable between LA and EU high on the international agenda of the governments

Description of work

A collection of existing relevant policy papers will be prepared.

Lobbying activity will enhance visibility of the intercontinental connectivity issue in as many international fora as possible. Specifically the consortium will lobby the governments of Brazil, Argentina, Chile and European countries to make sure that the point of intercontinental connectivity between Europe and LA will appear in the agenda of high level meetings like EU-LAC, Fora on Information Society, ELAC 2015, etc.

The proposers will seek meetings with government representatives, parliamentary representatives from technical committees (S&T, Telecommunications, Education) and officials of development banks and other public agencies, to raise consciousness and promote support.

Actions will be pursued to provoke official commitment statements on political and economic support for the initiative.

Reasonable attempts will be made to organize a high-level event to present to government authorities the result of this feasibility study.

Deliverables

Collection of supporting papers

Organisation and results of the high-level event

B.1.3.5.9. NA-9: Trigger the creation of a Consortium to build the cable

Work package number	**NA-9**		**Start date:**		**11**
Work package title	**Trigger the creation of a Consortium to build the cable**				
Activity Type	**COORD**				
Participant number	**1**	**3**	**2**		
Participant short name	**GARR**	**RNP**	**CLARA**		
Person-months per participant	**1**	**1**	**1**		

Objectives

To attempt to trigger the formation of a Consortium to undertake the deployment and exploitation of the new cable under study here, with the participation of research and education (R&E) communities of Europe and Latin America.

Description of work

As soon as there is reasonable confidence that the other WPs will have a positive outcome, a collection of abstracts of the results will be produced, with the objective of informing and attracting prospective actors from the non-R&E world.

Two or three information portfolios will be prepared covering the best options for partnership identified in the conclusions to NA-2, 3 and 4. These information portfolios will allow to begin discussions with potential partners.

A negotiation strategy will also be prepared for each case.

A series of bylateral meetings will be held with them, and more in-depth discussions will be carried out with the most promising ones.

A reasonable attempt will be carried out to trigger the creation of a consortium kernel within the time frame of the ELLA project.

The legal and economic constraints that will influence the role of the R&E communities in such a consortium will be discussed, and ways will be sought to safeguard the R&E interests in the usage of this new infrastructure.

After appropriate discussions, recommendations will be drawn on the role and the appropriate legal structure to accommodate the preferred and selected potential partners.

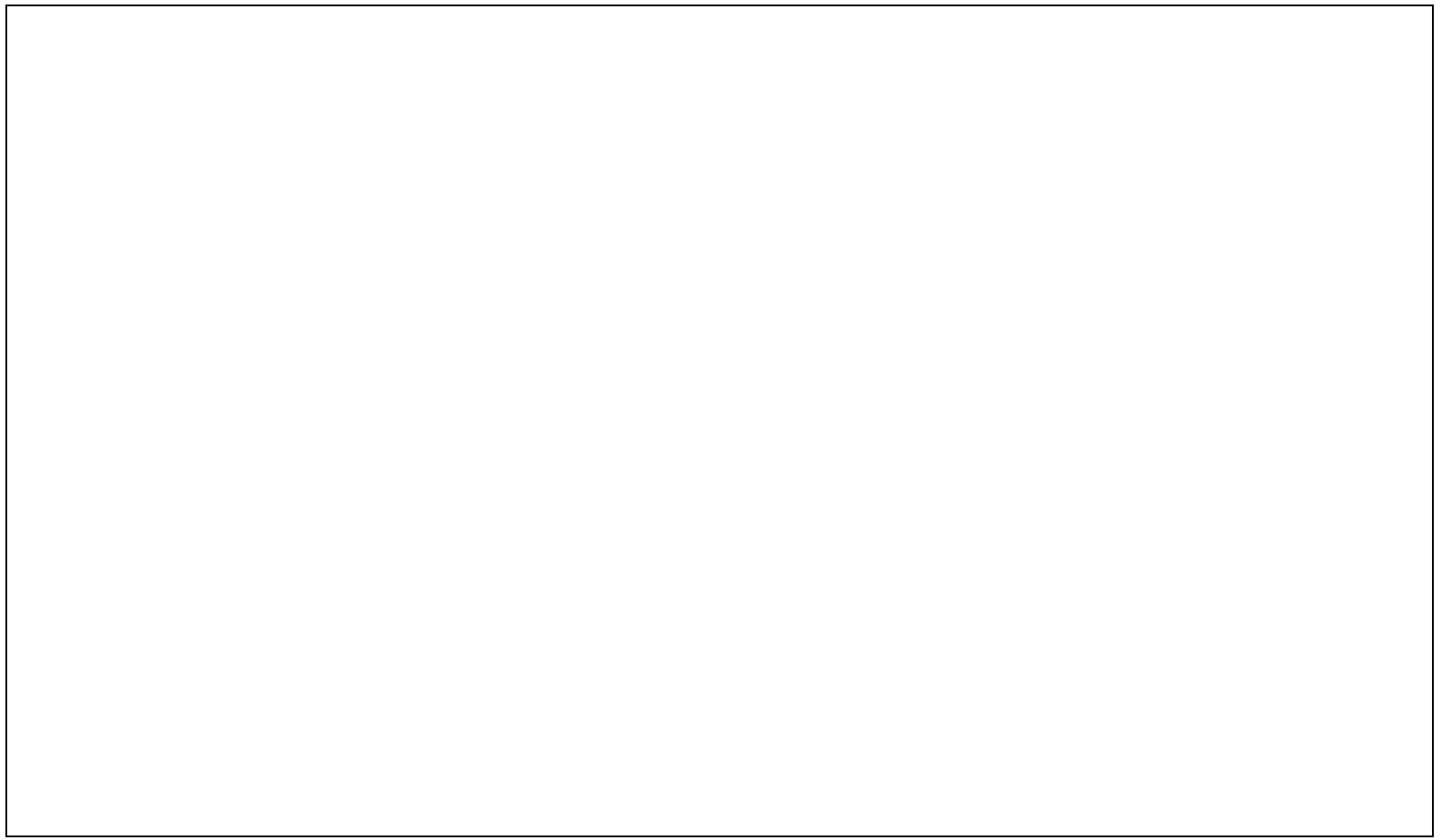
Deliverables

Report on the activities performed and results obtained including recommendations on the consortium structure.

