

アルゼンチン共和国
先進的地質リモートセンシングプロジェクト
運営指導(中間評価)調査報告書

平成16年2月
(2004年2月)

独立行政法人 国際協力機構

鉦開二
J R
04-05

序 文

アルゼンチン共和国は広大な国土及び鉱物資源賦存の可能性の高い地質環境を有しているが、探査・開発が十分に進んでおらず、いまだ鉱物資源の産出量は少ない。その一因として鉱物資源の探査・開発に必要な基礎的地質情報が整備されていないことがあげられており、今後、効率的に情報の整備を進めていく必要があると指摘されています。

そのためアルゼンチン共和国政府は、鉱業庁傘下の地質・鉱業調査所(SEGEMAR)において1993年より「国家地質・テーマ別地図作成プログラム」を実施中である。効率的にこれらの地図作成作業を進めていくために、人工衛星画像解析(リモートセンシング)を活用すべく、1994年にリモートセンシング・地理情報システム部を設置しました。しかしながら、人材及び設備の不足が制約要因となり、十分な成果をあげられない状況にありました。

かかる背景の下、アルゼンチン共和国政府は、先進的な衛星データ処理・解析技術、及びそのために必要な機器・ソフトウェアを導入することにより、地質マッピング作業を効率化することを目的とし、プロジェクト技術協力を我が国政府に対し要請してきました。

この要請を受け日本政府は国際協力事業団(JICA)を通じて3回の短期調査を実施し、2000年12月21日にR/D署名を行い、2001年3月より本プロジェクトを開始いたしました。

本プロジェクト開始後、約2年を経過した段階で中間評価を行うとともに、今後の協力期間の活動を協議することを目的に運営指導調査団を派遣しました。

本報告書は同運営指導の協議結果を取りまとめたものです。ここに本運営指導調査団の派遣に関して、ご協力頂いた日本・アルゼンチン両国の関係各位に対し、深甚な謝意を表すとともに、あわせて今後のご支援をお願いする次第です。

2004年2月

独立行政法人国際協力機構

鉱工業開発協力部

部長 中島 行男

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第 1 章 中間評価の概要

1 - 1 運営指導調査の概要

2001年3月より4年間の予定で開始された「アルゼンチン先進的地質リモートセンシングプロジェクト」において協力期間の中間を迎えるにあたり、プロジェクトの進捗状況や技術移転達成度の状況確認として中間評価を行うこととした。

1 - 2 調査団及び合同評価委員会構成

(1) 日本側

調査団

団長・総括	岡崎 俊夫(国際協力事業団 特任参事)
技術移転計画	加藤 碩一(産業技術総合研究所)
技術移転評価	熊谷 研一(インダストリアルサービス・インターナショナル)
リモートセンシング技術	小澤 晃子(国際鉱物資源開発協力協会)
プロジェクト運営管理	土井 ゆり子(国際協力事業団 鉱工業開発協力部)

プロジェクト専門家

チーフアドバイザー	横川 勝美
地質リモートセンシング	河野 愛
デジタル画像処理	賀来 学
業務調整	山口 浩二

JICAアルゼンチン事務所

所 長	高井 正夫
次 長	加藤 誠治
所 員	Juan Carlos Yamamoto

(2) アルゼンチン側

Mr. Jorge Mayoral	Undersecretary of Mining and President of SEGEMAR
Dr. Pedro Alcantara	Executive Secretary(Secretario Ejecutivo)
Dr. Roberto N.F. Page	Director of Geology and Mineral Resources Institute (Instituto de Geología y Recursos Minerales : IGRM)
Dr. Graciela Marín	Acting Director of Remote Sensing and GIS Division Unidad de Sensores Remotos y Sistema de Información Geografica) IGRM
Dr. José E. Mendía	Director of Regional Geology Direction(Dirección de Geología Regional : DGR) IGRM

Dr. Antonio Lizuain	Coordinator of Regional Geology Direction (Dirección de Geología Regional : DGR), IGRM
Dr. Eduardo Zappettini	Director of Geological and Mining Resources Direction (Dirección de Recursos Geológico Mineros : DGRM), IGRM
Dr. Omar R. Lapido	Director of Environmental and Applied Geology Direction (Dirección de Geología Ambiental y Aplicada : DGAA), IGRM
Dr. Carlos Gabriel Asato	Staff of Remote Sensing and GIS Division, IGRM
Mr. Martin Rivolta	Director of Bilateral Cooperation, Ministry of Foreign Affairs
Ms. Andrea De Fornasari	Staff of Bilateral Cooperation, Ministry of Foreign Affairs

1 - 3 調査日程及び面談者

日順	月 日	曜日	内 容	面会者
1	12月8日	日	10:55 熊谷団員エセイサ空港着	RG-8640
2	12月9日	月	10:00 プロジェクト内打合せ(～12:30) 14:00 専門家ヒアリング	横川専門家、山口調整員
3	12月10日	火	10:00 専門家ヒアリング(～12:30) 14:00 専門家、C/Pヒアリング	賀来専門家, Marin, Di Tommaso, Azcurra, Castro, Asato
4	12月11日	水	10:00 鉱山会社ヒアリング(～12:30) 14:00 セミナー参加者ヒアリング	Eduardo Espizua Carlos Ninci
5	12月12日	木	10:00 農業法人ヒアリング 10:55 団長他団員エセイサ空港着 14:00 専門家ヒアリング	Cristina Serafini.
6	12月13日	金	10:00 JICAアルゼンチン事務所打合せ 11:00 在アルゼンチン日本大使館表敬 12:00 関係機関(IGRM, SEGEMAR)表敬・ヒアリング 13:00 SEGENAR主催レセプション 15:00 関係機関(DGR) 16:00 関係機関(DGRM) 17:00 関係機関(DGAA) 18:00 外務省国際協力局表敬	高井所長 高木参事官 Page, Alcantara Mendia, Lizuain Zappettini Lapido RIVOLTA, FORNASARI
7	12月14日	土	評価報告書案作成	
8	12月15日	日	M/M案作成	
9	12月16日	月	10:00 専門家ヒアリング 14:00 関係機関ヒアリング	日本人専門家 Page, Mendia, Lizuain Zappettini, Lapido, Marin
10	12月17日	火	10:00 C/Pプレゼンテーション 14:00 評価報告書記載内容確認(関係機関) ミニッツ記載内容確認	C/P4名 Page, Mendia, Lizuain Zappettini, Lapido, Marin
11	12月18日	水	10:00 合同評価委員会	Page, Mendia, Lizuain Zappettini, Lapido, Marin
12	12月19日	木	12:00 ミニッツ署名 団長主催レセプション 14:00 産業公害プロジェクト視察 (来年度計画打合せ:土井)	M/M ANNEX-14参照
13	12月20日	金	10:00 JICAアルゼンチン事務所報告 17:15 土井団員アルゼンチン発	
14	12月21日	土	18:00 他団員アルゼンチン発	RG-8641
15	12月22日	日	移 動	
16	12月23日	月	日本着	

1 - 4 評価方法及び項目

投入実績の確認、専門家、カウンターパート(C/P)へのアンケート及びヒアリングをとおして必要な情報を入手し、プロジェクト・サイクル・マネージメント(PCM)手法により、評価5項目(効率性、目標達成度、インパクト、妥当性、自立発展性)について評価を行った。各項目に対する評価結果とともに、プロジェクト中間時点における結論、提言を導き出した。評価結果については合同評価委員会において日本・アルゼンチン側双方の承認を得たうえで、合同評価レポートとして取りまとめた。

第2章 協議結果

2 - 1 協議結果

1 - 3 に示した調査日程及び面談者のとおり関係者と協議のうえ、合同評価レポート及びM/Mとして協議結果を取りまとめた。

2 - 2 調査団所感

(1) アルゼンチンの経済が2001年12月から危機的状況に陥っているにもかかわらず、実施機関である地質・工業調査所 (SEGEMAR) が本プロジェクトの運営に優先的に予算をつけてきたことはアルゼンチン側が本プロジェクトを重要視していることに他ならないと評価できた。

2002年の上半期はまったく予算が執行されず、下半期になって予算が確保できたとの事実があることを考えればアルゼンチン側は本プロジェクトをよく支えているといえよう。

(2) しかしながら、アルゼンチン経済はまだ回復しておらず、厳しい状況が続いていることは事実である。2003年の予算の審議が下院で開始されたが、政府の予算案は22%のインフレ、GDP成長3%、公務員給与の13%カットなどまだまだ厳しい状況にあるといえる。したがって、日本側としてもこの状況を理解し、何んらかの手助けをすべきものとする。

(3) 名称 (ASTER) の技術そのものはランドサット画像よりはるかに利用価値の高いとの評価が世界的にあり、アルゼンチンでも本プロジェクトをとおして、その評価が高まりつつある。特に鉱山会社のみならず、研究機関、大学などで利用したいとの要望が増えていることは本プロジェクト技術協力の有効性を示すものとして評価できる。

(4) 本プロジェクトの自立発展性を考えた場合、C/Pの定着が不可欠であることはいうまでもない。この点でアルゼンチン側がプロジェクト協力期間中に、現在のC/Pを引き続き確保するように努力することを明言したことは自立発展性のプラス要因である。

(5) ASTERの利用技術としては、今後いろいろな分野が考えられる。たとえば防災ハザードや環境地図の作成など利用範囲は広い。今後の後半の協力に向けてASTERの活用・利用を考えるとプロジェクトの発展をもたらすとの評価が、日本・アルゼンチン側双方で一致した。また、評価結果の提言で述べたように、処理された衛星データに過去の既存データを集約し、リファレンスデータとなるような情報整理を行えば付加価値が更に上がり、利用価値が増すと思われる。外部へのデータ提供を考慮に入れたデータの整理、管理体制の整備が必要であると思われる。

第3章 評価結果

評価対象は本来、地質分野のパートAと環境等分野のパートBの2分野であるが、計画上、現段階ではパートBの活動、成果はAの活動・成果で充足されているとみなし、パートAを中心として評価を行った。

JPCMによる評価結果の要約

現在までのところ、「活動」「成果」はほぼ計画どおりに進行中であり、実行プロセスもほぼ良好である。「プロジェクト目標」の達成についてはアルゼンチンの経済危機の影響により、地質図、鉱床生成図作成のための現地調査が遅れている。

3 - 1 評価の詳細

3 - 1 - 1 効率性

効率性は高い。

投入に関しては、プロジェクト開始時に、資機材(本邦購入のパソコン)の入荷遅れ、インターネットの設置遅れ・不備で活動に遅れを生じたものの、現時点ではその影響はほとんどない。全体的には人・機材・施設が適切にタイミングよく配置され、有効に活用されている。

経費も計画的に運用している。ただし、2002年1月ごろから、アルゼンチン側は経済危機とペソ安による影響で、ローカルコスト(例えば消耗品、機械維持費)の支出及びドル建て物品の購入(例えばソフト)が厳しい状況になった。この状況の解消には時間を要するであろうし、今後、プロジェクトのローカルコストのみならず、地質図作成費用の手当てが懸念される。C/Pの大部分が6か月間の解約職員であることに関しては、基本的には新規の正規職員はどの官庁においても採用しないという政府の政策があり、解雇・離職率は低く、大きな問題となっていない。また、C/Pの大部分はプロジェクト終了後も同じ仕事に就きたいと希望している。IGRMにおいて、プロジェクト終了後もC/Pを継続的に定着させておくことは重要である。

3 - 1 - 2 有効性

プロジェクトは有効に運営されている。ただし、外部条件の変化(中央政府による運営費支援)により、プロジェクト終了までに有効性が十分に発揮できない可能性がある。

本プロジェクトに必要な組織体制は第1年度に確立され、質の高いC/Pが配置されている。C/Pは第1年度で機材の運用管理に習熟し、ガイダンスを通じて基礎的知識・技術を習得した。また、初年度後半には現地実証研修を行い、技術的理解の手助けとなった。2002年度は、詳細なデータ処理と応用面での技術移転が展開されている。C/Pの技術移転習熟度の評価は技術移転の

詳細にわたり、専門家による評価、C/Pの自己評価がなされている。その評価シートによれば、個人差はあるもののC/Pの先進的リモートセンシング活用能力は、順調に向上している。また、SEGEMARの幹部はC/Pの技術向上が予想以上であったと賞賛している。

セミナーは既に3度にわたり実施され毎回100名近い参加者があった。また、地方におけるワークショップの実施、学会等への投稿も行われている。こうした活動を通じて、地質図やテーマ図作成にかかわる地質技師の多くが先進的リモートセンシングの有用性を認識してきた。かつ、SEGEMAR職員以外(農業研究所、原子力委員会、大学、鉱山会社、地質コンサルタント)においても、本プロジェクト活動の理解が深まっている。なかでも、世界屈指の鉱山会社のリオチント等から画像処理依頼を受けていることは特筆すべきであろう。

以上のように「プロジェクト目標」達成に向け、成果は順調に推移している。一方、「プロジェクト目標」が達成されるためには計画された枚数の先進的リモートセンシングが活用された地質図・鉱床生成図が、作成されていなければならない。現在、地質図・鉱床生成図作成の予定されている地域の画像処理が行われている。

しかしながら、地質図やテーマ図作成のための現地調査費用の手当てが経済危機の影響で困難になっているため、画像を元にした現地調査作業に遅れを生じている。SEGEMARとしてはプロジェクトに支障のない範囲において、外部のユーザーに対し、有料の画像処理サービスを実施し、地質図・テーマ図作成費用の一部として充当するなどの手立てを講じて、プロジェクト目標を達成したいと考えている。

3 - 1 - 3 インパクト

以下のプラスのインパクトが見出された。

外部(農業研究所、原子力委員会、大学、鉱山会社、地質コンサルタント等)の先進的リモートセンシングの有効性の認識が高まってきており、画像処理の依頼がきている。また、アルゼンチンチンのリモートセンシングの権威である大学教授がASTERに高い関心を示すなど、アルゼンチンにおける先進的リモートセンシング期待の高まりが見出せる。

マイナスのインパクトは本調査においては見出せなかった。

3 - 1 - 4 妥当性

プロジェクトは妥当である。

プロジェクト開始前、国家経済の復興をめざして、外国企業による鉱業投資を促進し、鉱業を国の主要産業として形成する、という国家戦略が掲げられていた。この国家戦略にのっとり「国家地質・テーマ図作成プログラム」が実施されており、本プロジェクトはこのプログラムを支援するものであった(. 1 . 英文版プロジェクトの背景と調査団派遣の項目参照)。

2002年に新しい政権が発足したが、この鉱業に関する国家戦略に変わりはない。むしろ、直面する経済危機を克服するためにも、鉱業投資推進はますます必要性を増している。現在のところ金属価格の低迷により、世界中の金属鉱床探鉱開発は停滞気味であり、かつアルゼンチンの経済が不安定であることに対する懸念から、アルゼンチン鉱業への投資は少ない。しかし、2000年末に「アルゼンチン・チリ鉱業統合条約」が発効し、国境を越えた鉱床の広域調査・探査・開発が可能になっており、国境付近の金鉱山開発プロジェクトの開発が始まろうとしている。このようなことから、金属価格が上昇し、アルゼンチンの経済が安定化すれば、アルゼンチンに対する鉱業投資は高まってくると考えられる。そのためには鉱床貯存有望地区の精度の高い地質図・テーマ図の早急な整備が必要である。

また、技術移転されているASTERは現在でも地質図・テーマ図に、より有益な情報を与えることのできる「先進的リモートセンシング」の位置を占めている。

以上に述べたように国家戦略、経済再建、移転技術等の観点から、本プロジェクトは妥当性を有しているといえる。

3 - 1 - 5 自立発展性

現在までの「活動」及び「成果」の進捗状況から判断すれば「プロジェクト目標の達成」は可能である。今後、プロジェクト終了に向け、地質図・テーマ図の作成を通じて、C/Pの地質リモートセンシング技術力の強化、調査部門との技術協力体制を確立していくことが重要である。

セミナー・ワークショップを通じ、関係団体の関心も高まっており、将来的には協力関係が構築される可能性もある。今後は、作成された図面が鉱業開発の促進に供されるものであることを念頭に置いて、ユーザーのなかでも、特に民間鉱山会社を主眼とした広報活動が大切である。

以上、技術移転されたC/Pがプロジェクトに定着することを前提にすれば、技術的には自立発展性には問題はない。そのためにSEGEMARは、C/Pが安定的に雇用されるような手立てを講じなければならない。

自立発展性での問題点は、プロジェクト終了後、先進的リモートセンシングを活用した地質図・テーマ図の作成に必要な経費を政府が負担できるかどうかである。プロジェクト終了後、SEGEMARは人件費、消耗品等物品費、等の運営費に限らず、リモートセンシング・データの購入費、機材の維持管理費が必要であり、更には近い将来、機材の更新・増強費用が必要である。2001年の10月以降、経済危機の影響で、アルゼンチン側の困難な財政状態が続いている。しかしながら、現在の状況は改善傾向にある。

SEGEMARは、有料画像処理によって生じた収入を機材・システムの更新・維持管理に充当することを更に強化する検討を含んだプロジェクト終了後の先進的リモートセンシング活動の計画を、プロジェクト終了までに策定する。

第4章 結 論

今までのところ、ほぼ計画どおりの活動が実施され、期待された成果が発現してきている。今後、プロジェクト目標達成に向け、先進的データを用いた地質図及び鉱床生成図の作成の実作業を推進することになる。現在の達成度から判断すれば、プロジェクト目標は技術的にはプロジェクト終了までに達成可能である。

一方、アルゼンチンにおける経済危機が外部条件(中央政府の支援)を妨げており、プロジェクト目標も達成度を低くする可能性があり、プロジェクトへの運営費の安定確保に向けたSEGEMARの諸対策が肝要である。家を含む日本側の専門家とこれらに関する優先度を検討し具体案を立案することが望ましい。

第5章 提 言

- (1) リモートセンシングを用いたハザードマッピングや地質環境調査のようなパートBの活動を進捗させるために、短期専門家を含む日本側の専門家とこれらに関する優先度を検討し具体案を立案することが望ましい。
- (2) 処理されるアスターデータをより便利に利用し得るように、関連する地質・地物データだけでなく、メタデータ（検索図や文献ほか）のような補助的データを統合することが望ましい。