B.1.3.6. Summary of staff effort; Table 1.3 e

Participant No	Short Name	NA-1	NA-2	NA-3	NA-4	NA-5	NA-6	NA-7	NA-8	NA-9	Total Person-Month
1 (Coord.)	GARR	4	2	3	1	0.5	1	2	0.5	1	15
2	CLARA	0	2	0.5	2	1	3	1	.05	1	11
3	RNP	0	2	4	2	1	1	2	1	1	14
4	FCCN	0	0	0.5	0	1	0	0.5	0.5	0	2.5
5	Red.es	0	0	0.5	0	1	0	0.5	0.5	0	2.5
6	Innova-T	0	0	0	0	1	0	0	1	0	2
Total		4	6	8.5	5	5.5	5	6	4	3	47

B.1.3.7. PERT diagram of the deliverables



B.1.3.8. Risk analysis and contingency plans

The main risk of the project is associated with the necessity to obtain timely and accurate information from the large telecommunication operators and different market agents who own the information on the development of the telecommunications market. The accuracy of this information and the right choice of the methodology to forecast the market development and impact on pricing and competition are crucial to be able to produce a good business model for the cable implementation.
In particular, it will be crucial to obtain accurate plans on future alternative infrastructures – such as cables being planned in the near future between South America and the United States – since these infrastructures will be the main obstacle to the commercial success of the infrastructure whose feasibility we are studying and hence to its feasibility

This risk has been taken into account by involving from the beginning large telecommunication companies in South America and Europe. These companies are at the same time the owners of the telecommunication traffic data and the most likely users/investors of the proposed cable.
These companies are also in a privileged position to know the plans and future developments of the South-North America cables, since they are presently involved in these markets and will continue to be so in future.
Another element of risk mitigation is the involvement of international consulting companies who core business is the collection and evaluation of market–data. The information that we will purchase from them will also be crucial to build good estimates of the market development.

The direct involvement of Governments will also be a risk minimizing factor of this study. Specifically, LA and EU Governments have expressed their will to study this infrastructure in the Declarations of Madrid and Segovia earlier this year. Moreover, since June this year, LA Governments have started to be worried by the pricing of Broadband Services in the region and have created, with the support of ELAC, a Forum to work on possible alternatives to lower Internet rates. CLARA and LA NRENs have become active partners of this Forum. The data obtained through these channels will validate whatever data we will obtain from more traditional sources.

The complex of these elements will minimize the risk to produce too optimistic or too pessimistic scenarios which are the biggest uncertainty factor in this type of studies.

Another element of risk could be the excessive cost of the external consultancy that we require in some WPs, again the involvement of the operators and the Governments will minimize this risk, and will make possible, if necessary, to reduce expenditure on external consultants to a minimum.

B.2. Implementation

B.2.1. Management structure and procedures

The project proposed can be successful only if its activity is extremely focused on the final objective and a minimum of overhead is created by the management structure. As a consequence a minimalist approach has been adopted.
The project has been organized in a series of fairly independent tasks that address different aspects of the problem and that, as a result, can run in a fairly independent and parallel way.
Three organizations (GARR, CLARA and RNP) will lead 8 of out of the 9 WPs. The key persons from these organizations meet regularly as they are jointly involved in other projects and activities, so very frequent meetings to coordinate the work of ELLA can be organized to coincide with these occasions, and the participation of the remaining WP leader in these meetings will be guaranteed either in person or by videoconference.

B.2.1.1. Internal Project Communication

The most advanced tools for distributed document development will be used.
An internal, wiki based, collaborative site for the collection and exchange of data, documents, and any other relevant information among the Consortium's participants will be created. The site will be subdivided in sections for each WP will be created, and the working parties will engage to use this repositories for documents in preparation, so that the coordinator will have the possibility to monitor in "real-time" the progress of the work. To better achieve this objective, WP leaders will be asked to prepare and update monthly an internal schedule of the activities of their working groups; these schedules too will be accessed via the collaborative site.

B.2.1.2. Deliverable Reviews

Deliverables will be reviewed by a group of three experts in the different fields involved appointed by the coordinator. WP leaders will be asked to make available a draft copy of the deliverables with enough advance time to allow the experts to make their remarks and suggest further work. The advance time will vary from a few days to a few weeks according to the complexity of the deliverable. If necessary this review activity will be performed via videoconference to reduce to a minimum the cost (in terms of time and expense) of travelling.

B.2.1.3. Steering Committee

A three member steering committee has been *de facto* appointed during the preparation of this proposal, and will continue its functions during the activity if the project. The steering committee is composed by the coordinator and one representative each from RNP and CLARA. These people will convene at least bi-weekly via phone- or video-conference, unless a face to face meeting is possible in conjunction with other events.

B.2.2. Individual participants

B.2.2.1. GARR

Consortium GARR

GARR is the Italian Research and Education Network, interconnecting all major Academic and Scientific organizations in Italy. The GARR network infrastructure covers the whole national territory and it is an integrating part of the global R&E Networking system. Its widespread broadband access fully supports innovative applications such as Grids, Telemedicine, e-Learning, Multimedia, High Energy Physics, Radio-Astronomy. The existing backbone is being currently replaced by GARR-X, the next-generation, multi-service network based on leading-edge optical circuits and technologies, that will dramatically enhance global performances.
GARR promotes technology innovation, thanks to the constant development and testing of new network services and protocols, and to the collaboration with major R&E networking organizations, such as DANTE, TERENA, Internet2, IETF.
GARR institutional mandate includes the mission of facilitating cooperation in the field of research through the delivery of leading-edge e-Infrastructures, both at a national and international level, and stimulating User communities from different domains to pursue joint endeavors in this field. To this end, GARR supports the community in e-Infrastructure related activities, by gathering its requirements in terms of networking, distributed computing etc, and implementing solutions to meet them effectively. Targeted dissemination of eInfrastructures, and knowledge transfer in order to favor the adoption of advanced telecommunication technologies and services are also delivered to specific communities.
GARR is actively involved in several EC-funded projects in the field sof Research Networking (including GN3, EUMEDCONNECT2, ALICE2), Future Internet research (NOVI and FIRESTATION), as well as distributed computing (EGI-Inspire, EUMEDGRID-Support, EU-IndiaGrid2) and other e-Infrastructures dedicated to specific communities (AugerAccess, EVALSO, DECIDE, and INDICATE,)

Role in the project:
GARR will be the coordinator and will be involved in every aspect of the project

Key People Involved

Enzo Valente (Director)
Fernando Liello (Technical & Scientific Committee member)

B.2.2.2. CLARA

Cooperacion Laino Americana de Redes Avanzadas (CLARA)

CLARA, the Cooperación Latino Americana de Redes Avanzadas (Latin American Cooperation of Advanced Networks) is a consortium of the National Research and Education Networks (NRENs) of the Latin American Region. Legally established in Uruguay, CLARA is formed by the NRENs of Argentina, Bolivia, Brasil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panamá, Paraguay, Perú, Uruguay and Venezuela.

The Mission of CLARA is to foster collaboration between the different countries in the LA Region by providing a world class research networking infrastructure for the use of researchers, educators, students and innovators allowing to connect them among themselves and with the other regions of the World. CLARA was created as part of the ALICE Project (America Latina Inter Conectada Con Europa), a € 12.5 Million project funded by the European Commission under the umbrella of the @LIS Programm.

CLARA operates RedCLARA, the Research and Education Network of Latin America which connects 13 of the above mentioned countries in a high speed network which is in its turn connected to GEANT2 thru a link from São Paulo (Brazil) to Madrid. Also, thanks to the partial support of the American NSF, RedCLARA is linked to the US networks through connections in São Paulo (Brazil) and Tijuana (Mexico).

CLARA operates as very decentralized organisation, having its legal office in Uruguay, but spreading its operation over all Latin America, in particular with its Network Operation Center (NOC) located in Mexico, its Network Engineering Group (NEG) located in Brasil, its Project Management Office in Mexico and its General management located in Chile. In this way CLARA has permanent contact with its member NRENs, and ensures that appropiate feedback is obtained from them, while also ensuring that they collaborate in the overall functioning of the organisation.