第6章 評価グリッド

6 - 1 実績

		調査項目	調査結果	備考
上位目標 上位目標の達成度(見込み)	IGRMによって、資源探査のための地質図・テーマ図*が整備される。	1 . ・毎年、地質図・テーマ図は作成されたか ・毎年の計画を満たす数量の地質図・テーマ図は作成されたか？ ・地質図・テーマ図に先進的リモートセンシングのデータが活用されているか？	・現在IGRMは年ごとに地質図・テーマ図の作成を計画している。この計画に基づいて25万分の1の地質図はほぼアルゼンチンをカバーし、40枚の10万分の1の地質図が作成されている。160のテーマ図作成のプロジェクトが稼動中である。鉱床生成図作成は1999年に開始した。現在のところ、技術移転の段階であり、先進的リモートセンシングのデータの活用された図面はない。	
		2 . ・どのようなテーマ図が何種類、増えたか？ ・そのテーマ図に先進的リモートセンシングのデータが活用されているか？	・技術移転を通じて先進的リモートセンシングが有効に利用できるテーマ図の種類を検討中である。現在、詳細地質図(10万分の1のテーマ図)の作成を手掛けているが、これは新しいテーマ図のひとつである。	
		3 . ・作成されたテーマ図はすべてユーザーの入手が可能か？リモートセンシング画像は？ ・どのような手順、金額で入手できるか？それは確立されているか？ ・ユーザーにとって経済的・省力的メリットはあるか？ ・ユーザーの評判はどうか？どう反映しているか？	・完成したテーマ図は一般者が入手可能であり、手順等についてはSEGEMARのホームページで紹介している。完成しているが発行されていない段階のものはSEGEMARの図書館で閲覧できる。ASTER情報についてもホームページで紹介している。処理できる範囲内で一般に提供する。 ・ユーザーにとって探査対象地域の絞込みが可能になり、基礎調査の省力化による、経済的メリットがある。 ・セミナーの開催、学会等への投稿を通じて有効性をユーザーに紹介している。ユーザーからの問い合わせもあり、関心度が高まっている。	
プロジェクト目標 プロジェクト目標達成度	GRMが鉱物資源探査のための地質図・テーマ図を作成するのにASTER PALSARなどの先進的衛星データを利用できる。	1 . ・プロジェクト開始から何枚のテーマ図、地質図が作成されたか？ ・それは年度計画を満たす枚数であったか？ ・何枚のテーマ図、地質図の作成にASTERデータが活用されたか？ ・プロジェクト終了までに千分の1地質図8枚、25万分の1鉱床生成図2枚の作成は可能か？	・2002年度(暦年)事業予算では6地区の地質図の作成を行う。プロジェクトは2003年度より地質図作成作業にASTERデータを提供することになる。実際に着手しているのは4地区である。プロジェクトでは4地区(6枚)の地質図について画像処理を行い、DGRと地質的な検討を行っている。DGRの調査作業は資金難のため、スタートが遅れた。現在のところ、資金上の問題があるが、プロジェクト終了までの作成枚数については、達成可能である。 ・プロジェクト終了までの作成予定枚数は達成可能である。	

成果 成果の達成度		2 . ・ ASTERデータを使用した地質図・ テーマ図の精度アップに貢献したか？	・まだ図面は完成していないが、今まで使用してきたLANSATデータより、精度が高いことが、C/PやIGRM内の作図関係者の多くに認識されてきている。特に地質的には地質構造のみならず岩種や変質鉱物が確認できること。 ・実際に州と大学の要請に応じて作成しているFarallón Negro地域の詳細地質図作成作業において、過去に知られていなかった地質情報を得ている。	
		3 . ・ ASTERデータの活用により、作図作業の効率化はどのような面で、どの程度、増減したか？	・まだ図面は完成していないが、地質調査等の効率が高まることで、IGRM内の地質調査関係者の多くに認識されてきている。地形的には、国土が広く構造物が記載されている地形図がアルゼンチンには乏しく、DEMが地形図として利用できること。	
	1. IGRMにおいて衛星データ活用体制が確立されている。	1-1 . ・ C/P、専門家の配置計画にはどのようなものがあるか？ また、現時点での計画は？ ・ 各計画間で変更があれば、その理由は？ ・ 各計画どおりに人員配置がなされたか（時期、人数）？ ・ C/P、専門家（短期専門家）は質、量ともに十分か？ ・ 人員配置の不備による悪影響は生じたか？ ・ 今後、どのように推移する見通しか？	1-1 ・ フルタイムC/P、長期専門家の配置に関しては当初計画に基づいている。 ・ パートタイムC/P短期専門家は当初計画を基本にして、各年の詳細計画に従って配置されている。したがって、基本計画からの大きな乖離はない。 ・ C/P、専門家ともに計画どおりに配置されている。 ・ フルタイムC/P、長期・短期専門家ともに適正な人員が配置され、優秀な人材である。ただし、短期専門家の滞在期間が2週間程度と短く、しかもその間、専門家が持参したソフトのインストールや、講演に短期専門家の時間が多く費やされて、技術移転が十分に行われないケースも多いので、この点を改善してほしいとフルタイムC/P全員が希望している。 ・ 現在、SAR解析のため物理・数学的知識を有する要員1名、データ管理及び有料画像サービス化に向けて1名、合計2名の増員を検討中である。	
		1-2 . ・ 施設、機材、ローカルコストはどのように計画されているか？ ・ 当初計画に比べ、大きな変化があったか？ その理由は？ ・ 各計画どおりに施設、機材、ローカルコストが供与されたか？ ・ 施設、機材、ローカルコストは質、量ともに十分か？ ・ 施設、機材、ローカルコストの不備による悪影響は生じたか？ ・ 今後、どのように推移する見通しか？	1-2 ・ 当初計画を基に毎年計画が策定されており、したがって、当初計画との間に大きな乖離はない。 ・ いくつかの機材（日本から出荷されたパソコン4台）の入荷が約3か月遅れ、プロジェクト初期の活動が遅れた。このため2001年活動計画が見直された。またインターネットの遅れ、不備（ドメイン等に関して）も活動に若干の悪影響を与えている。2001年10月以降、アルゼンチンの経済危機の影響で、アルゼンチン側ではローカルコスト（消耗品や機材のメンテナンス）の支払い、またペソ安のためドル建ての資機材購入に困難が生じている。	

<p>成果 成果の達成度</p>			<ul style="list-style-type: none"> ローカルコストが不十分で2002年の現地調査に遅れを生じている。 SEGEMARとしてはプロジェクトに支障のない範囲において、外部のユーザーに対し、有料の画像処理サービスを実施し、地質図・テーマ図作成費用の一部として充当するなどの手立てを講じて、プロジェクト目標を達成したいと考えている。 	
	<p>2. 衛星データ活用に必要な機材、衛星データが適切に利用、維持管理されている。</p>	<p>2-1</p> <ul style="list-style-type: none"> 機材の利用、維持管理計画に関し、毎年、どのような計画が策定されたか？ 計画に基づいた、利用・維持管理がなされたか？ サプライヤーを含めた十分な保守体制が設けられているか？ <p>2-2</p> <ul style="list-style-type: none"> 機材の利用・管理に関する予算は十分であったか？ <p>2-3</p> <ul style="list-style-type: none"> 個々のC/Pは現有機材の利用・管理の知識をどの程度有しているか？ <p>2-1, 2-2, 2-3今後の見通しは？</p>	<p>2-1</p> <ul style="list-style-type: none"> 毎年、当初計画を基にした機材の利用、管理計画が策定されている。 計画に基づいて適切な機材・データの利用・維持管理が行われており、すべての機器はフル稼働率している。 RS/GIS部門にメンテナンス要員を有し、サプライヤーを含むメンテナンス体制は十分で、大きな故障が発生したことはない。 <p>2-2</p> <ul style="list-style-type: none"> アルゼンチンにおける経済危機の影響でローカルコストが不十分であり、データ等を日本側が肩代わりするなどの事態が発生し、機材利用維持管理が懸念される。 <p>2-3 機材の利用維持管理に関する技術移転は計画とおりに実施されており、利用管理に必要な基礎知識を習得している。</p> <p>2-1, 2-2, 2-3毎週のようにデータが入ってきており、また画像等もかなり蓄積されてきており、入手データ・データ検索のデータベース及び在庫管理システムの構築が必要になってきている。</p>	
	<p>3. IGRMの地質技師が、鉱物資源探査のための地質図・テーマ図作成に際してASTER、PALSAR等の先進的衛星データを利用するために必要な技術を習得している。</p>	<p>3 .</p> <ul style="list-style-type: none"> 技術移転（項目 ~ 、 ）は当初活動計画どおり、進捗しているか？ 質・量（時間）ともに十分か？ 個々のC/Pは移転された技術を十分に活用できるか？ 今後の見通しは？ 	<p>3 . 技術移転は機材の入荷遅れで若干の活動計画の修正が行われた。現在まで、活動はほぼ計画どおりに進捗している。ここの技術移転項目の進捗状況は以下のとおりである。</p> <ul style="list-style-type: none"> この分野はデータのハンドリング及びリモートセンシングの基本概念の把握にかかわるものである。C/Psは手法及び知識を習得している。項目3は未移転、項目2.d, 2.fは移転の第一段階である他は、計画どおりに技術移転が行われ、C/Pは移転された技術を習得している。 この分野はASTERによる画像処理と変質鉱物分類図・岩石分布図に関するものである。この分野における技術移転は全部の項目で順調に技術移転が進んでおり、C/Pが期待以上に技術・知識を習得している項目も半分ある。 	

			<p>・この分野はASTERデータの地質図作成及び鉱物資源探査への応用に関する分野である。この分野は2002年4月以降に移転が開始されており、技術移転が当初計画よりやや遅れ気味（活動の実施状況参照）であり、現場におけるスペクトロメータの使用法を除けば、移転の初期段階にある。C/Plは移転された技術・知識を習得している。</p> <p>・この分野はPALSARを使用したマイクロウェーブ解析に関するものである。この分野の技術移転は2003年以降に実施されるもの（計画とおり）で、今のところ概要説明程度の技術移転にとどまっている。また2005年以降のデータ利用が見込まれるPALSARに代えてSARの技術移転を行う。この技術移転には物理学、数学の知識をもったC/Pが1名必要である。</p> <p>・この項目はハイパースペクトルデータ解析に関するものである。技術移転は2003年以降に実施される（計画どおり）。</p> <p>技術的にはプロジェクト終了までにすべての成果が達成される見通しである。</p>	
	<p>4. セミナー・ワークショップ、学会・雑誌等へ発表を通じ、リモートセンシングデータの有用性が関係者やユーザー^{*2}に理解される。</p>	<p>4-1</p> <ul style="list-style-type: none"> ・セミナー、ワークショップは何度開催されたか？ ・どのような人（勤務先、職業）が何名、参加したか？ ・参加者の反応はどうであったか？ <p>4-2</p> <ul style="list-style-type: none"> ・学会、雑誌等に何件、どのような発表を行ったか？ ・学会での発表時、参加者の反応はどうであったか？ ・発表した内容について、外部からの問い合わせは何件あったか？ 	<p>4-1 セミナーは3回実施された。</p> <ul style="list-style-type: none"> ・2001年10月2日 参加者103名 ・2002年4月5日 参加者95名 ・2002年10月24、25日 参加者99名 <p>3回のセミナーを通じ、参加者に本プロジェクトを理解させ、かつ最近のセミナーにおいてはC/Pの行ったデータ処理の発表が、参加者の賞賛を浴びた。このように、先進的リモートセンシングの有効性が認識されてきている。</p> <ul style="list-style-type: none"> ・ワークショップは7回開催された。 <p>4-2 C/Pの行った発表を以下に示す。</p> <ul style="list-style-type: none"> ・アルゼンチン地質学会 3件 ・南米リモートセンシング・シンポジウム 5件 ・環境シンポジウム 7件 <p>極めて多数の問い合わせがあった。2002年5月の地質学会での発表に関して、多数の質問が多数あり、また、ASTERデータの使用、購入に関する問い合わせもあった。こうした発表を通じて関係者の関心が高まっていると判断する。また同年11月の南米リモートセンシングシンポジウムの発表に関してはボリビア、ブラジルからの問い合わせもあった。</p>	

		・ 専門家（長期・短期）の数、専門分野	長期専門家 ・ チーフアドバイザー 1名 ・ 調整員 1名 ・ 画像処理 1名 ・ 地質リモートセンシング 1名 短期専門家 13名（2001年度 8名、2002年度 5名） ・ ASTERの導入・利用 7名 ・ ソフトウェアのインストール 2名 ・ データ管理システムのインストール 1名 ・ SAR・次世代・その他データの利用 3名																																				
		・ C/Pの数、専門分野	1.フルタイム C/P RS/GIS 4名 2.パートタイム C/P RS/GIS 4名 DGR 20名 DRGM 8名 DGAA 8名																																				
		・ 供与機材内訳、支出金額	2002年11月末まで 総額 94,819千円 主要物品 ワークステーション 7,978 ネットワークプリンター 2セット 10,865 赤外フーリエ分光放射計 9,519 高速分光放射計 7,481																																				
		・ 運営経費	(単位：ペソ) <table border="1"> <thead> <tr> <th></th> <th>2001年 実績</th> <th>2002年実績 11月末現在</th> <th>2002年 予算</th> </tr> </thead> <tbody> <tr> <td>消耗品</td> <td>3,000</td> <td>4,700</td> <td>5,000</td> </tr> <tr> <td>ASTERデータ</td> <td></td> <td></td> <td>5,000</td> </tr> <tr> <td>施設、機材及びメンテナンス</td> <td>19,742</td> <td>1,300</td> <td>30,000</td> </tr> <tr> <td>現場調査手当</td> <td>2,436</td> <td>27,506</td> <td>45,000</td> </tr> <tr> <td>現場調査費</td> <td>1,370</td> <td>8,228</td> <td>15,500</td> </tr> <tr> <td>その他</td> <td>12,480</td> <td>11,560</td> <td>27,500</td> </tr> <tr> <td>合計</td> <td>39,028</td> <td>53,294</td> <td></td> </tr> <tr> <td>予算</td> <td>107,500</td> <td></td> <td>128,000</td> </tr> </tbody> </table>		2001年 実績	2002年実績 11月末現在	2002年 予算	消耗品	3,000	4,700	5,000	ASTERデータ			5,000	施設、機材及びメンテナンス	19,742	1,300	30,000	現場調査手当	2,436	27,506	45,000	現場調査費	1,370	8,228	15,500	その他	12,480	11,560	27,500	合計	39,028	53,294		予算	107,500		128,000
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		・ 受入研修員																																					

* 1 テーマ図 : 鉱床生成図、他に現在しているものとしては、物理探査解析図、地化学探査解析図、地すべり危険地域図、災害地域図、洪水警戒地域図、土地利用図がある。

* 2 関係者やユーザー : 他政府機関、民間企業、研究機関、大学等

実施プロセス

	調査項目	調査結果	備考
活動の進捗状況	活動は計画どおり行われたか	活動初期に機材の遅れによる若干の活動の遅れがあった。そのため、計画の修正も若干行われた。現在までのところ、大部分の活動は計画どおりに行われている。ただし、技術移転が、プロジェクト開始時に個々のC/Pに与えられていた地域の解析を通じて行われているため、画像処理は計画どおり進んだが、やや、地質的解釈の分野が遅れている。今後はこの分野の活動計画を見直し、プロジェクト終了までには、当初計画された活動すべてを実施する予定である。	
モニタリングの実施状況	<ul style="list-style-type: none"> ・モニタリングの仕組みは整備され、計画どおり行われているか？ ・モニタリングの結果は、どのようにプロジェクト全体に伝達されているか？ ・モニタリングの結果は、どのように活動に反映されたか？PDM、詳細活動の軌道修正はあったか？ ・外部条件の変化へはどのように対応したか？ 	<ul style="list-style-type: none"> ・モニタリングはプロジェクト開始直後、開始1年後、それ以降は半年ごとに計画されており、かつ計画どおりに実施されている。 ・それぞれの活動の評価は長期専門家によるC/Pの習熟度評価、及びC/P自身による自己評価が行われ、両者で技術移転状況のディスカッションがなされている。その結果は、その後の活動に反映されている（PDMの本質的見直しはなかった）。 ・運営経費の項参照。 	
専門家とC/Pとの関係性	<ul style="list-style-type: none"> ・定期的なコミュニケーションの場を有しているか？ ・どのようなかたちで両者間で生じた問題に対処しているか？ ・話し合いの結果はプロジェクトに生かされているか？具体的な例は？ ・C/Pは主体的、積極的にプロジェクトに参加しているか？ 	<ul style="list-style-type: none"> ・定期的な会議はないが、必要に応じて、随時、話し合いがもたれている。 ・正規の意見調整のルートとしてはC/Pが日本側調整員に提起し、それを受けて、チーフアドバイザーが意見を調整し、C/Pに伝えるかたちをとっている。 ・アンケート調査によれば、双方のコミュニケーションは良好である。 ・長期専門家のコメント及びC/Pに対するヒヤリングによれば、C/Pは主体的かつ積極的にプロジェクト活動に従事している。 	
受益者の事業へのかかわり	<ul style="list-style-type: none"> ・IGRM職員は技術移転の内容を理解し、積極的に協力しているか？ ・SEGEMAR職員はプロジェクト主催のセミナー・ワークショップに積極的に参加しているか？ 	<ul style="list-style-type: none"> ・プロジェクトへの関心が非常に高く、C/P以外のIGRMの地質技師がASTERによる解析を依頼してきている。依頼件数が多すぎてなかなか対応できないほどである。 	
相手国実施機関のオーナーシップ	<ul style="list-style-type: none"> ・実施機関責任者は自分の主管するプロジェクト活動に意欲的に参加しているか？ ・予算の手当では確実に実行されているか？ ・C/Pを計画どおり配置し、プロジェクト運営に支障を生じないよう留意しているか？ 	<ul style="list-style-type: none"> ・実施機関の責任者はプロジェクトが実施する重要な活動を指揮し、かつ意欲的に参加している。 ・プロジェクトの幹部は資金不足のなか、極力プロジェクトに優先的に経費を供給しようと努力したが、資金不足は解消できないままである。 ・C/Pの配置について今までのところ、ほとんど問題を生じていない。ただし、フルタイムC/Pの全員が契約社員であり、その契約期間は短い。SEGEMARはこの雇用条件の改善に尽力しているが、この契約は大統領の承認が必要であるため、難しい。 	

妥当性

(被援助国のニーズとの整合性、日本の援助事業としての妥当性があるか)

	調査項目	調査結果	備考
上位目標は相手側の開発政策に合致しているか	<ul style="list-style-type: none"> ・ 鉱業を国の主要産業とする国家戦略に変更はないか？ ・ 鉱業投資を促進する政策（規制緩和等）は推進されているか？ 	<ul style="list-style-type: none"> ・ 2002年1月よりEduardo Duhaldeを大統領とする新政権がスタートした。経済危機克服のため新政策が実施されているが、経済復興のために鉱業を重要視し、鉱業投資を促進するという政策に変化はない。 ・ 以前鉱業投資に妨げとなっていた、州営鉱山による鉱区の非開放といった問題はごく少数となっている。 	
ターゲット・グループ以外への波及効果は期待できるか	<ul style="list-style-type: none"> ・ 関連団体、特に、鉱山会社は本プロジェクトに深い関心を抱いているか？ ・ SEGEAR以外の官庁が本プロジェクトに深い関心を抱いているか？ 	<ul style="list-style-type: none"> ・ C/Pが行った学会等での発表や、専門誌の論文を通じて、関連団体からASTERデータに関する引き合いがあり、そのなかに鉱山会社からの引き合いもある（チリのリオ・ティントと、アルゼンチンの地質コンサルタントはプロジェクトに画像を発注した）。このことは鉱山会社の関心の高まりを示している。 ・ 農業研究所、原子力委員会、大学が本プロジェクトに深い関心を抱いている。 	
プロジェクト目標は相手側のニーズに合致しているか	<ul style="list-style-type: none"> ・ アルゼンチンの探鉱開発に対する鉱業界の意欲は高まっているか？ ・ 地質情報は豊富になるか？ 	<ul style="list-style-type: none"> ・ 現在、金属市場の低迷で世界の鉱山開発は停滞気味である。アルゼンチンにおいても最盛期には80件を超える開発プロジェクトがあったが、現在は約10プロジェクトしかない。しかしアルゼンチンに鉱物資源が存在する有望性は高く、国際価格が上昇すれば、鉱業開発は再開される。 ・ 2000年に発効したアルゼンチン・チリ鉱業統合条約により、国境付近の鉱床の効率的開発が可能になった。このためサンファン地区の金鉱山がF/S調査を終え、開発されようとしている。 ・ アルゼンチン国内で地質図・テーマ図の作成されている地域は少ない（地質図は25万分の1が103枚、10万分の1が39枚鉱床生成図約20枚、エアボーン物理探査70万km²、多成分地化学探査40万km²）。したがって、作成されれば地質の情報量は豊富になる。本プロジェクトは作図作業の効率化と情報量の追加に寄与できる。 	
日本の援助事業として妥当性があるのか？		<ul style="list-style-type: none"> ・ 日本はこれまで、JICA-MMAJのプロジェクトとしてアルゼンチンのアンデス山岳地域の金属鉱物調査を継続的に実施しており、この国における地質情報にも詳しい。最新のリモートセンシング技術と金属資源関連情報を持ち合わせて技術協力できる日本は、アルゼンチン側の要望を満たすことができる。 	

有効性

(プロジェクトの実施により、期待される効果が得られるか? プロジェクトは有効であったといえるか)

	調査項目	調査結果	備考
IGRMが鉱物資源探査のため地質図・テーマ図を作成するのにASTERの先進的衛星データは有効に利用できるか?	<ul style="list-style-type: none"> プロジェクト目標の達成は計画どおりか? プロジェクト終了時までにプロジェクト目標は計画どおりに達成できるか? ASTERデータは地質図・テーマ図に新たな情報を追加できたか? 	<ul style="list-style-type: none"> 技術的には、プロジェクト終了までに、ほぼ計画どおり達成できると判断した。 ASTERデータを利用した地質図・テーマ図はまだ作成されていないが、画像と現有の地質調査結果との対比から、新しい情報が追加できるとRS/GIS部門のC/Pのみならず、多くの地質調査の担当者も確信している。 	
	<ul style="list-style-type: none"> 図面作成の精度・作業性は向上したか? C/Pは新たな、技術・知識を身につけることができたか? 	<ul style="list-style-type: none"> 向上する(「プロジェクト目標」参照) 計画どおり、技術・知識を身につけてきている。SEGEMAR幹部はC/Pが短期間に多くの技術を習得したことを賞賛している。 	
	<ul style="list-style-type: none"> プロジェクトは継続して、連邦・地方政府、ユーザーの支持を得ているか?(外部条件に変化はないか) 	<ul style="list-style-type: none"> アルゼンチンにおける経済危機の影響で、中央政府からの資金面での支援が困難になってきており、見通しは明るくない。 	
	<ul style="list-style-type: none"> IGRM作図担当者、C/Pは本プロジェクトの成果に満足しているか? 	<ul style="list-style-type: none"> セミナー・ワークショップ及び現地での共同調査を通じて、作図担当者はASTERデータの有用性の認識を深めている。 	

効率性

(プロジェクトは効率的であったか)

	調査項目	調査結果	備考
投入された資源量に見合った成果が達成されているか	<ul style="list-style-type: none"> ・成果は計画どおり達成されているか？ ・プロジェクト終了までに成果は計画どおり達成できるか？ 	<ul style="list-style-type: none"> ・成果は、今までのところ、計画どおり達成されつつある。 ・プロジェクト終了までに成果は達成されると判断した。 	
	<ul style="list-style-type: none"> ・配置されたC/P、専門家は、所与の期間中、全員がプロジェクトに専念できるか？ ・配置された専門家、C/Pは技術移転に相応しい技量を有しているか？ ・提供された施設・機材の稼働率は高いか？ ・提供された施設・機材は、計画された活動に適しているか？ ・計画どおりの活動をするのに十分な資金が提供されているか？ ・今後、投入計画の当初計画に対する大きな乖離はないか？ 	<ul style="list-style-type: none"> ・C/Pのほとんどが契約社員であるが、ほとんどすべてのC/Pが現在の仕事を継続したいと望んでいる。RS/GIS部門で過去約10年、解雇は発生していない。 ・専門家、C/Pの人数、及び質的にも技術移転に相応しい技量を有している。 ・供与されたすべての機材は利用されており、稼働率も高い。 ・経済危機の影響で十分なローカルコストの提供が困難な状況にある。 	
	<ul style="list-style-type: none"> ・人員配置のタイミングは計画どおりであるか？ ・施設・機材の投入のタイミングは計画どおりであるか？ ・資金投入のタイミングは計画どおりであるか？ ・今後、タイミング面において投入計画の当初計画に対する大きな乖離はないか？ 	<ul style="list-style-type: none"> ・人員配置のタイミングは計画どおりである。 ・プロジェクト開始時に日本で購入したパソコンの入荷が遅れ、また、インターネットの設置が遅れた。他の機材投入のタイミングはほぼ計画どおりであった。 ・経済危機により、運営経費の投入タイミングの困難に直面している。 	
	<ul style="list-style-type: none"> ・投入にあたり、投入されるものは機能と支払い金額の面から十分検討されているか？ 	<ul style="list-style-type: none"> ・主要機材の購入にあたっては、機能と価格面から同種製品の比較検討が行われ最適な機材が選定されている。 	
	<ul style="list-style-type: none"> ・投入に著しい影響を及ぼした、予期できなかった外部要因はあったか？ 	<ul style="list-style-type: none"> ・アルゼンチンにおける経済危機により、政府の資金負担が困難になったのは、プロジェクト開始当時においては予測できない外部要因であった。 	

インパクト

(プロジェクト実施により間接的・波及的效果はあるか)

	調査項目	調査結果	備考
上位目標 (IGRMによって、資源探査のための地質図・テーマ図が整備される) の達成可能性が高まったか? その他の波及効果はあるか?	探鉱開発業者によるアルゼンチンの鉱物資源賦存に対する期待が高まっているか? 地質図・テーマ図の発行部数は増加しているか?	鉱物資源が有望視されている地域の地質図・テーマ図作成の初期の段階であるが、地質図・テーマ図の整備は鉱山業者に期待されている。	
	アルゼンチン国内において先進的リモートセンシングに対する研究・機材開発等が増加しているか?	アルゼンチンの多くの組織が本プロジェクトの活動を通じて、ASTERに関心を持つようになってきている。特にアルゼンチン国内のリモートセンシングの権威である大学教授がASTERに高い関心を示しており、アルゼンチンにおける先進的リモートセンシングの期待は高まりをみせると考えられる。	
	他の官庁において先進的リモートセンシングデータの活用計画が推進されてきているか?	ASTERに対する関心は高いが、活用しよう、協力しようという段階には至っていない。	
	SEGEMAR職員・IGRM職員の意識の変化はあるか?	SEGEMAR職員は最初のうち、このプロジェクトをあまり認識していなかったが、プロジェクト活動が進展し、プロジェクトの成果が出始めたことで、専門家、C/Pのみならず、RS/GIS部門に対し、高く評価するようになった。	
	上位目標はどの程度達成されているか?	(上位目標参照)	
	その他、予期しなかった (=PDMには書かれていない) プラス・マイナスの影響の有無	予測できない外部要因であった。	

自立発展性

(協力終了後も効果が持続していくか?)

	調査項目	調査結果	備考
政策支援の継続(見込み)	<ul style="list-style-type: none"> ・アルゼンチンにおける鉱業投資重点政策に変化はないか? ・変化が懸念される要因は存在していないか? 	2002年1月よりEduardo Duhaldeを大統領とする新政権がスタートした。経済危機克服のため新政策が実施されているが、経済復興のために鉱業を重要視し、鉱業投資を促進するという政策に変化はない。	
関連組織・業界の支援、連携	<ul style="list-style-type: none"> ・連邦政府、地方政府、ユーザーの支援は継続するか? ・他官庁との連携は検討されているか? ・近隣諸国との連携は可能か? 	<ul style="list-style-type: none"> ・アルゼンチンにおける経済危機の影響で、中央政府からの資金面での支援が困難になった。この状況は続いているが、最近の経済状態は改善の傾向にある。 ・今のところない。 	
実施機関の組織能力の有無	<ul style="list-style-type: none"> ・実施機関の責任者はプロジェクトのマネジメントに積極的であるか? ・人員の配置は活動を円滑に実施するのに適切であるか? ・離職率はどの程度か? ・活動を円滑に実施するのに適切な予算を確保することができるか? ・プロジェクト終了後も財政支援を継続することができるか? ・自ら資金を創出し、上位目標を達成に導く方法を検討しているか? ・モニタリング結果がプロジェクトに反映されているか? 	<ul style="list-style-type: none"> ・実施機関の責任者はプロジェクトが実施する重要な活動を指揮し、かつ意欲的に参加している。 ・2005年以降の先進的リモートセンシングの運営計画に従って、必要人員はプロジェクト終了までに見直される。 ・2005年以降の適切な資金の獲得方法について具体的に検討された計画がプロジェクト終了までに策定される。 ・C/Pと専門家との間のディスカッションと、合同調整委員会により、モニタリングがプロジェクト活動に反映されている。 	
技術の定着度・普及の仕組み	<ul style="list-style-type: none"> ・IGRMに知識・技術をどのように定着させるかを検討しているか? ・IGRMに技術を普及させる仕組みが検討されているか? ・資機材の維持管理は行き届いているか? ・資機材の更新・増強の仕組みが検討されているか? 	<ul style="list-style-type: none"> ・フルタイム及びパートタイムC/Pはプロジェクト終了後も引き続きIGRMに配置される。 ・2005年以降の技術を定着させる仕組みがプロジェクト終了までに策定される。 ・維持管理費用の面で不安がある。 ・2005年以降の資機材の更新・増強の仕組みがプロジェクト終了までに策定される。 	
社会配慮	<ul style="list-style-type: none"> ・鉱区周辺、鉱山労働者等への社会配慮が不十分であったために生じている不都合はあるか? 	本調査においては、社会配慮が不十分であったために生じている不都合はなかった。	
その他	(調査過程で明らかになる、自立発展を阻害している要因)		

付 属 資 料

1 . MINUTES OF THE MEETING

1. MINUTES OF THE MEETING

MINUTES OF MEETINGS
BETWEEN JAPANESE MID-TERM EVALUATION TEAM
AND AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE ARGENTINE REPUBLIC
ON JAPANESE TECHNICAL COOPERATION FOR
THE PROJECT ON REGIONAL GEOLOGICAL MAPPING WITH ADVANCED SATELLITE
DATA IN THE ARGENTINE REPUBLIC

The Japanese Mid-term Evaluation Team (hereinafter referred to as "the Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Toshio OKAZAKI, visited the Argentine Republic from December 11 to December 20, 2002, in order to review and evaluate jointly the activities being conducted under the Project on Regional Geological Mapping with Advanced Satellite Data in the Argentine Republic (hereinafter referred to as "the Project") and to formulate further development of the Project.

During its stay in the Argentine Republic, the Team had a series of discussions and exchanged views with the authorities concerned of the Government of the Argentine Republic (hereinafter referred to as "the Argentina side") and attended the Evaluation Meeting (hereinafter referred to "EM") for successful implementation of the Project.

As a result of the discussions as well as the EM, the Team and the Argentina side agreed upon the matters referred to the document attached hereto.

Buenos Aires, December 19, 2002

岡崎 復夫

Mr. Toshio OKAZAKI
Leader
Mid-term Evaluation Team
Japan International Cooperation Agency
Japan



Mr. Pedro ALCANTARA
Executive Secretary
Argentine Geological and Mining Survey
(SEGEMAR)
Argentine Republic

ATTACHED DOCUMENT

1. GENERAL ITEMS

1.1 Purpose of the Mid-term Evaluation

The Team explained that the main purpose of this survey was to conduct a mid-term evaluation of the Project so that both sides could monitor the progress of technical cooperation, make a plan for further effective implementation in the remaining period, and discuss necessary measures to be taken by both sides in preparation for a final evaluation.

2. CURRENT STATUS OF THE PROJECT

2.1 Current Situation

The Argentina side explained to the Japanese side the current situation economy and mining industry in Argentine. Since October 2001, Argentine has been faced to financial difficulty due to the economical crisis. The project also has been affected by changes of external assumption due to economic crisis. And the same situation has continued for the present, however the recent economic situation is changing toward the improvement.

There are not only bad but also good influences of the economic crisis upon investment and development of mining industry. Especially depreciation of the national currency unit "Peso" can promote the investment by foreign companies though many of them are still conservative because of the situation. However the situation of mining industry will be improved after overcoming the economic crisis. Thus, firms and mining industry expect utilization of ASTER data and geological and thematic maps to promote mineral resources development.

2.2 Government Policy

The Argentina side explained the national policies that aim to promote the mining investment and the importance of the mining industry as a main factor of nation wealth hasn't been changed even though the economic crisis. These policies have been supported by the government, and the support to the project hasn't changed.

2.3. Organization

The team confirmed that there has been no change in the legal status of IGRM as a government institute attached to SEGEMAR since the last Management Consultation Team dispatched 2001. The organization chart is as shown in ANNEX 2, 3.

2.4. Budget

The annual budget, expenditure and income of SEGEMAR are as below:

YEAR	AMMOUNT (Peso)
2001	11,991,149
2001	10,272,979

2.5. Staff Allocation

The staff allocation of IGRM is shown in ANNEX 4.

Four (4) technical counterparts have been assigned to the project as full time contract staff since the project has started. The Argentina side confirmed to make an effort to ensure its allocation continuously during the project term in order to sustain the results of the project.

3. Mid-term Evaluation of the project

3.1. Review of inputs to the Project by Japanese side

(1) Dispatch of the Japanese Experts

Both sides confirmed the record of dispatch of the Japanese Experts as shown in ANNEX5.

(2) Training of C/P in Japan

Both sides confirmed the record of training of C/P in Japan to date as shown in ANNEX6.

(3) Provision of Machinery and Equipment

Both sides confirmed the record of to date as shown in ANNEX7.

(4) Allocation of the Budget for the Project

Both sides confirmed the record of allocation of the Budget for the Project to date as shown in ANNEX8.

3.2. Review of inputs to the Project by Argentine side

(1) Allocation C/P and the Administrative Personnel for the Project

Both sides confirmed the record of allocation C/P and the Administrative Personnel for the Project to date as shown in ANNEX 5.

(2) Provision of Machinery and Equipment

Both sides confirmed the record of provision of Machinery and Equipment to date as shown in ANNEX9.

(3) Allocation of the Budget for the Project

Both sides confirmed the record of allocation of the Budget for the Project to date as shown in ANNEX10

3.3. Review of the Project of Technology Transfer to December 2002 and Outputs

Both sides confirmed the achievement of the project from March 2001 to December 2002 to date as shown in ANNEX11.

3.4. Joint evaluation report

Both sides confirmed the mid-term evaluation report based on five basic evaluation components resulting from the joint evaluation meeting as described in ANNEX1. In conclusion, the cooperation period activities have been appropriate to achieve the project purpose in time, and no drastic change of project's design and direction is required. Summary of the five criteria evaluation report is as follows;



- Efficiency

The efficiency is high.

With the Input personnel, equipment and facilities, which have been timely arranged and functioned effectively, appropriate results have been produced as a whole. However, at the beginning of the Project, the progress of the project was delayed by the timing of the equipment (Personal computers purchased in Japan) delivery, delay of installation and a slight imperfection in the internet system. But the influence was little at the present. The expenses were also borne as scheduled.