CLARA, together with its European counterparts, is currently excuting the ALICE2 project which aims at leapfrogging in terms of network bandwidth so as to be able to serve demanding applications such as High Energy Physics, Earthquake Simulations, Biodiversity Databases, VLBI and Astronomy, among others.

Role in the project:
CLARA will be involved in every aspect of the project, but mainly in:

- Market assesments
- Business Plans
- Study of financial options

Staff involved in the project:

- Florencio Utreras (Executive Director)
- Alberto Barrios (Director of Operations)
- Gustavo Garcia (Technical Manager)

B.2.2.3. RNP

RNP

RNP (http://www.rnp.br) is a non-profit company supported by the Brazilian government and dedicated to promoting the development of technologies in the field of networks and innovative applications in Brazil. RNP operates the national advanced networking infrastructure for cooperation and communication in education and research. Besides interconnecting all the federal government institutions of higher education and research, this network provides a laboratory for the experimental development of new applications and network services for the benefit of the organisations using it. This Brazilian national research and education network (NREN) enables interaction and cooperation between people and resources in the country and abroad.
The network reaches all 27 states in the country, with speeds of up to 10 Gbps, and interconnects more than 600 campi of more than 300 education and research institutions, serving around 800,000 users. By the end of 2010, local access to the points of presence (PoPs) of the national backbone for more than 200 RNP clients will be available through RNP-built optical metro networks operating at gigabit speeds. RNP maintains direct international research networking connections to Europe through RedClara and also to the USA.
RNP is also involved in the prospection and development of new networking applications and in the qualification of human resources for research and education networking throughout the country. Some pilot and production services include Internet telephony, video distribution and identity management infrastructure.
RNP has participated in a number of projects in partnership with European instititutions, such as ALICE, Mercosur Digital, EELA, EELA-2 and RINGrid, and actively participates in ALICE2.

Role in the project:
RNP will be involved in every aspect of the project, but mainly in:

- Study of the technical options
- Study of the Business Model
- Financial Support
- Maintain high the interest at political level

Key Personnel

- Nelson Simões da Silva (Director General)
- Jose Luiz Ribeiro Filho (Director of Solutions and Services)
- Michael Stanton (Director of Research and Development)
- Eduardo Grizendi (Project Manager, Directorate of Services and Solutions)

B.2.2.4. FCCN

FCCN

FCCN is a private non-profit organization responsible for the Portuguese Research and Education Network (Portuguese NREN). FCCN started it's activities in January 1987. Since then, with the support of Universities and various national R&D institutions, FCCN has continued to play its part in the expansion of the Internet in Portugal, namely for the research and education community. The main activity of FCCN concerns the planning, managing and operating of the Science, Technology and Social Community Network [Rede Ciência, Tecnologia e Sociedade (RCTS)]. This is a high-performance network for those institutions with the most demanding needs for communications, and is thus an experimentation platform for advanced communications software and services. RCTS is a computer network that uses Internet protocols to provide a communication and cooperation platform among institutions in the system of education, science, technology and culture. FCCN owns an infrastructure comprising 1.000km of dark fibre cable with 48 fibres covering the largest Portuguese cities and with two connection points to the Spanish border (Valença to the North and Elvas to the East; closest Spanish cities are Vigo and Badajoz, respectively). Over these cables and optical network with capacity of up to 40 channels of 10Gpbs each is in operation, serving about 85% of the Portuguese R&D community. The Portuguese NREN is a member of the GN-3 project that manages the Pan-european GÉANT network.
FCCN has also much experience of giving training courses (e.g. on IPv6, through the 6DISS project).
FCCN also manages projects and services for the Portuguese R&D community, namely:

i) digital scientific library, providing access to the electronic version of more than 17.000 scientific magazines (www.b-on.pt);
ii) open access scientific repository (www.rcaap.pt);
iii) VoIP communications;
iv) video-conferencing facilities;
v) authentication and authorization federated infrastructure:
vi) security services; and vii) video services of educational, scientific and artistic content (www.zappiens.pt).

Apart from managing RCTS, FCCN is also the registry and infrastructure operator for the .pt top level domain.

Role in the project:

FCCN will take a leading role in the study of potential impact and benefits

Key Personnel

Pedro Veiga (Chairman of the Council)

B.2.2.5. Red.es

red.es

red.es (*http://www.red.es*) is a public entity which belongs to the Spanish Ministry for Industry, Trade and Tourism (*http://www.mityc.es*) through its State Department for Telecommunications and Information Society (*http://www.setsi.mityc.es*).
The main duty of red.es is to promote the development of Information Society.
For this purpose, red.es:

- manages the Registry for domain names under ".es" (http://www.dominios.es);
- has put in place a "Telecom and Information Society Observatory" (http://www.observatorio.es);
- manages several programs related to the promotion of the Information Society, in, e.g., the health, education or justice sectors
- provides several e-government services to public administrations;
- owns INTECO (http://www.inteco.es), a entity based in León which, among other tasks, that of managing a national CERT for individuals and SMEs and
- manages the Spanish National Research and Education Network, RedIRIS (http://www.rediris.es)

red.es (staff: approx. 200 people) will participate in this project through its Department RedIRIS, which manages the Spanish National Research and Academic Network. RedIRIS (staff of approx. 25 people). RedIRIS has over 400 institutions currently connected (mainly, universities, technological centres, research centres and units of biomedical investigation).
RedIRIS provides advanced communications services to these affiliated institutions. In order to provide this service, RedIRIS manages a national backbone, with a core backbone of 10 Gbps, and a dark fibre connection to the Pan-European Research and Education Network GÉANT. RedIRIS is currently deploying a dark fiber network, called RedIRIS-NOVA, with a budget of 138 M€. Most of it will be in operation by the end of 2011.
RedIRIS' infrastructures allow the support of research projects that require advanced connectivity services, such us collaborative work, libraries, remote education, virtual tele-immersion, the management of remote telescopes, real-time applications, remote access to supercomputers or the use of GRID technology.
RedIRIS also provides middleware, applications and services to the affiliated institutions: it provides a federated digital identity service, SIR (http://www.rediris.es/servicios/sir); it manages a security team (http://www.rediris.es/cert); it promotes a mobility project (http://www.eduroam.es), it provides distribution lists to researchers (http://www.rediris.es/servicios/listserv/), etc.
RedIRIS participates or has participated in several research and development projects funded by the EC: GN2, GN3, MUPBED, FEDERICA, ALICE, ALICE2, EUMEDCONNECT, EUMEDCONNECT2, EGEE, EGEE-II, EGEE-III, EGI-InSPIRE, EUMEDGRID and EELA.

Role in the project:

RedIRIS will mainly contribute to the impact studies

Key Personnel

Dr. Tomás de Miguel (Director of RedIRIS)
Ms. Esther Robles is (Head of Network Department at RedIRIS)

B.2.2.6. Innova-T

INNOVA-RED

INNOVA-RED, is the national research and education network of Argentina (NREN), a project of the Fundación Innova-T, the technological transfer unit of CONICET, the national research and technology council of Argentina. Its continuing mission is to provide the education and research communities of Argentina with state-of-the art technology in data transfer and to assist in any development these communities may profit from. It cooperates and coordinates actions with other academic networks in the country but it is the sole provider of advanced network connectivity. Under its current denomination Innova-Red began operations in December 2006 but its activities date back to 1990 and it connected to the Internet in March 1994.