- Effectiveness

The Project has been managed effectively. Nevertheless, the Project has the possibility the enough effectiveness cannot show caused by the obstruction against the "Important Assumption (The Project supported by the federal government)". The necessary systems for utilizing the advanced satellite data were established in the first year of the Project, and the counterparts, excellent in quality, have been allocated. Counterparts acquired enough skill in managing and maintaining equipment, and also acquired fundamental knowledge and technology on advanced satellite data thorough guidance during the first year of the Project.

- Impact

The following positive impacts were found.

Outside organizations such as the Institute of Climate and Agriculture, the National Commission of Atomic Energy, Universities, mining companies, Geological consultants, recognized the usefulness of the ASTER data and one of them made request of the Project for the ASTER image processed. The university professors, specialists in remote sensing in Argentina, show a keen interest in the Project, so that it can find a rising tide of the expectation towards the advanced satellite utilization data in Argentina.

Negative impacts were not found in this investigation.

- Relevance

The Project is relevant.

Before the Project, Argentina had presented as a national strategy the promotion of mining investments by foreign companies and the growth of its mining industry as a main industry of the nation in an attempt to improve its national economy. In adherence to this strategy, a "Geological and Thematic Maps National Program" is being executed, and the Project supports the Program.

In term of the national strategy, economical restructuring and technology being transferred, the project is high relevance.

- Sustainability

Judging from the progress of the Activities and Output, prepared as scheduled, the "Project Purpose" is achievable. Toward the completion of the Project, it will be important to increase the capability of counterparts in the field of Geological remote sensing, and to establish strengthening the technical cooperation system with related division such as geological survey.

As mentioned, technically there is no problem with the Sustainability, if the counterparts technology transferred will

be engaged in their job continuously.

SEGEMAR should strengthen the plan on the managing the advanced satellite data operation after the Project, including the studies that supply the income from the chargeable image processing for the replacement and maintenance of the equipments/system, by the completion of the Project.

• CONCLUSION

The “Activities” have been carried out, and expected “Output” have been generated as scheduled so far. The preparation works of the geological maps and thematic maps using advanced satellite data are being conducted toward the achievement of the ”Project Purpose”. Judging from today’s degree of achievement, it is possible technically to achieve the “Project Purpose” by the completion of the Project.

• RECOMENDATIONS

1. To promote the activities in the Part B such as hazards mapping and research of geo-environmental issues by using remote sensing technology. It is recommendable to examine the priority and to make a concrete plan among these issues.
2. To make a more available use the analysis ASTER image, it is recommendable to integrate not only related to geology and geophysics data but also the supplementary data such as metadata (index map, bibliography, etc.) in cooperation with GIS group in near future.

4.DISCUSSION ON RESIDUAL PERIOD OF THE PROJECT

4.1.Review of master plan of the Project. Project Design Matrix (PDM), Tentative Schedule of Implementation (TSI),Plan of Operation(PO).

4.1.1 MASTER PLAN and PROJECT DESIGN MATRIX (PDM)

Both sides confirmed that there is no drastic change in the Master Plan of the Project and the Project Design Matrix (PDM) shown in ANNEX 12.

The Argentina side suggested adding a word “detection” in activities 3-2 of part B. Japanese side agreed.

4.1.2 TENTATIVE SCHEDULE OF IMPLEMENTATION (TSI) and PLAN OF OPERATIONS (PO)

Both sides confirmed that there is no drastic change in that the Tentative Schedule of Implementation (TSI) and the Plan of Operations (PO) as shown in ANNEX 13.

4.2.Inputs by Japanese Side

Both sides confirmed that there is no drastic change in the plan of Inputs by Japanese side from Master Plan.

4.3.Inputs by Argentine Side

Both sides confirmed that there is no drastic change in the plan of Inputs by Argentine side from Master Plan. However Argentine side has financial difficulties because of economic crisis.



Therefore, there is a possibility to change Inputs by Argentine side

4.4.Others

- The Argentina side request to The Japanese side to provide the fee of software maintenance (about twenty thousand dollars) and the fee for field survey during from January to March 2003(about ten thousand dollars). Because Argentine has not recovered from affection of Economic crisis yet, they still have financial difficulty.

- SAGEMAR will move to new facility in North part of Buenos Aires. The project site also will move to the new place. Both sides confirmed that there will be no delay of project activities due to movement of the project site.

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ANNEX LIST

ANNEX 1	Joint Evaluation Report
ANNEX 2	Organization chart of SEGMAR
ANNEX 3	Organization chart of The Project
ANNEX 4	Allocation of Counterpart Personnel by the Argentina side
ANNEX 5	Dispatch of Japanese Experts from March 2001 to December 2002
ANNEX 6	Training of Counterpart Personnel in Japan from March 2001 to December 2002
ANNEX 7	List of equipment by Japanese side
ANNEX 8	Allocation of the Budget for the Project by Japanese side
ANNEX 9	Allocation of the Budget for the Project by Argentina side
ANNEX 10	List of equipment by Argentina side
ANNEX 11	Technology Transfer and Outputs from March 2001 to December 2002
ANNEX 12	Project Design Matrix (PDM)
ANNEX 13	Plan of Operations (PO) for Residual Period
ANNEX 14	List of attendance

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JOINT EVALUATION REPORT ON
THE JAPANESE TECHNICAL COOPERATION
FOR
REGIONAL GEOLOGICAL MAPPING
WITH ADVANCED SATELLITE DATA
IN THE ARGENTINE REPUBLIC

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

ARGENTINE GEOLOGICAL AND MINING SURVEY (SEGEMAR)

DECEMBER 18, 2002

BUENOS AIRES

THE ARGENTINE REPUBLIC

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I. INTRODUCTION

1. The Evaluation Team

The Japanese Evaluation Team (hereinafter referred to as "the Japanese Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Toshio Okazaki, visited the Argentine Republic from December 8 to 21, 2002, for the purpose of joint evaluation with the Argentine Evaluation Team (hereinafter referred to as "the Argentine Team") on the achievement of Regional Geological Mapping with Advanced Satellite Data in Argentine Republic (hereinafter referred to as "the Project") on the basis of the Record of Discussions (hereinafter referred to as "R/D") signed on December 21, 2000.

Both teams discussed and studied together the efficiency, effectiveness, impact, relevance and sustainability of the Project in accordance with the JICA Project Cycle Management (hereinafter referred to as "JPCM") method.

Through careful studies and discussions, both sides summarized their findings and observations as described in this Joint Evaluation Report.



2. Schedule of Joint Evaluation

December	8	Sun.	Arrival in Buenos Aires of a member in charge of evaluation analysis
2002	9	Mon.	•Interview with Japanese experts
	10	Tue.	•Interview with counterparts and Japanese experts
	11	Wed.	•Interview with counterparts and Other Government office staff
	12	Thu.	•Interview with counterparts and Other Government office staff •Arrival in Manila of the main body of the Japanese Team.
	13	Fri.	•Meeting at JICA Office. •Courtesy call to the Embassy of Japan •Meeting with SEGEMAR
	14	Sat.	•Summarizing the results of interviews and meetings.
	15	Sun.	•Team meeting
	16	Mon.	•Interview with SEGEMAR and Japanese Experts
	17	Tue.	•Presentation by Counterparts •Discussion on the Evaluation Report
	18	Wed.	•Joint Evaluation Committee •Discussion on the M/M draft
	19	Thu.	•Signing of the Joint Evaluation Report and the M/M.
	20	Fri.	•Report to the JICA office. •Report to the Embassy of Japan.
	21	Sat.	•Departure from Buenos Aires

Handwritten signature

3. Members of Evaluation Team

3-1 The Japanese Team

Mr. Toshio Okazaki	Leader Special Adviser, Mining and Industrial Development Cooperation Department, JICA
Dr. Hirokazu Kato	Technology Transfer Planning Director, Institute of Geoscience, Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology
Ms. Akiko Ozawa	Geologist, International Cooperation Division, Japan Mining Engineering Center for International Cooperation
Ms. Yuriko Doi	Project Management Staff, Second Technical Cooperation Division, Mining and Industrial Development Cooperation Department, JICA
Mr. Kenichi Kumagai	Evaluation Analysis (Consultant) General Manager, International Cooperation Department, Industrial Services International Co., Ltd.

3-2 The Argentine Team

Eng. Jorge Mayoral	Undersecretary of Mining and President of SEGEMAR
Dr. Pedro Alcantara	Project Director Executive Secretary of Argentine Geological and Mining Survey (SEGEMAR)
Dr. Roberto N.F. Page	Project Manager Director, Geology and Mineral Resources Institute (IGRM)
Dr. Graciela Marín	Project Coordinator Acting Director of Remote Sensing and GIS Division
Dr. José E. Mendía	Project Coordinator Director of Regional Geology Direction (DGR)
Dr. Antonio Lizuain	Project Coordinator Coordinator of Regional Geology Direction (DGR)
Dr. Eduardo O. Zappettini	Project Coordinator Director of Geological and Mining Resources Direction (DGRM)
Dr. Omar R. Lapido	Project Coordinator Director of Environmental and Applied Geology Directions (DGAA)
Dr. Carlos G. Asato	Staff of Remote Sensing and GIS Division

3-3 JICA Argentine Office

Mr. Masao Takai	Resident Representative
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3-4 The Experts

Mr. Katsumi Yokokawa	Leader
Mr. Koji Yamaguchi	Coordinator
Mr. Itoshi Kohno	Geological Remote Sensing
Mr. Manabu Kaku	Digital Image Processing



II. METHODOLOGY OF EVALUATION

1. Method of Evaluation

The Project evaluation was conducted in accordance with the JPCM method.

- The Project Design Matrix (PDM) was agreed by both sides as a basis of the evaluation.
- Achievement of the Project was studied by collecting data of the Verifiable Indicators set in the PDM.
- The Project was evaluated on five aspects described below.

2. Aspect of Evaluation

The Project was evaluated on the following five aspects:

- (1) Efficiency: Evaluate how the results stood in relation to the efforts and resources, how economically the resources were converted into output, and whether the results could have been achieved by other better methods.
- (2) Effectiveness: Evaluate the extent to which the purpose has been achieved or not, and whether the project purpose can be expected to happen on the basis of the outputs of the Project.
- (3) Impact: Foreseeable or unforeseeable, and favorable or adverse effect of the Project upon the target groups and persons possibly affected by the Project.
- (4) Relevance: Evaluate the degree to which the Project can still be justified in relation to the national and regional priority levels given to the theme.
- (5) Sustainability: Evaluate the extent to which the positive effects as a result of the Project will still continue after external assistance has been concluded.

3. Information for Evaluation

Following sources of information were used in this study.

- (1) Documents agreed by both sides prior to and/or in the course of the Project implementation:
 - Record of Discussion (R/D)
 - Minutes of the Meeting (M/M)
 - Tentative Schedule of Implementation (TSI)
 - Detailed Plan of Operations (DPO)
- (2) The Project Design Matrix (Annex-1)
- (3) Record of inputs from both sides and activities of the Project.
- (4) Statistics.
- (5) Interviews with and questionnaires to counterparts, Japanese experts and persons interested.

III. Project Summary

1. Background of Project and Dispatch of Survey Team

Argentina has a large territory and a geological environment that is highly likely to contain mineral resources. However, these resources have not been enough explored or developed, resulting in the mineral resources still low. One reason identified for that is the lack of well-arranged stock of basic geological information required for exploring and developing mineral resources. Such information should be collected and arranged efficiently.

To that end, the Argentine government has had its Geological and Thematic Maps National Program in operate since 1993, at the Argentine Geological and mining Survey (SEGEMAR) under the auspices of the Secretariat of Industry, Commerce and Mining (the mining department was restructured as the Secretariat of Energy and Mining in September 2000). A Remote Sensing and Geographic Information System Division (RS/GIS Division) was set up in 1994 to use satellite image analysis (remote sensing) in an attempt to proceed with such mapping efficiently. The reality is, however, that the shortages of personnel and equipment are constraints that prevent these efforts from showing sufficient achievements.

Under these circumstances, the Argentine government asked the Japanese government for project-type technical cooperation in an attempt to increase efficiency of geological and thematic maps by introducing advanced technologies for satellite data processing analysis and equipment and software required for those technologies.

In response, the Japanese government conducted three short-term surveys from June through November 2000 in order to confirm the significance of the project and to draft a project document specifying the basic concepts and a concrete plan, along with other details. In December 2000, JICA dispatched Japanese Implementation Study Team which signed R/D with SEGEMAR to start the Project.

The four-year cooperation program started on March 1, 2001.

2. Purpose of the Project

The Super goal, overall goal and the project purpose were stipulated in the R/D as follows

(1) Part A

(1-1) Super goal

Geological maps and thematic maps prepared by IGRM are utilized by mining investors in Argentine.

(1-2) Overall goal

Geological maps and thematic maps for mineral exploration using advanced satellite data are prepared by IGRM.

(1-3) Project Purpose

IGRM is able to utilize advanced satellite data such as ASTER and/or PALSAR in order to make geological maps and thematic maps for mineral exploration

(2) Part B

(2-1) Overall Goal

Thematic maps for environmental conservation and hazard prevention are prepared by IGRM.

(2-2) Project Purpose

IGRM understands how to utilize advanced satellite data such as ASTER and/or PALSAR in environmental or hazardous area study.



3. Implementation Chart

The Implementation Chart is attached in Annex-2

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IV. RESULTS OF EVALUATION

Summary of JPCM Evaluation Report

The "Activities", and "Output" have progressed almost as scheduled, and the execution processes have been almost satisfactory. However, as for the progress of the "Project Purpose", has been delayed in the field of field survey for geological and metallogenic maps by the influence of the economic crisis of Argentine.

1. Details

Originally this evaluation should be conducted for two Parts, that is, "Part A" on the field of geology and "Part B" on the field of environmental etc. However according to the original plan the "Activities" and "Output" of "Part B" have been satisfied by the implementation of "Part A", at this stage.

1-1. Efficiency

The efficiency is high.

With the Input personnel, equipment and facilities, which have been timely arranged and functioned effectively, appropriate results have been produced as a whole. However, at the beginning of the Project, the progress of the project was delayed by the timing of the equipment (Personal computers purchased in Japan) delivery, delay of installation and a slight imperfection in the internet system. But the influence was little at the present. The expenses were also borne as scheduled. Although, since some time in January 2002, Argentine side has faced difficult economic conditions to disburse the local cost (such as consumables, maintenance cost of equipment) and to purchase materials priced in dollars (such as software) due to the economic crisis in Argentine and the depreciation peso against dollars. However SEGEMAR give a higher priority to the disbursement of this Project, the solution of these conditions will take time. Therefore, there is concerned with the disburse not only the local cost but also the geological maps and thematic maps preparation cost from now on. With regard to counterparts almost all are contract staff members for six months, it is the basic employment policy of the federal government that none of new employees of the government offices is the regular employee. This employment policy does not provoke severe problem such as high discharge and/or separation rate, and almost counterparts expect to work the same job after the Project completion. It is important for the IGRM that the counterparts will be able to be engaged the same jobs in continuously after the Project completion.

1-2. Effectiveness

The Project has been managed effectively. Nevertheless, the Project has the possibility the enough effectiveness cannot show caused by the obstruction against the "Important Assumption (The Project supported by the federal government)".

The necessary systems for utilizing the advanced satellite data were established in the first year of the Project, and the counterparts excellent in quality have been allocated. Counterparts acquired enough skill in managing and maintaining equipment, and also acquired fundamental knowledge and technology on advanced satellite data thorough guidance during the first year of the Project. Also two ground truth studies were carried out in the later half on the first year, and these studies aided counterparts in understanding of the technology transferred. Detailed advanced satellite data processing and a technology transfer on the application side are being developed in this year. The degree of the skill and knowledge which counterpart acquired through the Project were estimated for details by the Japanese experts and the counterparts by themselves. According to the evaluation sheet, though there are variations among individuals, the capabilities of the counterpart to use the advanced



satellite data have been increased smoothly. And further the SEGEMAR executives admire the counterparts for acquiring so many technology, exceeding their expectations.

Three seminars/workshops were held, and about one hundred people participated. Besides, mini-seminars were held in the regional areas. And counterparts presented their results to the academic societies. Most of the geologists concerned with the geological mapping and thematic mapping recognized the usefulness of advances satellite data through these information activities. In addition, the understandings of the people except for the SEGEMAR staff (Institute of Climate and Agriculture, National Commission of Atomic Energy, University, mining companies, geological consultants), about the Project activities have been deepened. Among them it is remarkable that the Project took order for the ASTER images from the Rio Tinto, one of largest mining companies in the world, etc.

The Outputs have been progressed smoothly toward the achievement of the Project Purpose, as mentioned above. On the other hand, as for the achievement of the Project Purpose, the number of sheets of the geologic map and metallogenic map using the advanced satellite data as planned shall be prepared. At present, the image processing of the areas, where geologic mapping and metallogenic mapping are scheduled, is carrying out.

However, because of the disbursement of preparation cost of these maps are fallen into difficulties due to the economic crisis, the mapping work has been delayed. Consequently the field survey delayed due to the processed images. SEGEMAR consider achieving the Project Purpose, the image processing service on the chargeable basis will be carried out toward the outside. And the charge will be disbursed as a part of the local cost for the geological and thematic mappings.

1-3. Impact

The following positive impacts were found.

- Outside organizations such as Institute of Climate and Agriculture, National Commission of Atomic Energy, University, mining companies, Geological consultants recognized ASTER the usefulness of the ASTER data and one of them made request of the Project for the ASTER image processed. The university professors, specialists in remote sensing in Argentina, show a keen interest in the Project, so that it can find a rising tide of the expectation towards the advanced satellite utilization data in Argentina.

The negative impacts were not found in this investigation.

1-4. Relevance

The Project is relevant.

Before the Project, Argentina had presented as a national strategy the promotion of mining investments by foreign companies and the growth of its mining industry as the main industry of the nation in attempt to improve its national economy. In adherence to this strategy, a "Geological and Thematic Maps National Program" is being executed, and the Project is supports the Program. (see III.1)

Though a new administration made a start in January , 2002, the national strategy for promoting the mining remain unchanged. Mining investment promotion need increasingly to get over the economic crisis which the country faces. At present the investments in the exploration and/or development of Argentine mineral deposit are few, because of the world wide slowdown in mining investment due to sluggish international metal price, also of the concern about the instability of Argentine economy. At the end of 2000, The "Argentine-Chilean Mining Integration Treaty" which allows mining prospecting, exploration and exploitation in the mineral deposit that straddle the border, became effective. In fact a gold mine development project is about to start in this area. Therefore it can be thought that mining investment to Argentine will increase if the international metal market ascend and/or the Argentine economy is stabilized. For the sake of the promotion, higher quality geological and thematic maps of the areas that have potentials for minerals, should be prepared immediately.

And the utilization technology transfer of ASTER data has occupied the position of the "Advance satellite data" that provides more useful information to the geological and thematic maps.

As mentioned above, in term of the national strategy, economical restructuring and technology being transferred,

the project is high relevance.

1-5 Sustainability


Judging from the progress of the Activities and Output will be prepared as scheduled, the "Project Purpose" is achievable. Toward the completion of the Project, it will be important to increase the capability of counterparts in the field of geological remote sensing, and to establish strengthening the technical cooperation system with related division such as geological survey.

Through the seminar, the organizations concerned show the interest in the advanced satellite data. It will be possible for the Project to team up with them, or to get support from them. Further, from now on, bearing that maps prepared will be mainly used for promoting the mining development in mind, the public relations should be practiced for the targeted users, that is, private mining company.

As mentioned, technically there is no problem with the Sustainability, if the counterparts technology transferred will be engaged in their job continuously. Therefore SEGEMAR should pay attention to employ the counterparts steadily.

The major concern is whether the Government will bear the expense for the geological and thematic mapping using the advanced satellite data. After the project completion, not only the local cost such as a payroll, and consumables, but also the expense for the equipment maintenance, purchasing software should be borne by SEGEMAR. Near future SEGEMAR also should bear the expense for the replacement and/or expansion of the equipment. Since October 2001, Argentine side has been fallen into financial difficulty due to the economical crisis. And the same situation has continued at present, however the recent economic situation is changing toward the improvement.

SEGEMAR should strengthen the plan on the managing the advanced satellite data operation after the Project, including the studies that supply the income from the chargeable image processing for the replacement and maintenance of the equipments/system, by the completion of the Project.



V. CONCLUSION

The "Activities" have been carried out, and expected "Output" have been generated as scheduled so far. The preparation works of the geological maps and thematic maps using advanced satellite data are being conducted toward the achievement of the "Project Purpose". Judging from today's degree of achievement, it is possible technically to achieve the "Project Purpose" by the completion of the Project. However the economical crisis in Argentine has been obstructed the Important Assumption (support by federal government), thus there is a possibility that the degree of achievement of the "Project Purpose" will remained low. Therefore the various countermeasures of SEGEMAR toward securing stability of the local cost are the most important.

VI. RECOMENDATIONS

1. To promote the activities in the Part B such as hazards mapping and research of geo-environmental issues by using remote sensing technology. It is recommendable to examine the priority and to make a concrete plan among these issues.
2. To make a more available use the analysis ASTER image, it is recommendable to integrate not only related to geology and geophysics data but also the supplementary data such as metadata (index map, bibliography, etc.) in cooperation with GIS group in near future.



VII. EVALUATION GRID

1. Achievement of the Plan

		Objective Verification Indicator	Investigation Result	Remarks
<p><u>Overall Goal</u></p> <p><The degree of achievement of the Overall Goal (Forecast)></p>	<p>Geological maps and thematic maps prepared by IGRM are utilized by mining investors in Argentine.</p>	<p>1. •Have the geological maps and thematic maps been made as planned?</p> <p>•Have the geological maps and thematic maps using been made according to the annual plans ?</p> <p>•Advanced satellite data have been used to make the geological maps and the thematic maps.</p>	<p>IGRM has annual plan . Based on this Plan, 1:250,000 geological maps almost covering Argentine, 40 sheets of 1:100,000geological maps were made. And 160 of thematic map project are operating. Metallogenic mapping was started 1999. It is a stage of the technological transfer at present, and there are no maps showing the advanced satellite data.</p>	
		<p>2. •What types of thematic maps have been increased, and how many ?</p> <p>•Advanced satellite data have been used to make the geological maps and the thematic maps.</p> <p>•Have advanced satellite data been used to make those types of maps ?</p>	<p>Through the technology transfer, the Project has been examining the thematic maps which advanced satellite data are effectively available. At present the Project is preparing a "detail geological map"(1:100,000, thematic map) which is one of the new type of the thematic map.</p>	
		<p>3. •Are the user able to access all the thematic maps easily?</p> <p>•Can users obtain the maps by what kind of procedures and the amount of money? Was the system established?</p> <p>• Are there any economical and/or labor-saving advantages for the users ?</p> <p>•What do the users think of the procedures and efficiency?</p> <p>Are the users opinions reflected on those mentioned above ?</p>	<p>•All thematic maps issued are available for the general public. The procedure and so on are presented in the homepage of the SEGEMAR . The thematic maps made but not printed can be accessed at the SAGEMAR Library. ASTER data are also presented in the Homepage. SEGEMAR offer images, within the confines of the extra capacity.</p> <p>Focusing of the investigation applicable area becomes possible for the user, and there is an economical advantage by the labor saving of the basic investigation.</p> <p>Validity is introduced to the user through holding of the seminar and the contribution to the academic meeting and so on. There are inquiries from the user, it can be considered that the user's degree of concern rises</p>	
<p><u>Project Purpose</u></p> <p><The degrees of achievement of the Project Purpose.></p>	<p>IGRM is able to utilize advanced satellite data such as ASTER and/or PALSAR in order to make geological maps and thematic maps for mineral exploration.</p>	<p>1. How many maps have been made since the Project started?</p> <p>•Were the number of the maps made as annual plans in each year?</p> <p>•Did it make use of the ASTER data for how many sheets of thematic maps and geological maps?</p> <p>•Is it possible to make 8 sheets of 1:100,000 geological maps and 2 sheet of mettalogenic maps using ASTER and/or PALSAR data by the Project completion?</p>	<p>1According to the IGRM's CY 2002 Plan, 6 sheets of geological maps are made. From this year, the Project Provides ASTER data for the geological maps preparation work. It is 4 areas actually to start it. Image processing has been preparing on 4 area (6 sheets) of this by the project. And studies on the geological interpretation are being done with DGR. The field work of DGR progresses slowly for the financial difficulties.</p> <p>As for the preparation number of sheets of maps by the Project completion will be achievable.</p>	
		<p>2. •Have the ASTER data contributed to improve the qualities of the geological maps and the thematic maps?</p>	<p>•Although the maps using ASTER data are not made, but there is growing acknowledgment of the C/Ps and IGRM staff related to the mapping that the qualities of the ASTER data are higher than the LANDSAT data. Especially, on</p>	

			<p>geology, different units and alternation minerals are identification as well as the geological structure are extracted for mapping. In fact, the geological information which are not found yet, was gained through the Detail Geological mapping in the area of area Farallón Negro.</p>	
		<p>3. How much did the efficiency of the mapping works vary according to the use of the ASTER data in what kind of side?</p>	<p>Although the maps using ASTER data are not made, but there is growing acknowledgment of the ASTER data, from the effectiveness point of view. Especially, on Topography ,DEM products are very important for Argentine, a large country with poor infrastructure maps.</p>	
<p><u>Output</u></p> <p><The degree of achievement of the Output></p>	<p>1. System for utilizing satellite data is established.</p>	<p>1-1. How many allocation plans are there for C/Ps and Japanese Experts prepared by the Project? And as for the plan at the present?</p> <p>If there are some changes among the plans, what are the reason for changes?</p> <p>Were the C/Ps and Japanese Experts allocated according to each plan? (timing, the number)</p> <p>Are the C/Ps and Japanese Experts(including short-term experts) adequate to their post, both in quality and quantity?</p> <p>Did bad influences by the defect of the C/P and/or Experts allocation arise?</p> <p>How are the progress of the personnel allocation forecasted the future?</p> <p>1-2. How are local costs, facilities and equipment planned?</p> <p>Were there big changes in comparison with the original plan? What are the reasons?</p> <p>Were facilities, equipment and local cost arranged as planned?</p> <p>Were there no big change in the original plan? What are the reasons?</p> <p>Are local costs facilities, equipment adequate both in the quality and in quantity?</p> <p>Did bad influences by the defect of local costs facilities, equipment arise?</p> <p>How are the progress of the budget forecasted the future?</p>	<p>The allocation of Full-time C/Ps and Long-term Japanese Experts was carried out as originally planned. The allocations of the Part-time C/Ps and Short-term Japanese Experts have been planned each year based on the original plan. Therefore, there is no big alienation between the yearly plans and the original plan.</p> <p>The C/Ps and Japanese Experts allocated according to each plan both in numbers and timings.</p> <p>The proper numbers have been allocated to the Full-time C/Ps, the Long-term and Short-term Japanese Experts, and they are excellent talented people. However all full-time C/Ps require that the technology transfer by the Short-term Experts shall be made more time. Because some cases many time were taken to install the soft which the Experts brought, besides some time were used for the seminar. Therefore the time to the technology transfer was too short.</p> <p>No serious bad influences have been arisen caused by the personnel allocation.</p> <p>At present SEGEMAR studies to increase two persons, one who has knowledge of physics and mathematics for the SAR analysis, and one for the data management and chargeable image processing services.</p> <p>1-2. The local costs, facilities and equipment have been planned each year based on the original plan. Therefore, there is no big alienation between the yearly plans and the original plan.</p> <p>The Project Activities were delayed caused by the delays in deliveries (4 computers purchased in Japan). The Plan of Operations was reviewed for 2001 years because of this. Also the installation delay and imperfection (on domain etc) in internet system affect but influence to the Activities a little. Since some time in October 2001,Argentine side has been faced difficult economic condition to disburse the local cost(such as consumables, maintenance cost of equipment) and to purchase materials priced in dollars (such as software) due to the economic crisis in Argentine and the depreciation peso against dollars.</p> <p>The field works in 2002 is suffering delay from the insufficient local costs.</p> <p>SEGEMAR consider achieving the Project Purpose, the image processing service on the chargeable basis will be carried out toward the private sector. And the charge will be disbursed as a part of the local cost for the geological and thematic mappings.</p>	
<p><u>(Output)</u></p>	<p>2. Equipment and advanced satellite data are managed</p>	<p>2-1. What kind of plan was settled on about the operation and maintenance for equipment every year?</p> <p>Have the equipments been utilized and</p>	<p>2-1. The operation and maintenance for equipment have been planned each year based on the original plan.</p> <p>The operation and maintenance for equipment have been carried out sufficiently, and all equipment have been operated at high utilization.</p>	

<p>and maintained properly.</p>	<p>maintained based on the plan?</p> <ul style="list-style-type: none"> • Are the sufficient maintenance system established with maintenance division and suppliers. 2-2 • Has enough budget for operating and maintaining the equipment been allocated and disbursed? 2-3 • How much knowledge of operating and maintaining the equipment has been acquired by each C/P? 2-1, 2-2, 2-3 How are the forecasts ? 	<ul style="list-style-type: none"> • There are maintenance persons in the RS/GIS division and have sufficient system with suppliers, therefore no serious break down has occurred. 2-2 • A local cost is insufficient caused by the influence of the economic crisis in Argentine, so the situation that a Japanese side took over costs for the data and so on occurred. Therefore there is apprehension that the operation and maintenance for equipment would not be well managed. • The technology transfer on the operation and maintenance for the equipment have been carried out as planned, and C/Ps acquired the elementary knowledge which is necessary for the operation and maintenance for the equipment 2-1, 2-2, 2-3 Data have been delivered every week, and a large number of the image as well has been accumulated, and electing of the data base access to acquisition and data reference inventory management system is necessary. 	
<p>3. IGRM geologists have enough technology to utilize advanced satellite data such as ASTER and/or PALSAR on geological and thematic mapping for mineral exploration.</p>	<p>3. • Have I - IV, VII of the fields of technology transfer progressed according to the original Plan of Operations?</p> <ul style="list-style-type: none"> • Have the technology been transferred adequately? • Does each C/P utilize the technology transferred adequately? • How are the forecasts ? 	<p>3. As for the technology transfer, some activities plans were modified due to delivery delay of the equipment. Technology transfers have been progressed almost as planned.</p> <p>The progress conditions of this technology transfers are as the following :</p> <p>I This is the field on data handling and fundamental concept of earth resources satellite data. Although item 3. is not transferred, and item 2.d, 2.f are in the first stage of the technology transfer, almost item of this field as planned have been transferred to C/Ps. C/Ps have acquired the transferred skill and knowledge.</p> <p>II. This is the field on digital image processing and thematic mapping of alteration minerals and lithology. All items of the field have been transferred smoothly as scheduled. C/P acquired the transferred skill and knowledge, besides C/Ps acquired those exceed the Expert's hope with the half of the items.</p> <p>III. This is the field on Application of ASTER data to geological mapping and mineral resources exploration. The technology transfers are a little bit behind the original plan (see.2 Process Implemented 'The progress condition of the activities'). Technical transfers are in the first stage, other than the operation of spectrometer in the field C/Ps have acquired transferred skill and knowledge.</p> <p>IV. This is the field on the microwave analysis using PALSAR data. All items of this field are transferred after 2003 (as planned), and only outline explanation was given to C/Ps. SAR data are used for technology transfer, as the alternative on PALSAR data which might be available after 2005.</p> <p>One C/P who has knowledge of physics and mathematics is required for this technology transfer.</p> <p>VII. This is the field on the introduction to hyperspectral data analysis. This field are transferred after 2003 (as planned)</p> <p>It is forecasted that all "Output" shall be achieved by the Project completion.</p>	
<p>4. Usefulness of the remote sensing data is understood by the persons concerned and</p>	<p>4-1 • How many times were seminars /workshops held?</p> <ul style="list-style-type: none"> • How many people did attend the seminars and workshops? And what are their occupations and organizations? 	<p>4-1 The seminars were carried out three times, as follows:</p> <ul style="list-style-type: none"> • October 2, 2001 103 participants • April 5, 2002 95 participants • October 24-25, 2002, 99 participants <ul style="list-style-type: none"> • The participants were made to understand this Project through the seminar of 	

<p>users through seminars and workshops, and announcements to the academic societies and/or journals conducted by C/Ps.</p>	<p>• How were the response of participants?</p> <p>4-2-What kind of announcement did C/Ps do in the academic meeting, and write for magazines, and how many?</p> <p>• How were the response of participants at the academic meeting?</p> <p>• How many inquiries about the announcements and/or papers have been received from the outside?</p>	<p>three times. And the recent announcements of the ASTER data processing which C/Ps did won the big praise from the participants. There were a lot of inquiries about the acquisition, handling, and usage of the ASTER data. Thus the usefulness of the advanced satellite data have been attracted interest from the participants.</p> <p>• Workshops carried out seven times.</p> <p>4-2 The announcements done by the C/Ps were as follows</p> <ul style="list-style-type: none"> • 3 reports in the Argentine Geology Congress • 5 reports in the Latin-American Remote Sensing Symposium • 2 reports in the 29th International Symposium on Remote Sensing of Environment <p>• There were huge numbers of inquiries. About the announcement done by C/Ps in the Argentine Geology Congress in April, 2002, there were many questions taken from audiences. Also, there were inquiries about the use of the ASTER data and the purchase. It is judged that the persons concerned interested in the ASTER data, through the announcements given like these.</p> <p>And as for the announcement done by C/P in the Latina American Remote Sensing Symposium, there were inquiries from Bolivian and Brazilian.</p>	
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<p>Input</p>	<p>• The number of experts (long-term, short-term), and their expertise.</p>	<p>1. Long-term Japanese Experts 4 persons</p> <ul style="list-style-type: none"> • One Chief Adviser • One Coordinator • One for Digital Image Processing • One for Geological Remote Sensing <p>2. Short-term Japanese Experts 13 persons (FY01-8, FY02-5)</p> <ul style="list-style-type: none"> • Seven for Introductions and Applications of ASTER DATA • Two for Software Installations. • One for Installation of Data Management System. • Three for Introduction on SAR, Next Generation and other Data. 	
	<p>• The number of C/Ps, and their expertise</p>	<p>1. Fulltime C/P RS/GIS 4 Persons</p> <p>2. Part-time C/P RS/GIS 4 Persons</p> <p>DRG 20 Persons</p> <p>DRGM 8 Persons</p> <p>DGAA 8 Persons</p>	
	<p>• Equipment provided and expense.</p>	<p>Total Amount up to Nov. 30, 02 94,816,000 (¥EN)</p> <p>Major Equipment</p> <ul style="list-style-type: none"> Workstation 7,978,000 Network Printers 2 sets 10,865,000 FT-IR Spectrometer 9,519,000 Field Portable Spectroradiometer 7,481,000 	

• Local cost		Actual 2001	Actual 2002 Up to 30.Nov
	consumables	3,000	4,700
	ASTER data		
	Facilities, Equipment Maintenance	19,742	1,300
	Field Allowance	2,436	27,506
	Field Operations	1,370	8,228
	Others	12,480	11,560
	Total	39,028	53,294
	Budget	107,500	128,000
		(unit \$)	
• C/P training in Japan	Fiscal Year 2001	3 persons	
	Fiscal Year 2002	2 persons	