In 2001, under its previous denomination, launched the Advanced Academic Networks program fostering its implementation throughout the country. It was part of the AmPath Project of NSF and later a founding member of CLARA, the regional research and academic network Innova-Red is also a partner of the AugerAccess project funded under the EC's FP-6.

In 2010 launched a bid to acquire 4,200km of dark fiber which is at this moment (November 2010) being bid in open tender. Currently InnovaRed connects directly to nine public universities and indirectly (through RIU) to the other 39. It also gives access to Advanced Networking to 24 institutions throughout the country, including CONICET´s institutes and regional centers, the National Institute of Agriculture and Livestock Technology, the National Weather Service and the National Atomic Energy Commission, to name the most relevant.

To learn more about Innova-Red and its activities go to www.innova-red.net

Role in the project:

Innova-T will mainly contribute to the impact studies

Key Personnel

Anibal Gattone (Executive director)

B.2.3. Consortium as a whole

The complexity of a feasibility studi for an intercontinental infrastructure has convinced us that an approach different from the *usual* was needed.
The original idea of the proposers was to include in the consortium at least one commercial entity with experience in the deployment and running of intercontinental submarine cables. More careful considerations, however, have suggested us not to do so. We believe that the next step after the successful completion of this study will be the formation of a consortium with a strong private and a relatively small public presences to build and run the new cable. To select private partners for the feasibility study could have been felt by other private actors as biasing the results. On the other side to have *all* possible future actors present in the team would have been impossible. Our choice has been instead to run the feasibility study with a pure REN consortium, but issue an open invitation to the private stake holders to contribute with knowledge and expertise, but without a direct responsibility. A number of providers have answered our call, and the letter of commitment from these are included in this section; if others will join the process, this will be reflected in the composition of the support working groups for the relevant WPs.

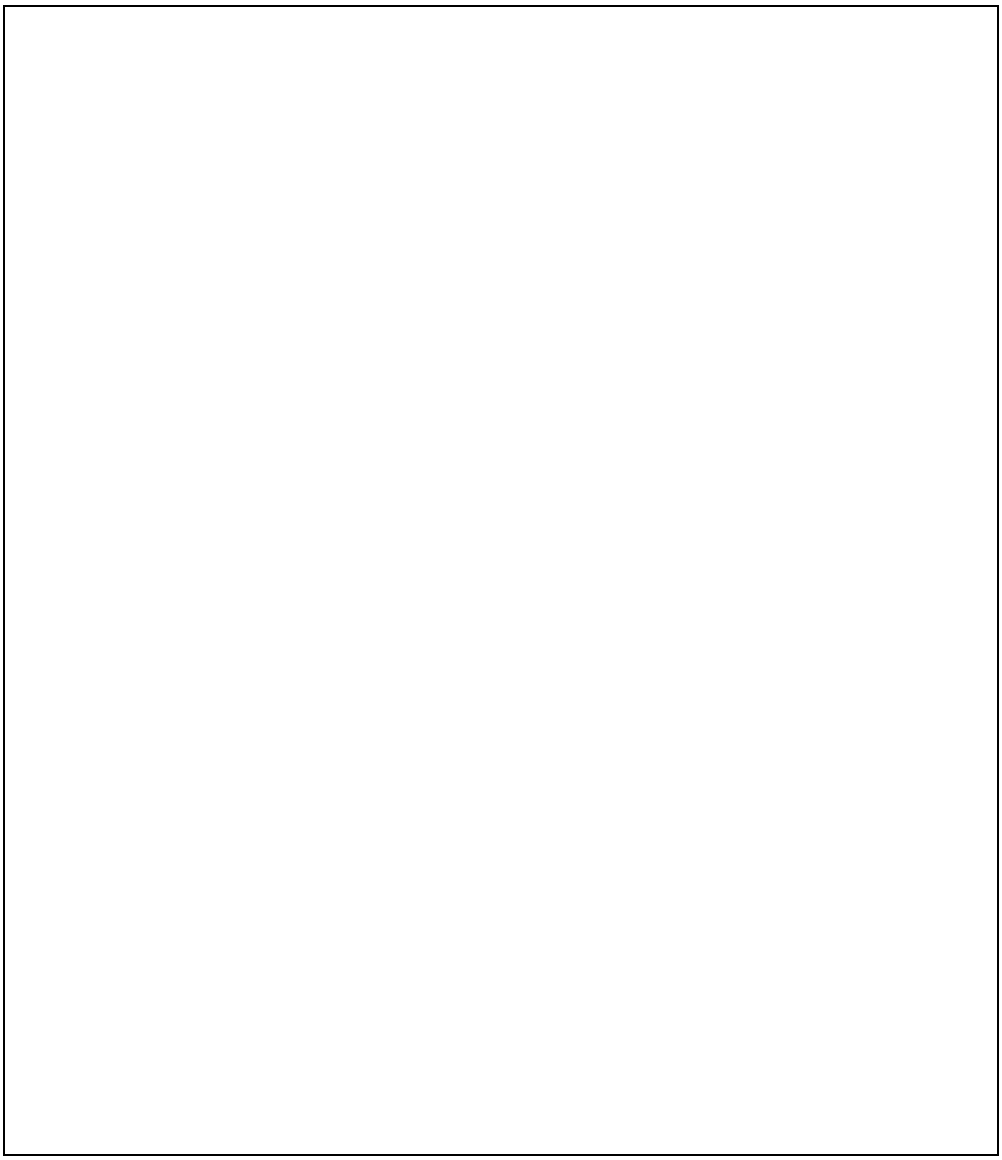
The RENs that have collectively presented this proposal are based on the two sides of the Atlantic, and can collectively contribute a very broad experience and knowledge of the market and users base that will benefit from the new infrastructure under study.

Purely economic and social studies will be contributed directly or by the relevant universities departments that the NRENs involved are able to involve via the direct contacts they have. External consultancy is foreseen to obtain different views and will be provided by the supporting operators and, if appropriate, from private consultants.

Another aspect of the consortium composition is that fact that has been already able to mobilize governments at the highest level. Government's commitment will be extremely important in many WPs and will greatly facilitate the creation of the new infrastructure, but will also help to access data and sources of expertise otherwise difficult to mobilize.