2. Process Implemented

	Objective Verification Indicator	Investigation result	Remarks
The progress condition of the activities.	Were activities conducted as planned?	<p>At the beginning of the Project some "Activities" were delayed by the delay of equipment. Therefore, some operation plan were modified.</p> <p>At present most of the "Activities" have been carried on as scheduled. However the technology transfer has been conducted to analyze the area which had allocated to each C/P. As the result digital image processing has been carried out as planned, while the geological interpretation has been a little behind plan. This field is reviewed near future and all "Activities" shall be caught up by the Project completion.</p>	
The implementation of project monitoring	<ul style="list-style-type: none"> • Has the structure of the monitoring prepared, and being done as planned? • Have the result of the monitoring been transmitted to the whole of the Project? • Have the result of the monitoring been reflected on the activities? <p>Were the PDM and/or the details activities modified?</p> <ul style="list-style-type: none"> • How has the Project coped with the change in the Important Assumptions? 	<ul style="list-style-type: none"> • The Monitoring are planned to execute just after the Project start, one year after the Project start and from then on twice a year. And monitoring were executed as planned <p>The skills and knowledge acquisition level of each C/P are evaluated by the Long-term Experts and by C/P oneself, and discussion of the technology transfer conditions is made with both based on the each evaluation. That results have been reflected on the activities on and after the Project period. (The substantial modification of (PDM wasn't done).</p> <ul style="list-style-type: none"> • See the items of local cost . 	
Relationship between the experts and C/Ps.	<ul style="list-style-type: none"> • Were the lines of communication between the experts and C/Ps established? • How has the Project be coping with the problem between C/Ps and the experts? • Have the result of the meetings improved the project activities? Are there concrete examples? • Do the C/Ps carryout the Project independently actively? 	<ul style="list-style-type: none"> • There is no regular meeting between Experts and C/Ps. But meetings have been held any time as occasion arises. • In regard to the formal procedure of the adjustment of opinions, first a C/P informs one's opinion to the Japanese Coordinator, second the Coordinator reports the opinion to the Chief Adviser. Then Chief Adviser arrange the opinion and transfer the Japanese side's opinion to the C/P. • According to the interview with, and questionnaires to the C/P, they well understand each other. • According to the comment of the Experts and interviews with the C/Ps, C/P 	

		carryout the Project independently and actively.	
Were beneficiaries interested in the Project?	<ul style="list-style-type: none"> • Do the IGRM staff members understand the contents of the technology transfer, and do they cooperate the Project positively? • Do the SEGEMA staff members join the seminars and/or workshops under the auspices of the Project positively? 	<ul style="list-style-type: none"> • The SEGEMAR geologists other than the C/Ps show a keen interest in the ASTER data, and they ask the Project to process the images they need. There are too many requests to support. 	
Ownership of implementing Agency of the project, Argentines side.	<ul style="list-style-type: none"> • Has the executive of the Implementing Agency participate in the Project activities aggressively? • Have the disbursements of the budget carried out securely? • Has the Implement Agency allocated C/Ps as planned, and paid attention in such the way to prevent the hindrance for the project management? 	<ul style="list-style-type: none"> • The executive of the Implementing Agency has lead the major Project activities, and has participated the activities aggressively. • In the condition of the financial difficulty, the Argentine side Project executives have been trying to distribute the cost to the Project highest priority. However insufficiency of the local costs still can't be dissolved. The serious problem does not occurred on the arrangement of C/P till now. But, all of the members of C/P are contract employees, and that term of contract is short (six months). The improvement of the employment of the C/P is difficult because the President's approval is necessary for this contract, though SEGEMAR makes effort for the improvement. 	

EP.

3. Five Evaluation Items

3-1 Relevance

(Consistency with the needs of the recipient country.) Does it have relevance as assistant activities of Japan?

	Objective Verification Indicator	Investigation Result	Remarks
Does the Overall Goal agree in the development policy on the Argentine side?	<ul style="list-style-type: none"> •Is there any change in the government strategy which makes mining the key industries of the country? •Has the policy (in such cases as the deregulation) that promotes mining investment been evolved? 	<p>The new administration started with President Eduardo Duhalde from January, 2002 started. Though a new policy is being enforced for the economic crisis conquest, mining is taken seriously because of the economic recovery, and there is no change with the policy that mining investment is promoted.</p> <ul style="list-style-type: none"> •Previous problem that the province-run mining companies hold large area of mineral potential area, and did not release the area toward the mine investors is hardly found. 	
Can we expect the ripple effect on any people except for the target group?	<ul style="list-style-type: none"> •Do the related groups, especially mining industries, show keen interest in this Project? •Do the government offices other than SEGEAR show keen interest in this Project? 	<ul style="list-style-type: none"> •There are inquiries related to the ASTER data from the related group through the announcement in the academic meeting which C/P made and the thesis of the technical magazine which C/P contributed to, and there are inquiries from the mining companies (RIO TINTO Chile and an Argentine Geological consultant ordered the images to the Project) into the data, too. It shows that the interest of the mining company in this Project increase. •Institute of Climate and Agriculture, National Commission of Atomic Energy, and Universities show keen interest in this Project. 	
Does the Project Purpose agree in the needs on the Argentine side?	<ul style="list-style-type: none"> Have the aspirations of the mining industries to explore and/or to develop the mineral resources been raised? •Does geological information become abundant? 	<ul style="list-style-type: none"> •At present, development of a mine of the world tends to stagnate by sluggish metal market. Though there were about 80 development projects at its peak, there is only about 10 projects in the at present. But, development of mining is resumed if the international metal price rises, so that potentiality of mineral resources is high in Argentina. According to the Argentine-Chilean Mining Integration Treaty coming into effect 2000, the mineral deposits straddle the border are allowed to develop efficiently. Then a gold mine project in the San-Juan area finalized the feasibility study and is about to be developed. •There are a few areas where a geological maps and a thematic maps are being made (geological maps 1:250,000 103 sheets, 1:100,000 39 sheet, metallogenic map about 20 sheets, 700,000km² of airborne geotysics and 400,000km² of multi element geochemistry coverage) in Argentina. Therefore, if those are made, the amount of information of the geology becomes abundant. This project can contribute to the increase in efficiency of the mapping work and the add the amount of geological information. 	
Does it have relevance as assistant activities of Japan?		<p>Japan has so far continued cooperative exploration for mineral development in the Andean mountainous areas in Argentina as a Project of JICA-MMAJ JAPAN thus well versed in the local geology of Argentina. As a country ready to offer technical cooperation with its latest remote sensing technology and information about metal resources, Japan can meet the requirements of the recipient country.</p>	

3-2. Effectiveness

Can we get expected effect by the execution of the Project? Can we say that the Project is effective?

	Objective Verification Indicator	Investigation Result	Remarks
Is IGRM able to utilize advanced satellite data such as ASTER and/or PALSAR in order to make geological maps and thematic maps for mineral exploration?	<ul style="list-style-type: none"> - Is the Project Purpose achieved as planned? *Will the Project Purpose be achieved as planned by the completion of the Project? *Have the ASTER data been able to add new information to the geologic map and the thematic maps? 	<ul style="list-style-type: none"> *It is judged that technically the Project Purpose will be able to be almost achieved as planned by the Project completion. *The geological maps and thematic maps have not been prepared yet, from the comparison of the image and the result of the geological survey, not only C/P in the RS/GIS division but also almost the geologist geological survey in charge feel certain that the ASTER data will add new information to the maps. *Yes.(see the "Project Purpose) 	
	<ul style="list-style-type: none"> Have the quality of the maps and/or efficiency of the mapping improved? Have the C/P acquired new knowledge and technology? 	<ul style="list-style-type: none"> *The C/Ps have been acquiring the technology and the knowledge as planned. The SEGEMAR executives admire the C/Ps for acquiring the so many technologies in short period. 	
	<ul style="list-style-type: none"> *Is the Project supported continuously by the federal government, provincial government and users? (Is there any change with the external condition?) 	<ul style="list-style-type: none"> *Support on the fund side from the federal government has been getting difficult, caused by the influence of the economic crisis in Argentine and an outlook isn't bright. 	
	<ul style="list-style-type: none"> *Are the IGRM staff members in charge of mapping and C/Ps satisfied with the result of this project? 	<ul style="list-style-type: none"> *The mapping people in charge deepen the recognition of the usefulness of the ASTER data through seminars, mini-seminars and the joint field survey. 	

JA.

3-3. Efficiency

Was the Project efficient?

	Objective Verification Indicator	Investigation Result	Result	
Is the Output, which corresponded with the Input of resources, attained?	<ul style="list-style-type: none"> • Have the Output been achieved as planned? • Will the Output be achieved as planned by the completion of the Project? 	<ul style="list-style-type: none"> • At present the Output have been achieving as planned. • It is judged that the Output will be able to be almost achieved as planned by the Project completion. 		
	<ul style="list-style-type: none"> • Can all the C/Ps and the Japanese Experts concentrate on the Project, during the time given to them? • Do the C/P, Japanese Experts have the skill suitable for the technology transfer? • Have the provided facilities and equipment been operating at high availabilities? • Are provided facilities and equipment suitable for the planned activities? • Is the provided budget suitable for the planned activities? • Is there big alienation between the original plan and the recent (or forecasted) input plan from the viewpoint of allocation? 	<ul style="list-style-type: none"> • Although Almost C/P are contract employees, almost all of them hope to be engaged the present jobs continuously. No one has been fired at the RS/GIS division in the past about 10 years. • The Experts and C/Ps have the skill suitable for the technology transfer in both numbers and qualities. • All provided equipment are suitable for the planned activities, therefore being used, also operating at high availabilities. • The Project is in the conditions that the provision of the satisfactory local cost is difficult cause by influence of the economic crisis. 		
	<ul style="list-style-type: none"> • Was the timing of the personnel allocation appropriate for the plan? • Was the timing of the installation of facilities and equipment appropriate for the plan? • Was the timing of disbursement appropriate for the plan? • Is there big alienation between the original plan and the recent (or forecasted) input plan, from the viewpoint of timing? 	<ul style="list-style-type: none"> • The timing of the personnel allocation have been appropriate for the plan. • At the time of the project start the arrival of the personal computers purchased in Japan was delayed, and the installation of the Internet system was delayed. The timing of other equipment input was provided almost as planned. • The Project faces the difficulty of the timing of the local costs disbursement by the economic crisis. It faces the difficulty of the injection of the management expenses by the economic crisis. 		
	<ul style="list-style-type: none"> • Have the Inputs been made close studies of both utilities and cost, before the purchase? 	<ul style="list-style-type: none"> • Before the purchase of the main equipment, the comparisons of the same type products had been executed from the function and the price side, then the most suitable equipment were selected. 		
	<ul style="list-style-type: none"> • Was there any unexpected Important assumption which exerted a remarkable influence on the Input? 	<ul style="list-style-type: none"> It was the unexpected Important assumption that couldn't be predicted at the time of the Project start that a governmental fund burden to the Project became difficult by the economic crisis in Argentina. 		

3-4. Impact

Is there indirect or ripple effect by the project execution?

	Objective Verification Indicator	Investigation Result	Remarks
<p>Have the possibility to achieve the Overall Goal ("Geological maps for mineral exploration using advanced satellite data are prepared by IGRM.") risen?</p> <p>Are there other ripple effects?</p>	<p>•Have the expectation of the existence of Argentine mineral resources by the mining industries been rising?</p> <p>Have the released geological maps and thematic maps been increasing?</p>	<p>It is the first stage of the geologic mapping and thematic mapping of the area where high potentiality of the mineral resources are expected. However mining industries have been expecting the preparation of the geological maps and thematic maps.</p>	
	<p>•Have the research and the development of equipment for advanced satellite data been increased in Argentina?</p>	<p>•Many organizations in argentine are interested in the ASTER data through the Project activities. The university professors who are the authorities of remote sensing of the Argentine show a keen interest in the Project, so that it can find a rising tide of the research on the advanced satellite data in Argentine.</p>	
	<p>Have the plans utilize advanced satellite data been promoted in other government offices?</p>	<p>Although the other government offices have interest in the ASTER data, but at present, but they do not reach the stage that they decide to use the ASTER data or to corporate each other.</p>	
	<p>Has the consciousness of SEGEMAR and /or IGRM staff changed?</p>	<p>At the beginning SEGEMAR staff did not know the Project. However, as the Project activities proceed and the Project yielded practical result, they highly evaluated the not only the Experts and C/Ps but also the staffs of the RS/GIS division.</p>	
	<p>How much has the overall goal achieved?</p>	<p>(see Overall Goal)</p>	
	<p>Are there unexpected positive and/or influence those are not written in the PDM?</p>	<p>No.</p>	

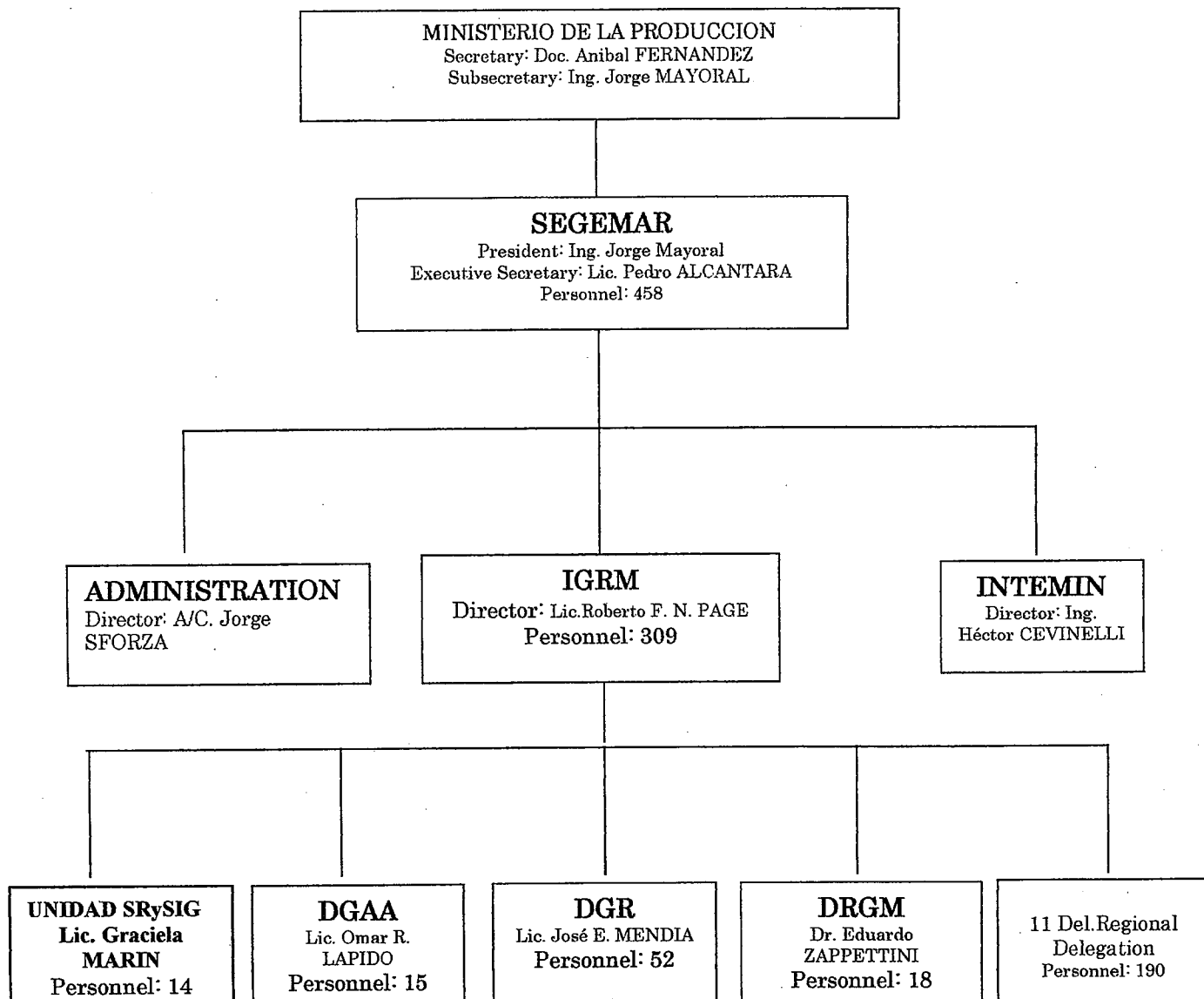
3-5. Sustainability

Does the effect last after cooperation is finished ?

	Objective Verification Indicator	Investigation Result	Remarks
Government support for organization and systems (forecast).	<ul style="list-style-type: none"> • Is there any change in the government strategy which makes mining the key industries of the country? • Does the factor that is expected a strategy change exit ? 	<p>The new administration started with President Eduardo Duhalde from January, 2002 started. Though a new policy is being enforced for the economic crisis conquest, mining is taken seriously because of the economic recovery, and there is no change with the policy that mining investment is promoted.</p>	
The support of the related organization and/or industries.	<ul style="list-style-type: none"> • Will the project be supported continuously by federal and provincial government, and users? • Is the connection with other government offices examined? • Is the connection with the neighboring countries possible? 	<ul style="list-style-type: none"> • Support on the fund side from the federal government has been getting difficult, caused by the influence of the economic crisis in Argentina. And the same situation has continued at present, however the recent economic situation is changing toward the improvement. The support from the federal government to this Project confirms • Not yet. • Not yet. 	
The existence of the organization ability of the Implementing Agency.	<ul style="list-style-type: none"> • Do the executives of the Implementing Agency participate in the Project activities aggressively? And will the aggressive attitude be kept? • Is the arrangement of C/Ps proper to carry out activities smoothly? How will it be in the future? • How much is the turnover rate in Argentina and in IGRM? • Is the budget which is appropriate for carrying out the Project activities smoothly secured? • Will the Agency or the Government continue financial support after the completion of the Project ? • Does Agency examine the method which creates fund and leads the Project to achieve the Overall Goal? • Is a result of a monitoring reflected on the project by the Agency? 	<ul style="list-style-type: none"> • The executive of the Implementing Agency has lead the major Project activities, and has participated the activities aggressively. • The necessary number of people is reviewed in accordance with the management plan of the advanced satellite data after 2005, by the project completion. • • The budget which the concrete methods of fund acquisition are included is developed by the project completion. • The results of the monitoring are reflected on the Project activities through discussions between C/P and the Expert and/or the Joint Coordinate Committee. 	
The fixity of the technology, and the structure of fixing.	<ul style="list-style-type: none"> • Does IGMR consider how to take root the knowledge and technology transferred ? • Does IGRM examine the structure which popularizes the technology transferred? • Will the materials and equipment be attentive? • Is the structure of the replacement and/or expansion of facilities and equipment examined? 	<ul style="list-style-type: none"> • The fulltime and part-time C/Ps are allocated continuously in the IGRM after the completion of the Project. • The structures which popularized the technology transfer are developed after 2005, by the project completion. • From the view point of the maintenance cost, a sense of unease is felt. • The structures of the replacement and/or the expansion of facilities and equipment are developed after 2005, by the project completion. 	

Consideration to the society	Is there any social inconvenience caused by insufficient consideration to inhabitant in vicinity of potential mining area or mine workers?	• In this investigation no social inconvenience caused by insufficient consideration did not found.	
Others	(The factor that obstruct the Sustainability, which becomes clear in the investigation process.)		

ORGANIZATION



SEGEMAR – Servicio Geológico Minero Argentino (Argentine Geological and Mining Survey)

IGRM – Instituto de Geología y Recursos Minerales (Geology and Mineral Resources Institute)

INTEMIN – Instituto de Tecnología Minera (Mining Technology Institute)

DGAA – Dirección de Geología Ambiental y Aplicada (Environmental and Applied Geology Direction)

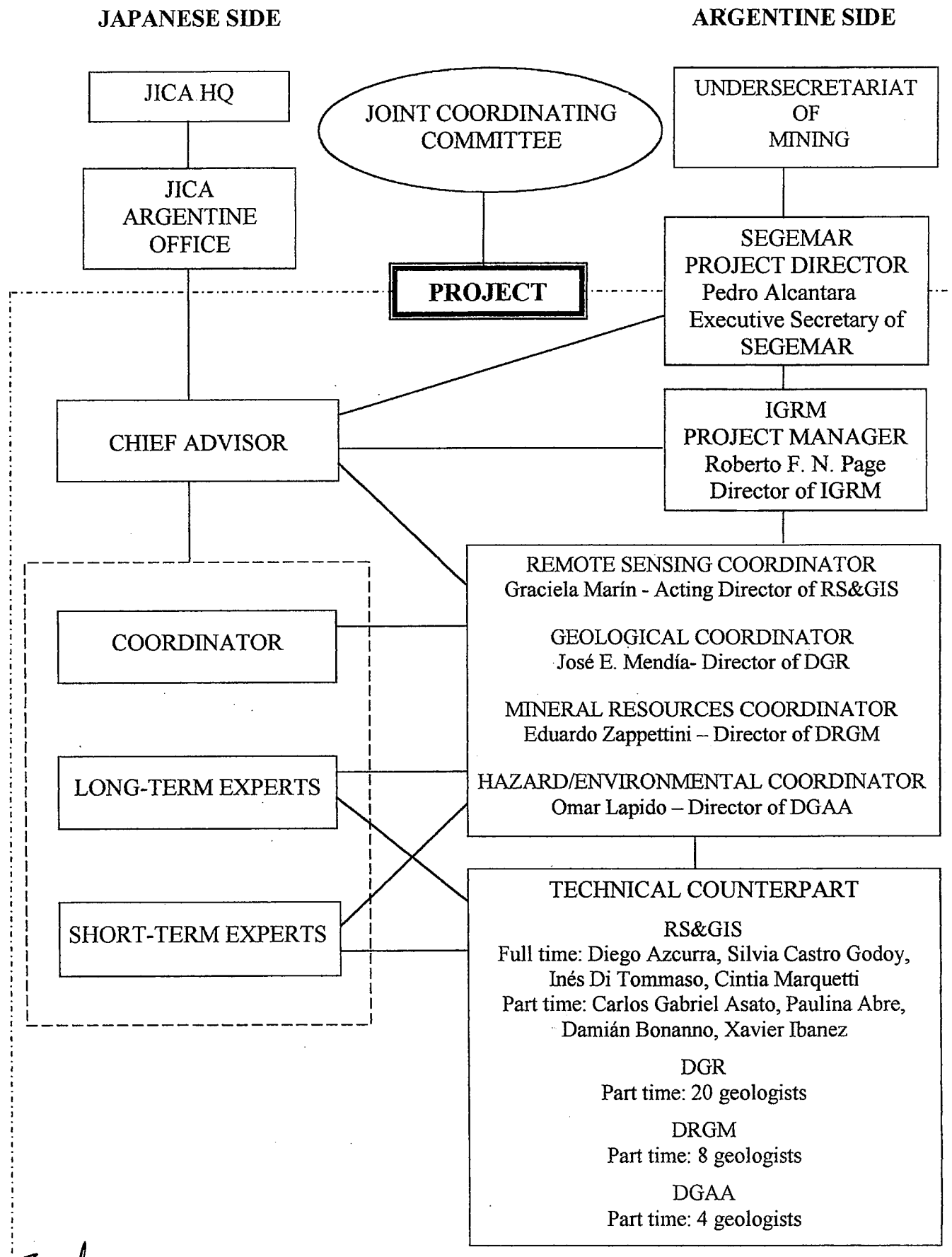
DGR – Dirección de Geología Regional (Regional Geology Direction)

DRGM – Dirección de Recursos Geológico-Mineros (Geological and Mining Resources Direction)

UNIDAD SRySIG – Unidad Sensores Remotos y Sistemas de Información Geológica (Remote Sensing and Geographic Information System Division)

Regional Delegations

ORGANIZATION CHART OF THE PROJECT



ZH

List of full-time and part-time counterpart

1. Coordinators

Name	Position
Graciela Marín	Acting Director of the RS&GIS Division
Jose E. Mendia	Director of Regional Geology Direction (DGR)
Eduardo Zappettini	Director of Geological and Mining Resources Direction (DRGM)
Omar R. Lapido	Director of Environmental and Applied Geology Direction (DGAA)

2. RS and GIS Division Staff

	Present Activity
Carlos Gabriel Asato - Geologist, specialized in RS and GIS (1991).	Corporate GIS administrator, GIS and integration data projects developer.

RS Project Staff – Full Time

Inés Di Tommaso – Geologist (1979) and GIS operator (1996).	RS processing.
Silvia Castro Godoy – Geologist (1993) and GIS operator (1996).	RS processing.
Diego Azcurra – Geologist (2000) specialized in RS (1997).	RS processing.
Cintia Marquetti – Geologist 2000).	RS processing.

RS Project Staff – Part Time

Xavier Ruiz Ibanez Computer Analyst (2002).	RS&GIS network administrator
Gustavo Mercado Computer Analyst	PC Support
Paulina Abre specialized in RS and GIS.	RS processing.
Damian Bonnano – Technician (1998) in RS (1999).	RS processing.

GIS Staff

Silvia Chavez – Geologist (2000) and GIS operator (1996).	GIS digitizer.
Norberto Gabriel Candaosa - Math-Topographic Technician (1997) and GIS operator (1997).	GIS digitizer.
María Liliana Gambandé Alvarez – Geographer (1994) and GIS operator (1998).	GIS digitizer.
Ana Felisa Tavitian Serrano - Math-Topographic Technician (1994) and GIS operator (1996).	GIS digitizer.
María Isabel Olmos – Geographer (1990) and GIS operator.	GIS digitizer.

3. Part-time counterpart from other sections

Sections	No of staff
Regional Geology Direction (DGR)	20 geologists
Geological and Mining Resources Direction (DRGM)	8 geologists
Environmental and Applied Geology Direction (DGAA)	4 geologists

List of Long-term Experts

Name	Position	Duration
Katsumi Yokokawa	Chief Advisor	2000/3/2~2003/3/1
Koji Yamaguchi	Coordinator	2000/3/2~2003/3/1
Manabu Kaku	Digital Image Processing	2000/3/2~2003/3/1
Itoshi Kohno	Geological Remote Sensing	2000/3/2~2003/3/1

List of Short-term Experts

Name	Activity	Duration
Hiroshi Hyodo	Installation of Data Management Systems	2001/7/30~8/13
Seiichi Hara	ASTER DEM Processor Library	2001/7/30~8/13
Ryo Nakajima	ASTER Level 3A Processor	2001/7/30~8/13
Yoshiki Ninomiya	Status of next generation sensors	2001/8/19~8/31
Hiroyuki Fujisada	ASTER sensor specification, Level-1 Data Processing	2001/9/22~10/6
Yasushi Yamaguchi	ASTER sensor specification/geological application	2001/9/23~10/6
Hiroji Tsu	ASTER SWIR Cross talk Correction	2002/3/31~4/15
Akira Iwasaki	Status of next generation sensors	2002/3/31~4/15
Hidehisa Watanabe	Installation and instruction of discrimination software	2002/7/13~8/17
Hideyuki Tonooka	The installation and guidance of T/Eseparation algorithm	2002/8/3~8/17
Tsuneo Matsunaga	TIR application	2002/10/19~11/3
Isao Sato	The status of PALSAR development and the introduction of InSAR technology	2002/10/19~11/3

List of Training of C/P in Japan

Name	Name of Training Course	Term
1. JOSE E. MENDIA	Utilization of Remote Sensing	2001/5/20~2001/6/2
2. GRACIELA MARIN	Utilization of Remote Sensing	2001/5/20~2001/6/7
3. INES M. DI TOMMASO	Remote Sensing Technology	2001/5/8~2001/7/22
4. ANTONIO LIZUAIN	Utilization of Remote Sensing	2002/5/19~2002/6/1
5. SILVIA CASTRO	Utilization of Remote Sensing	2002/5/19~2002/7/27
6. ALEJANDRA COLUCCIA	Remote Sensing Technology	2002/5/7~2002/7/15



LIST OF EQUIPMENT

YEARS	NAME OF EQUIPMENT		DAY OF ORDER	DAY OF STOCK	DAY OF OPERATION
2001	Work Station (SUN Ultra 80 Model 4450 with SUN StorEdge A1000,SUN Pci)	1	2001/01/22	2001/04/18	2001/04/26
"	Network Printer (Xerox SC55)	1	2001/02/01	2001/02/19	2001/02/27
"	Network Color Printer (Xerox Docucolor 12)	1	2001/02/01	2001/02/19	2001/02/27
"	InkJet Color Plotter (Hewlett Packard Desing Jet 5000ps 60inch(6096A)	1	2001/01/22	2001/01/30	2001/02/19
"	ERDAS Imagine 8.4 OrthoRadar,StereoSAR,IFSAR	1	2001/01/23	2001/03/14	2001/06/25
"	FT-IR Portable Spectrometer (Designs&Prototypes 102)	1	2001/01/31	2001/06/14	2001/06/18
"	Field Portable Spectroradiometer (GER3700)	1	2001/01/31	2001/05/01	2001/05/14

2001	Network Server(Sun Enterprise 220R.)	1	2001/01/22	2001/04/18	2001/04/26
"	Note PC (IBM Thinkpad T20-2547 47X+10/100 Base-TX LAN	2	2001/01/25	2001/01/31	2001/03/13
2002	Note PC (Sony PCG-SRX7)	2	2002/02/27	2002/02/28	2002/03/01
"	Mobile Accessories(Memory Stick, memory Writer,Battery pack,Battery charger,case)	2	2002/02/27	2002/02/28	2002/03/01
"	Project (EPSON-ELP810)	1	2002/02/27	2002/02/28	2002/03/01
"	Hard Disc (MAXTOR)	4	2002/02/27	2002/02/28	2002/03/02
2001	ENVI/IDL for Windows	4	2001/01/22	2001/03/01	2001/06/27
"	Noesis for Windows	4	2001/01/22	2001/03/01	2001/06/27
"	ERDAS Imagine 8.4 professional for Windows	2	2001/01/23	2001/03/14	2001/06/27
"	ERDAS Imagine 8.4 Vector	1	2001/01/23	2001/03/14	2001/06/27

YEAR	NAME OF EQUIPMENT	CANT.	DAY OF ORDER	DAY OF STOCK	DAY OF OPERATION
"	ERDAS Imagine 8.4 Virtual GIS	1	2001/01/23	2001/03/14	2001/06/27
"	ERDAS Imagine 8.4 OrthoBASE	1	2001/01/23	2001/03/14	2001/06/27
"	ERDAS Imagine 8.4 ATCOR2	1	2001/01/23	2001/03/14	2001/06/27
"	PCI InSAR Interferometric SAR	2	2001/01/22	2001/05/08	2001/05/10
"	PCI Advanced Precision Processor(APP)	2	2001/01/22	2001/02/01	2001/05/10
"	ArcView Ver.3.2	2	2001/01/23	2001/05/08	2001/06/26
"	ArcView Image Analyst	2	2001/01/23	2001/05/08	2001/06/26
"	ArcView Spatial Analyst	2	2001/01/23	2001/05/08	2001/06/26
"	Lahey Fortran/C Compiler	1	2001/02/19	2001/03/01	2001/06/29
"	Sun Forte C++ Personal Edition	1	2001/01/22	2001/03/22	2001/6/26
"	Sun Forte Fortran Desktop Edition	1	2001/01/22	2001/03/22	2001/06/26
2002	Satellite Image Navigation	1	2002/02/26	2002/02/27	2002/03/04
"	ENVI 3.5	2	2002/02/26	2002/02/27	2002/03/02
"	LANDSAT 5 TM, 7 TM	3	2002/03/08	2002/03/14	2002/03/15
2001	GPS (Geoploter 3 (Timble))	4	2001/01/31	2001/02/02	2002/03/16
"	Note PC (IBM Thinkpad T20-2547 4TX+10/100 Base-TX LAN Adapter)	2	2001/01/31	2001/06/14	2002/03/13
"	Desktop (DELL OptiPlexGX150)	1	2000/02/28	2001/03/27	2002/04/03
"	Desktop (Kayak XU800)	1	2000/02/28	2001/03/27	2002/04/03

"	Desktop (DELL Dimension8100)	2	2000/02/28	2001/03/27	2002/04/03
"	Digital Camera (NIKON COOLPIX990)	2	2000/02/28	2001/03/27	2002/04/20
2002	Scanner (EPSON Expression 1640 XL)	1	2002/04/18	2002/03/27	2002/03/29
YEAR	NAME OF EQUIPMENT	CANT.	DAY OF ORDER	DAY OF STOCK	DAY OF OPERATION
2001	Desktop (HP Visualize P-Class)	4	2001/05/11	2001/06/14	2001/06/18
"	ASTER SOFTWARE GMDMS (ERSDAC GMDMS)	1	2001/06/22	2001/08/10	2001/08/14
"	ASTER SOFTWARE DEM (ERSDAC ASTER DEM)	1	2001/06/22	2001/08/10	2001/08/13
"	ASTER SOFTWARE LEVEL 3 (ERSDAC LEVEL 3)	1	2001/06/22	2001/08/10	2001/08/14
"	ASTER SOFTWARE GCP LIBRARY (ERSDAC GCP LIBRARY)	1	2001/06/22	2001/08/10	2001/08/13
2002	DATA (ASTER LEVE L1A, 1B, 2A02, 2A03 2B03, 2B04, 2B05)	3	2001	2002/04/12	2002/04/16
"	DATA(JERS-1/SAR Level 0, Level 2.1)	3	2002	2002/08/15	2002/08/23
"	Software ATCOTT	1	2002	2002/10/19	2002/10/24
"	Software Modtran	1	2002	2002/08/03	2002/08/24
"	Software D-IFP	1	2002	2002/08/03	2002/08/10

Cost of Operation(Japanese Side)2000

Equipment	\$US	630.00
Commodity	\$US	500.00
Traffic expense	\$US	200.00
Domestic travel expense	\$US	590.00
Interpreter	\$US	300.00
Conference	\$US	100.00
Others	\$US	750.00
	\$US	3,070.00

Cost of Operation(Japanese Side)2001

Research fee	\$US	15,000.00
Equipment	\$US	3,710.00
Commodity	\$US	4,800.00
Traffic expense	\$US	1,200.00
Domestic travel expense	\$US	21,120.00
Communication and Transportation	\$US	5,280.00
Printing fee	\$US	6,400.00
Interpreter	\$US	2,400.00
Conference	\$US	480.00
Others	\$US	2,000.00
	\$US	62,390.00

Cost of Operation(Japanese Side)2002

Research fee	\$US	4,800.00
Equipment	\$US	2,510.00
Commodity	\$US	3,840.00
Traffic expense	\$US	600.00
Domestic travel expense	\$US	15,820.00
Communication and Transportation	\$US	1,680.00
Printing fee	\$US	955.00
Interpreter	\$US	7,056.00
Conference	\$US	340.00
Car rental fee	\$US	1,200.00
Overseas Travel expense	\$US	6,924.00
Others	\$US	1,250.00
	\$US	46,975.00

REMOTE SENSING AREA

Quantity	Description
2	PENTIUM COMPUTER DELL OptiPlex Pentium II 64 Mb RAM, 4 Gb SCSI HD Image Processing Platform PCI, ER-Mapper 5.2
1	KAYAK COMPUTER XM600 7/800 Pentium III 800 Mhz 256 Mb RAM, 9 Gb SCSI HD Image Processing Platform ERDAS Imagine 8.4 (NT)

GIS AREA**1. Digitizing and Edition Component**

Quantity	Description
1	PENTIUM COMPUTER ACER 5200 Pentium 200 64 Mb 2Gb SCSI HD Windows NT 4 p3. ArcView 3.1. Microstation. X Windows Server Digitizer platform with Arc-Info EWS and Microstation. Attached scanning system (A0 Scanner connected)
2	PENTIUM COMPUTER DELL OptiPlex Pentium 200 32 Mb RAM, 1Gb SCSI HD Digitizing platform with Arc/Info NT
1	PENTIUM COMPUTER DELL OptiPlex Pentium 200 32 Mb RAM, 1Gb SCSI HD X Windows Digitizing platform width LINUX RED HAT 6.1
1	COMPAQ COMPUTER DESK PRO EP Pentium III 650 Mhz 256 Mb RAM 18 Gb SCSI HD X Windows Digitizing platform width LINUX RED HAT 6.1
3	DIGITIZER TABLE SUMAGRAPHS IV

2. Server System

Quantity	Description
1	SUN Sparcstation 20, 128 Mb RAM, 8Mb HD MAIN ARC/INFO Application and Development System. Arc/Info Map Production Server. Arc/Info Digitizing Server. 3 Arc/Info Licenses Internal HTTP Server GIS Data Server

1	SUN Enterprise 250, 400 Mb RAM, 18Mb HD MAIN ARC/INFO Application and Development System. Arc/Info Map Production Server. Arc/Info Digitizing Server. 3 Arc/Info Licenses Internal HTTP Server GIS Data Server
1	ACER ALTOS 9000 COMPUTER Pentium PRO 256 Mb RAM, LINUX RED HAT OS 6.1, 4 Gb SCSI HD. MAIN FILE SERVER
1	PLOTTER A0 HP 755CM 74 Mb RAM Postscript printer Network supported

3. Others

Quantity	Description
1	COMPUTADORA PENTIUM DELL OptiPlex Pentium 200 64 Mb RAM, 1Gb SCSI HD Development and Data Administration platform with Arc/Info EWS, X Windows emulator, Arc/View 3.2.
1	PENTIUM COMPUTER DELL OptiPlex Pentium 200, 32 Mb, 1Gb SCSI HD. Administrative Computer. Windows NT 4 p3. Arc-View 3.1 (Graciela Marin computer)

Shareable Equipment

Quantity	Description
1	PLOTTER A0 HP 755CM 74 Mb RAM Postscript printer Network supported
1	LASER PRINTER HP 5M 8 Mb RAM Postscript printer Network supported
1	A0 SCSI Scanner B/W 800 dpi max.
1	PENTIUM COMPUTER ACER ALTOS 300 Pentium 200, 32 Mb, 1Gb SCSI HD. LINUX RED HAT 6.1 OS UNIX Application Development Server FGDC Metadata Server Internal HTTP Server

1	Five 2x CDROM SCSI Tower, with HP 4x CD ROM recorder
1	HEXABYTE 870 LT (under UNIX)
When necessity arises	Equipment for Workshops and Seminars (copy machine, LCD projector etc.)