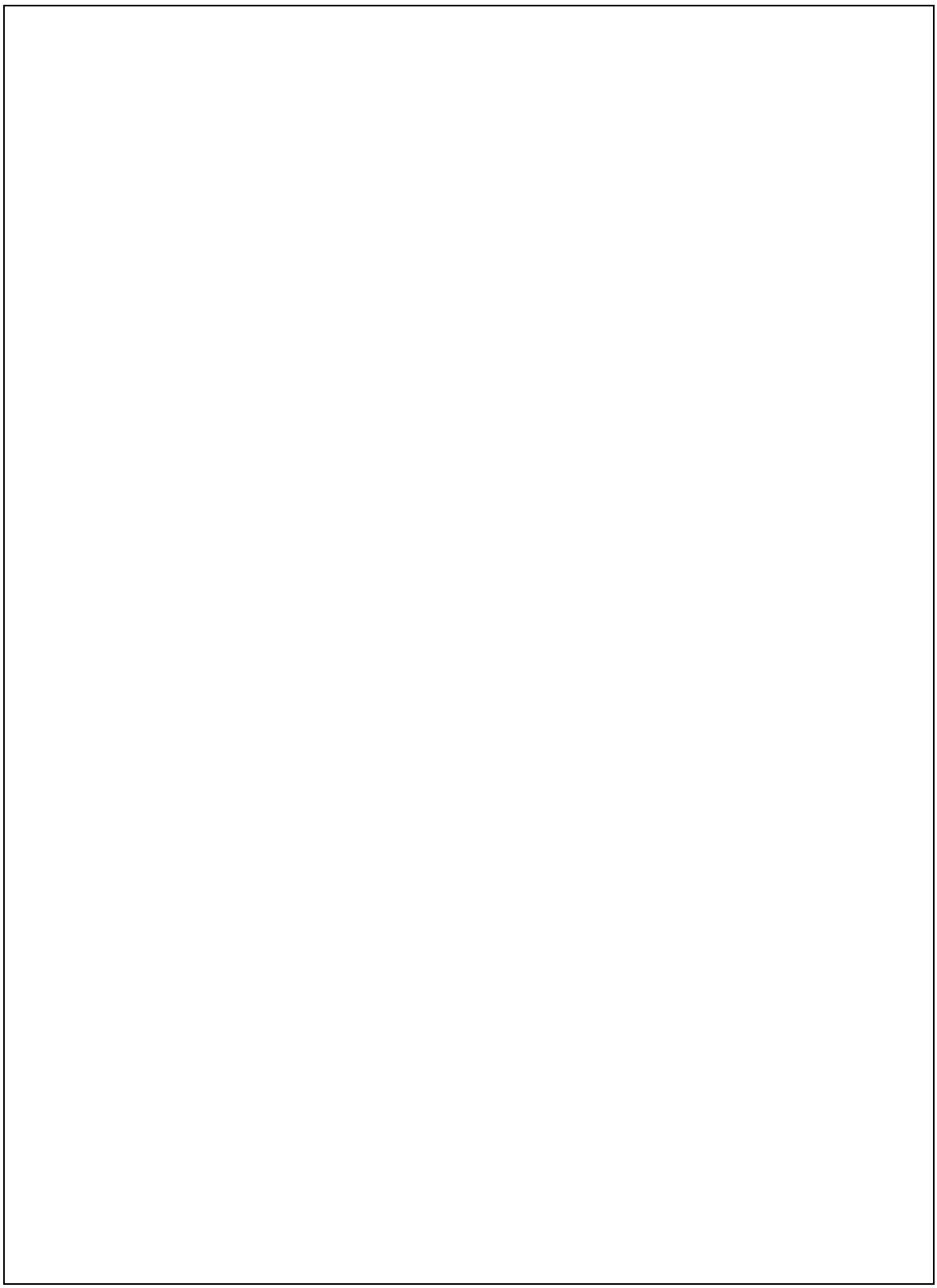
As of the time of submission we have received the following letters of support or commitment:

B.2.3.1. Ministerio de Sciencia, Tecnologia e Innovacion Productive – Argentina

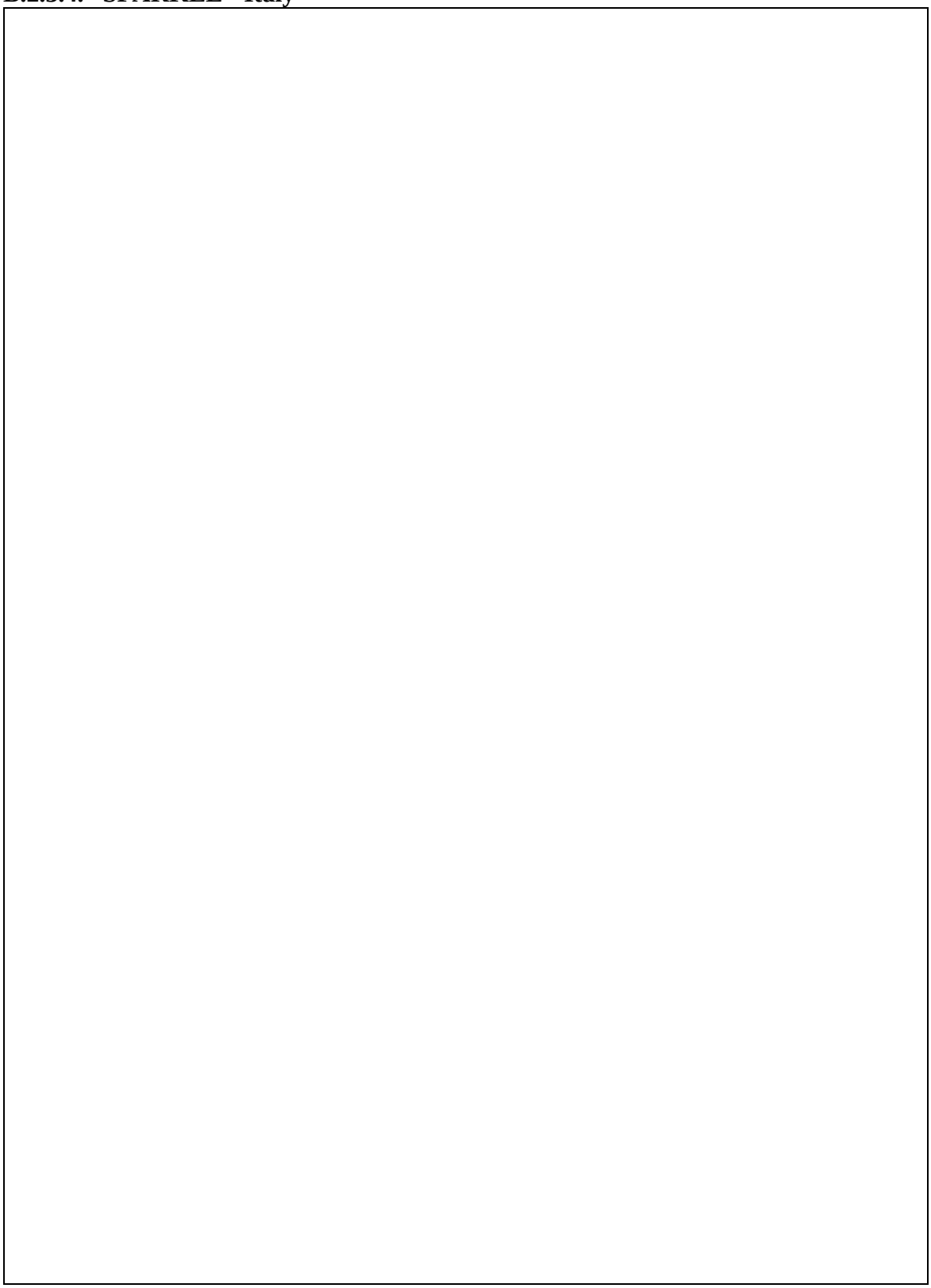


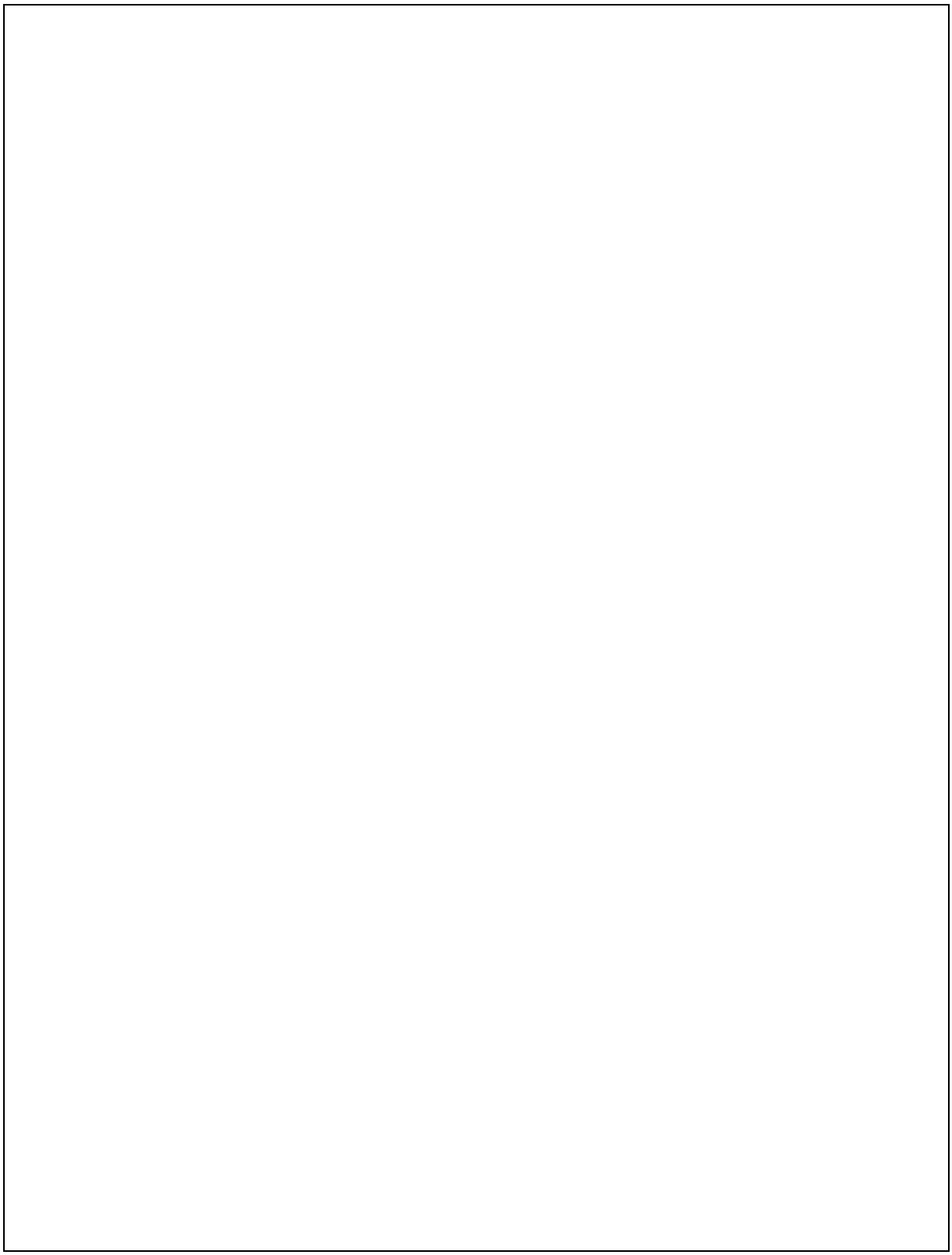
B.2.3.2. Ministerio de Ciencia y Tecnologia - Brazil

B.2.3.3. Presidencia da Republica – Brazil

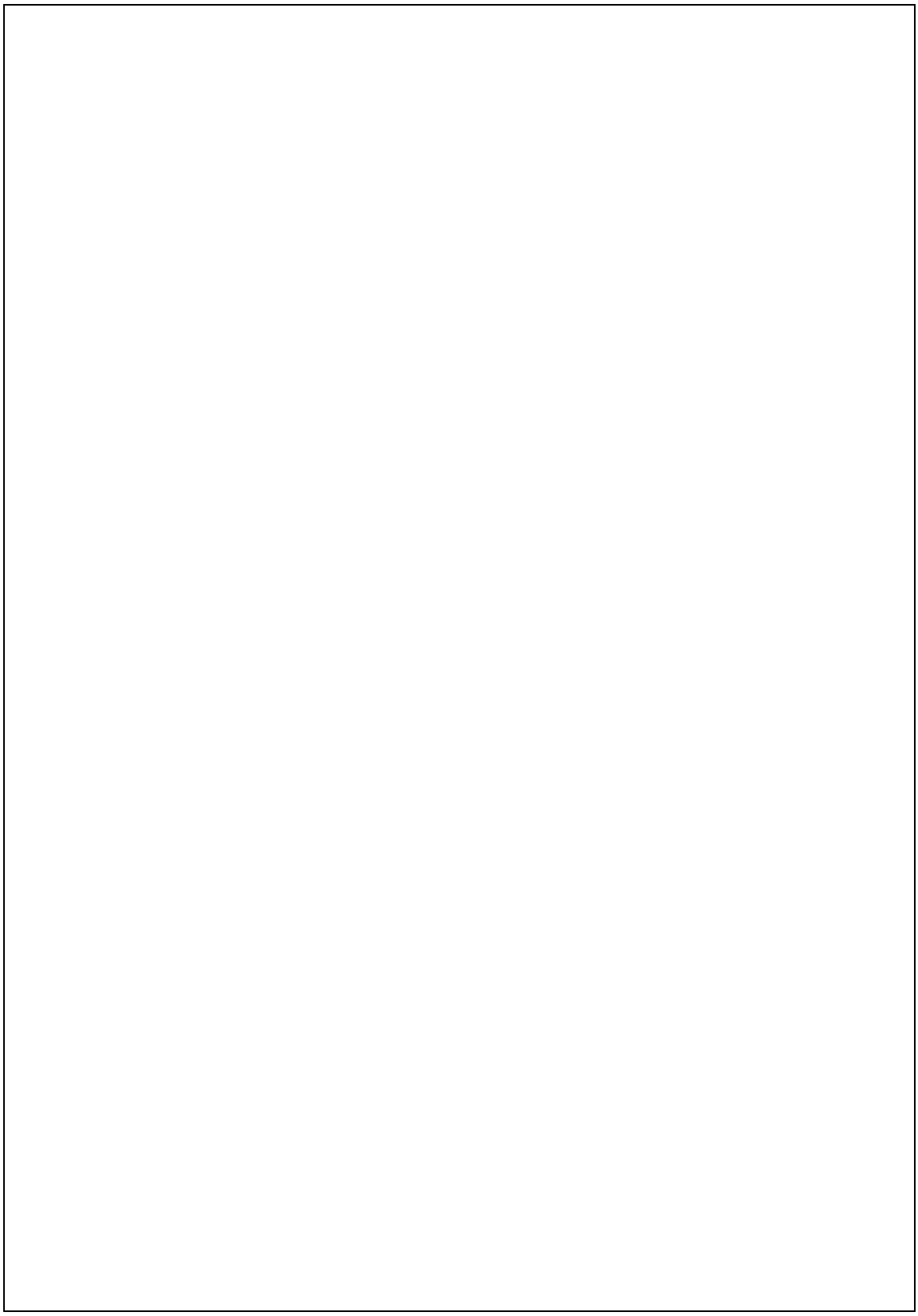


B.2.3.4. SPARKLE - Italy

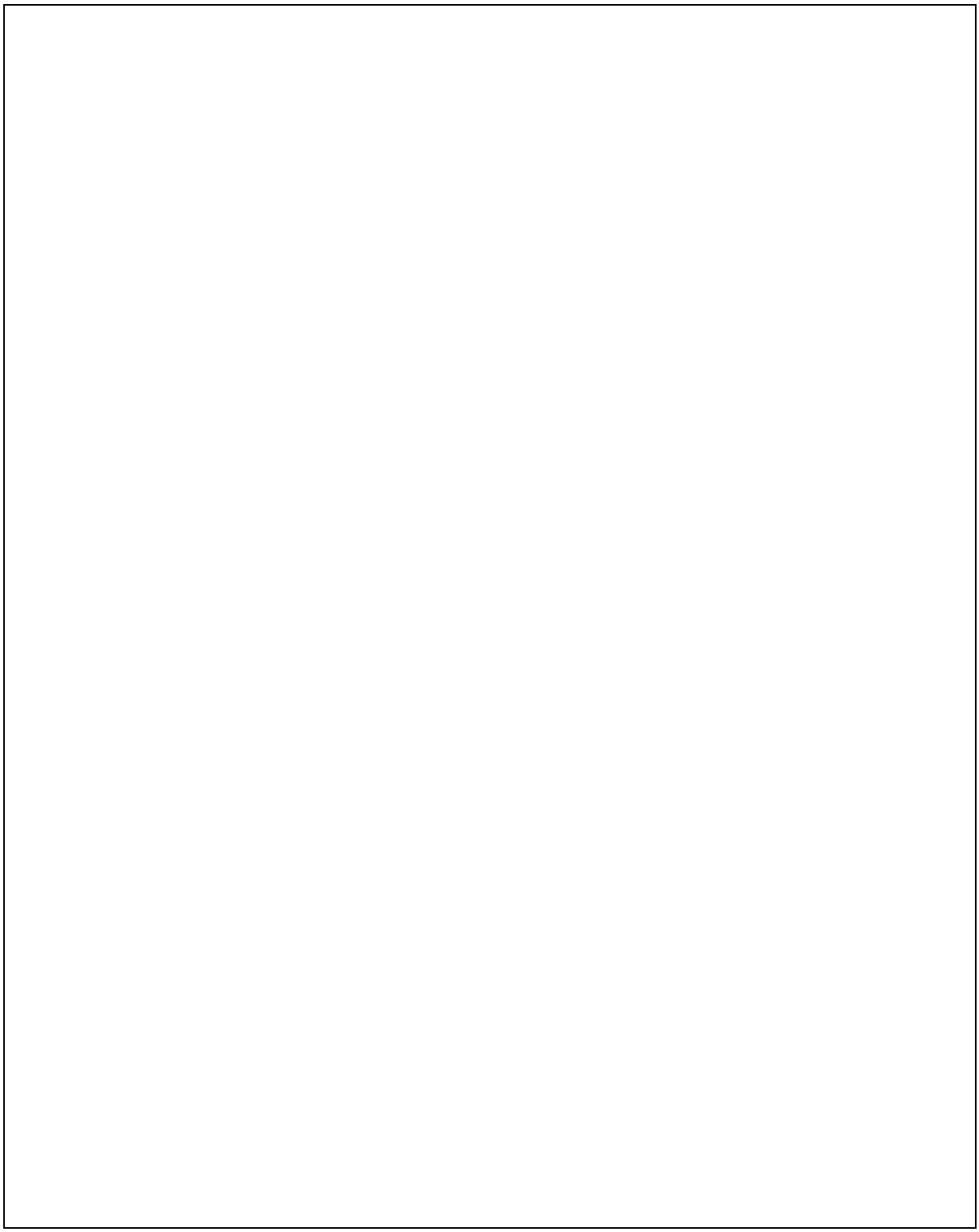




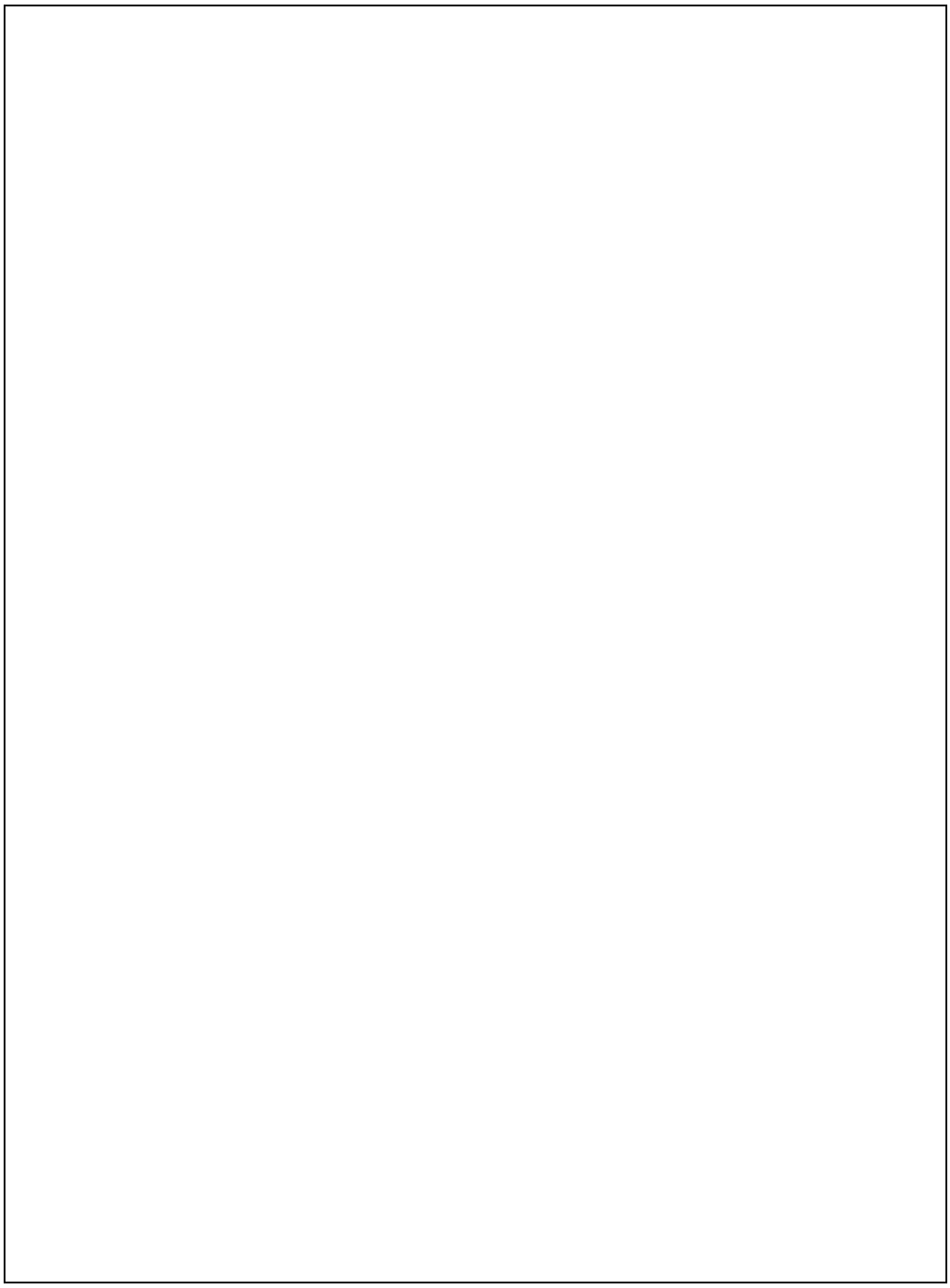
B.2.3.5. TELEBRÀS - Brazil



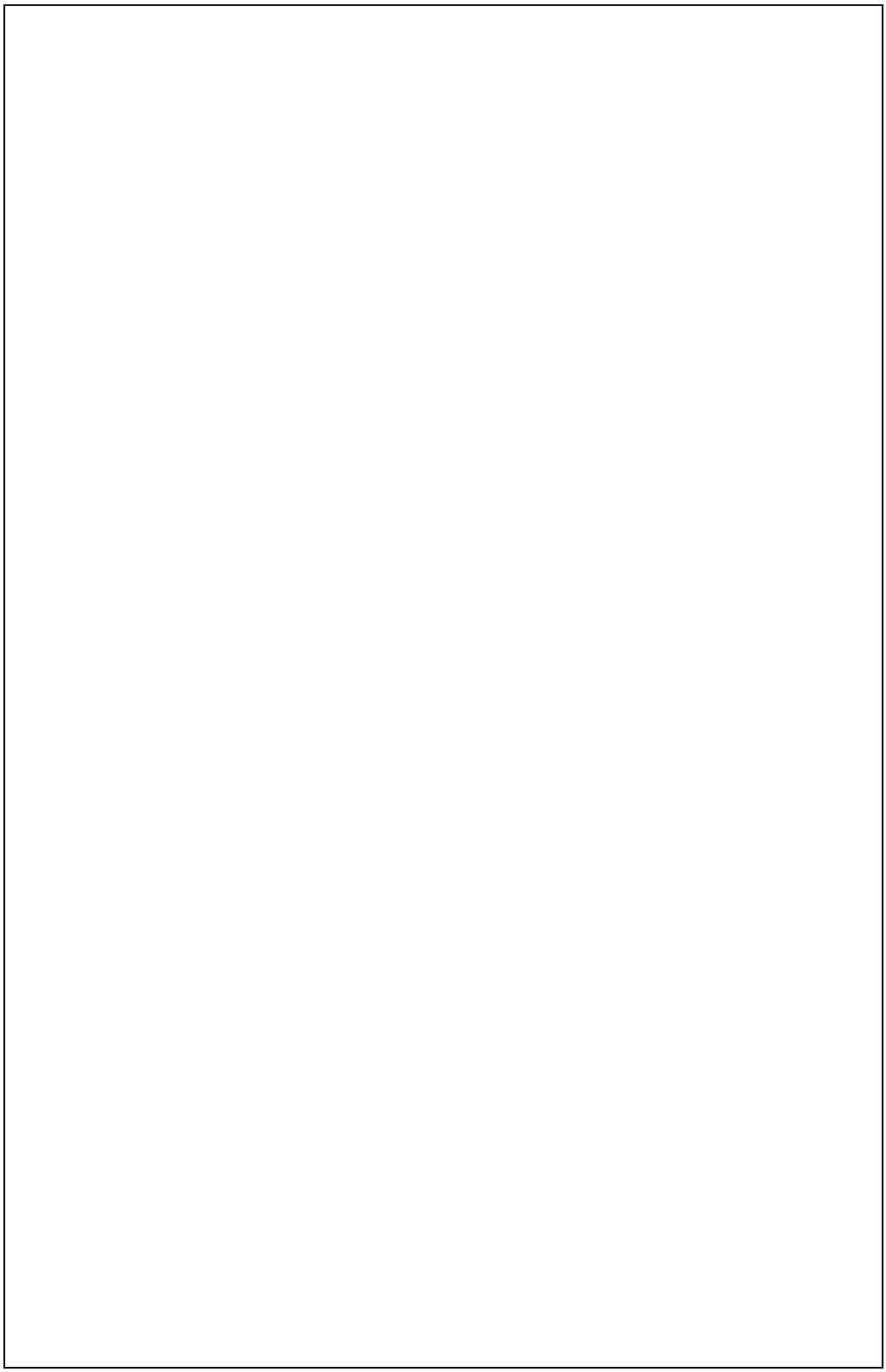
B.2.3.6. Telemar Norte Leste (“OI”) - Brazil



B.2.3.7. Telefonica International Wholesale Services - Uruguay



B.2.3.8. Islalink - Spain



B.3. Impact

B.3.1. Expected impacts listed in the work programme

The activity performed in FP7 are more and more involving Latin American countries. This involvement, however, is heavily hampered by the communication bottleneck existing between the European backbone, GEANT, and the Latin American one, RedCLARA.
Without entering into a long socio-economical discussion – that would be beyond the scopes of this document – we can say that this bottleneck is essentially created by the anomalous distribution of transatlantic communication facilities, that creates a demand/offer ratio that strongly penalizes Latin America with respect to USA and Canada.
It would be unreasonable to ask for the creation of such expensive infrastructure as a submarine cable on public funding; it is however reasonable to carry on a feasibility study with the intent of later involving private interest in the actual builing.
In this respect the proposed Feasibility Study would have potentially an enormous impact on the development of the whole programme and on the implementation of the future ones.

B.3.2. Spreading excellence, exploiting results, disseminating knowledge

The feasibility study results will set a milestone for future development of the Europe to Latin America telecommunication infrastructure, and will be the basis for future developments. A large effort of dissemination will be carried out by the Consortium Members, both with Governments and potential investors. In particular, the results will be presented at REGULATEL, eLAC, EU-LAC Fora, EU and LA Governments and other relevant Meetings as well as the already mentioned “Broadband Forum” lead by CEPAL. Also, the results will be presented to potential investors both privately and in coordination with AHCIET, the Ibero-American Association of Telecom Operators.

B.4. Ethics Issues

No ethics issues will arise from the activities of this project.