FOR FIELD SURVEY

When necessity arises	Vehicles
When necessity arises	Equipments for field survey (rock hammer, portable-GPS etc.)

Z
MP.

SEGEMAR Costs for GEOSAT-AR Project - 2001

<i>Item-Description</i>	<i>Date</i>	<i>Cost</i>
Furniture	1-Mar	7000,00
Customs duty and services for equipments	28-May-01	2003,20
Customs duty and services for equipments	2001/5/31	1784,60
Customs duty and services for equipments	2001/4/18	1723,11
Customs duty and services for 45 software	2001/3/28	1526,12
Customs duty and services for Spectroradiometer GER	2001/5/31	1655,20
Customs duty and services for Spectroradiometer F-TIR	2001/6/14	1470,26
Infraestructure reparation	2001	2500,00
ENVI Course (Cintia & Silvia)	4 to 6-Jul-01	360,00
ASTER Seminar - Coffee & lunch	2-Oct-01	800,00
Fax (Panasonic Model KX-FP88 AG)	Ago-01	280,00
Federal Express (ASTER data delivery)	2001	80,00
Allowances (Cintia & Diego) - Farallón Negro-Andalgalá	5-Oct-01	1260,00
Transportation (air tickets Cintia & Diego)	5-Oct-01	678,22
Allowances (Inés & Silvia) - Sierra Aguilar	27-Oct-01	1176
Transportation (air tickets Inés & Silvia) - Sierra Aguilar	27-Oct-01	692,26
Lunch after Ceremony for GEOSAT Equipment Presentation	18-Dec-01	1040,00
Consumables	2001	3000,00
Internet installation & annual costs	2001	10000,00
	TOTAL= \$	39028.97

SEGEMAR Costs for GEOSAT-AR Project - 2002

Item-Description	Date	Cost
Federal Express (ASTER data delivery)	21 Feb-02 & others	500,00
Allowances (Cintia, Diego, Inés & Silvia) - Salta Workshop	18 to 23 Feb-02	1575,00
Transportation (air tickets) - Salta Workshop	18 to 23 Feb-02	1032,60
Allowances (Osvaldo González) - Salta Workshop	18 to 23 Feb-02	462,00
Operative costs - Salta Workshop	18 to 23 Feb-02	42,00
II ASTER Seminar, (coffee)	5-Apr-02	180,00
Transportation & Allowances (Candiani) - II Seminar	5-6 Apr-02	348,00
Customs duty	5-Apr-02	800,00
Allowances (DiTommaso,Marquetti,Castro,Azurra) Arg.Geol.Cong. El Calafate	25-Apr-02	504,00
Transportations x 4 - Arg.Geol.Cong. El Calafate	25-Apr-02	953,02
Inscription - Arg.Geol.Cong. El Calafate	25-Apr-02	1000,00
Allowances (Marquetti) - Andalgalá & Farallón Negro	17-Jun-02	1428,00
Transportation (air tickets Marquetti) - Andalgalá & Farallón Negro	17-Jun-02	323,15
Allowances & Costs (Becchio & Seggiaro) - Andalgalá	17-Jun-02	840,00
Allowances (Diego Azcurra) - Farallón Negro	27-Jun-02	561,41
Transportation (air tickets Diego Azcurra) -Farallón Negro	27-Jun-02	267,70
Allowances (Osvaldo González) - Farallón Negro	27-Jun-02	786,91
Costs (Osvaldo González) -Farallón Negro	27-Jun-02	548,91
Allowances (Marquetti,Marín,Azurra,Candiani,Miró,Marcos)-San Juan Works	23-Sep-02	2520,00
Transportation (Zubia) - Workshop Buenos Aires	9-Oct-02	136,35
Allowances (Zubia) Workshop Buenos Aires	9-Oct-02	252,00
Transportation (Giacosa) - Workshop Buenos Aires	9-Oct-02	136,35
Allowances (Giacossa) - Workshop Buenos Aires	9-Oct-02	315,00
Transportation (Dalponte) - Workshop Buenos Aires	9-Oct-02	120,00
Allowances (Dalponte) - Workshop Buenos Aires	9-Oct-02	336,00
III ASTER Seminar (coffee)	24-25 Oct-02	380,00
Allowances & Costs Abre, Di Tommaso, González - Los Menucos	18-Nov-02	3029,00
Transportation Abre & Di Tommaso - Los Menucos	18-Nov-02	361,57
Allowances Busteros - Los Menucos	18-Nov-02	1596,00
Allowances Lema - Los Menucos	18-Nov-02	1596,00
Costs- Los Menucos	18-Nov-02	670,00
Allowances Dalponte - Los Menucos	18-Nov-02	924,00
Allowances Giacossa - Los Menucos	18-Nov-02	1092,00
Costs- Los Menucos	18-Nov-02	1240,00
Allowances Azcurra, Castro Godo& - Sierra Famatina	27-Nov-02	3048,00
Transportations Azcurra & Castro - Sierra Famatina	27-Nov-02	182,20
Allowances Candiani - Sierra Famatina	27-Nov-02	504,00
Costs - Sierra Famatina	27-Nov-02	23,00
Allowances (Carrizo) - Sierra Famatina	27-Nov-02	672,00
Allowances (driver) - Sierra Famatina	27-Nov-02	504,00
Costs - Sierra Famatina	27-Nov-02	300,00
Allowances (Cintia Marquetti) - Malimán	5-Dec-02	840,00
Transportations (air tickets Cintia Marquetti) - Malimán	5-Dec-02	322,01
Allowances (Cardó) - Malimán	5-Dec-02	1008,00
Allowances (Díaz) - Malimán	5-Dec-02	1008,00
Allowances (Ayala) - Malimán	5-Dec-02	756,00
Costs - Malimán	5-Dec-02	1770,00
Consumables	2002	4700,00
Internet Annual costs	2002	10800,00
	TOTAL+C23 \$	53294,18

The project of Technology Transfer from 2001 to 2002

ANNEX-11

OUTPUT	ACTIVITY	Calendar Year TARGET	2001												in charge		REMARKS	
			2001				2002				Japan	Argentina						
			JFY 2000	I	II	III	IV	I	II	III			IV					
A1. System for utilizing satellite data is established.	1-1 Allocate staff as planned														CA	P/M		
	1-2 Make the plan of operations		■	■	■	■	■	■	■	■	■	■	■	■	■	CA	P/M	
	1-3 Make the budgetary plans															CA	P/M	
	1-4 Make and implement the monitoring and evaluation plan															CA	P/M	
	1-5 Operate the joint coordinating committee															CA	P/M	
A2. Equipment and satellite data are managed and maintained properly.	2-1 Make and implement equipment operation and maintenance plan														Expert both	RS/GIS DRG		
	2-2 Establish and operate data management systems														Expert Image P.	RS/GIS		
	2-3 Procure and install necessary equipment														Expert both	RS/GIS DGR		
	2-4 Allocate budget for operation and maintenance of the equipment		■	■	■	■	■	■	■	■	■	■	■	■	■	CA	RS/GIS DGR	
	2-5 Teach C/Ps how to operate and maintain of the equipment															Expert both	RS/GIS DGR	
A3. IGRM geologists have enough technology to utilize advanced satellite data such as ASTER and/or PALSAR on geological and thematic mapping for mineral exploration.	3-1 Training for hard ware and soft ware		■	■	■	■	■	■	■	■	■	■	■	■	Expert Image P.	RS/GIS		
	3-2 Introduce interpretation examples by using ASTER simulation data		■	■	■	■	■	■	■	■	■	■	■	■	Expert Geology	RS/GIS DGR,DGR M		
	3-3 Teach C/Ps how to process ASTER data														Expert Image P.	RS/GIS		
	3-4 Teach C/Ps how to utilize ASTER DEM														Expert Geology	RS/GIS DGR		
	3-5 Teach C/Ps how to make alteration mineral maps and lithologic maps by silica content														Expert Geology	RS/GIS DGR,DGR M		
	3-6 Teach C/Ps how to conduct field survey for alteration mineral mapping and lithologic mapping by silica content														Expert Geology	DGR DGRM		
	3-7 Teach C/Ps how to perform integrated geological interpretation by ASTER data														Expert Geology	IGRM		
	3-8 Teach C/Ps how to analyze PALSAR data														Short T. Expert	RS/GIS		
	3-9 Teach C/Ps how to analyze Hyperspectral data														Short T. Expert	RS/GIS		
A4. Usefulness of the remote sensing technology is understood by the persons concerned and users through seminars and workshops.	4-1 Hold seminars and workshops														CA	P/M		
B.3 IGRM geologists understand how to utilize advanced satellite data such as ASTER and/or PALSAR in environmental or hazardous area study.	1. Teach C/Ps how to conduct environmental analysis by ASTER and/or PALSAR data														Short T. Expert	RS/GIS DGAA		
	2. Teach C/Ps how to conduct hazardous area analysis using ASTER and/or PALSAR														Short T. Expert	RS/GIS DGAA		
	3. Teach C/Ps how to conduct field survey to verify the results of environmental and hazardous area analysis														Short T. Expert	DGAA		

NOTE: The Japanese fiscal year starts in April and ends in March.

List of Report of C/P

ANNEX-11

Name	Title	Organization	Day
Castro Godoy Di. Tommaso	Datos ASTER en el Mapeo Geologico y la Evaluacion del potencial Minero en la region Centro de Jujuy, Argentina	X V Congreso Geologico Argentino	2002.4.24
Di. Tommaso	Mapeo Geologico e Identificacion de Areas Mineralizadas, en el Distrito Minero Los menucos, Rio Negro, Utilizado Datos ASTER	X V Congreso Geologico Argentino	2002.4.24
Marquetti Azcurra	Utilizacion de Datos ASTER para la Investigacion y Analisis de las Zonas de alteracion hidrotermal en el Distrito Minero Farallon Negro, Catamarca, Argentina	X V Congreso Geologico Argentino	2002.4.24
Marin	Datos ASTER en la cartografia geologica de Argentina	IX Simposio Latinoamericano de Percepcion Remote	2002.11.12
Asato	Integracion Dinamica y Digital de Cartas para la Produccion de Mapas de Grandes Regiones	IX Simposio Latinoamericano de Percepcion Remote	2002.11.12
Marquetti y Azcurra	Registro y Analisis de Datos ASTER en el Distrito Minero Parallon Negro, Catamarca, Argentina	IX Simposio Latinoamericano de Percepcion Remote	2002.11.14
Castro Godoy	Utilizacion de Datos ASTER para el Mapeo Geologico y la Evaluacion del Potencial Minero de la Sierra de Aguilar, Jujuy, Argentina	IX Simposio Latinoamericano de Percepcion Remote	2002.11.12
Di. Tommaso	Mapeo Geologico e Identificacion de Areas Mineralizadas, en el Distrito Minero Los menucos, Rio Negro, Argentina, con la Utilizacion de Datos ASTER	IX Simposio Latinoamericano de Percepcion Remote	2002.11.12

Project Design Matrix (PDM)

ANNEX 12

Project Name: Regional Geological Mapping with Advanced Satellite Data in the Argentine Republic
Duration of the Project : From March 1, 2001 to February 28, 2005
Prepared by : Both sides after discussion based on the draft of the Japanese side

Implementing Agency :
 -Argentine Geological and Mining Survey (SEGEMAR)
 -Japan International Cooperation Agency (JICA)

Target Area : The whole country of the Argentine Republic
Target Group: Geologists who are engaged in thematic mapping with remote sensing in SEGEMAR

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
(Super Goal A) Geological maps and thematic maps prepared by IGRM are utilized by mining investors in Argentine.			
(Overall Goal A) Geological maps and thematic maps for mineral exploration using advanced satellite data are prepared by IGRM.	1. The area covered by the geological maps and thematic maps is expanded. 2. The types of the thematic map increase. 3. Users (other government organizations and private companies) are able to access the thematic maps easily.	1. Number of the geological maps and thematic maps made 2. Types of the thematic map made 3. Questionnaires to the users	a. Prices of metals do not decrease drastically. b. Administrative measures necessary for promoting mining investments (e.g. improvement of the mining rights management system) are carried out.
(Project Purpose A) IGRM is able to utilize advanced satellite data such as ASTER and/or PALSAR in order to make geological maps and thematic maps for mineral exploration.	1. 8 sheets of 1:100,000 geological maps and 2 sheets of metallogenic maps are made using ASTER and/or PALSAR data. 2. Quality of geological maps and thematic maps are improved by using ASTER and/or PALSAR data. 3. Efficiency of geological mapping and thematic mapping are increased by using ASTER and/or PALSAR data.	1. Number of geological maps and thematic maps made 2-1. Evaluation by Japanese experts 2-2. Evaluation by Evaluation Committee 2-3. Questionnaires to geologists of DGR and DRGM 3-1. Evaluation by Japanese experts 3-2. Evaluation by Evaluation Committee 3-3. Questionnaires to geologists of DGR and DRGM	a. Personnel and budget are allocated to continue operations for thematic mapping after the Project ends. b. System for distributing the thematic maps is established.
(Output A) 1. System for utilizing satellite data is established. 2. Equipment and advanced satellite data are managed and maintained properly. 3. IGRM geologists have enough technology to utilize advanced satellite data such as ASTER and/or PALSAR on geological and thematic mapping for mineral exploration. 4. Usefulness of the remote sensing data is understood by the persons concerned and users through seminars and workshops.	1-1. Enough C/Ps of adequate qualification are allocated. 1-2. Enough budget is allocated and disbursed properly. 2-1. Operation and maintenance plan for equipment and satellite data is made and implemented. 2-2. Enough budget for operating and maintaining the equipment and the satellite data is allocated and disbursed. 2-3. Enough knowledge on operating and maintaining the equipment is acquired by the C/Ps. 3. I~IV, VII of the fields of technology transfer are acquired by the C/Ps concerned. 4-1. Many persons concerned and users participate in the seminars and workshops. 4-2. Usefulness of remote sensing data is understood by the participants in the seminars and workshops.	1. Records and plans of inputs 2-1. Operation and maintenance plan for equipment 2-2. Budget plan and record of disbursement for operating and maintaining the equipment 2-3. Monitoring sheet for technology transfer 3. Monitoring sheet for technology transfer 4-1. Number of participants in the seminars and workshops 4-2. Questionnaires to the participants in the seminars and workshops	a. C/Ps continue to work at IGRM.
(Activities) 1-1 Allocate staff as planned 1-2 Make the plan of operations 1-3 Make the budgetary plans 1-4 Make and implement the monitoring and evaluation plan 1-5 Operate the joint coordinating committee 2-1 Make and implement equipment operation and maintenance plan 2-2 Establish and operate data management systems 2-3 Procure and install necessary equipment 2-4 Allocate budget for operation and maintenance of the equipment 2-5 Teach C/Ps how to operate and maintain the equipment 3-1. Training for hardware and software 3-2. Introduce interpretation examples by using ASTER simulation data 3-3. Teach C/Ps how to process ASTER data 3-4. Teach C/Ps how to use DEM data 3-5. Teach C/Ps how to make alteration mineral maps and lithological maps 3-6. Teach C/Ps how to conduct field surveys for alteration minerals mapping and lithological mapping 3-7. Teach C/Ps how to perform integrated geological interpretation using ASTER data 3-8. Teach C/Ps how to analyze PALSAR data 3-9. Teach C/Ps how to analyze hyperspectral data 4-1 Hold seminars and workshops	Inputs		
	Japanese side	Argentine side	
	a. Dispatch of Experts (Long-term) -Chief advisor -Coordinator -Digital image processing -Geological remote sensing (Short-term) -Installation of DEM software -Introduction of ASTER -Installation of data management system -PALSAR data analysis -Hyperspectral analysis	a. Buildings and Facilities b. Allocation of C/P c. Preparation of Equipment d. Local Costs	
	b. Training of C/P in Japan		
	c. Provision of Equipment -RS data processing system -Field survey equipment -ASTER data		
			Pre-conditions

Project Design Matrix (PDM)

ANNEX 12

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
(Overall Goal B) Thematic maps for environmental conservation and hazard prevention are prepared by IGRM.	<ol style="list-style-type: none"> 1. The area covered by the thematic maps is expanded. 2. The types of the thematic map increases. 3. Users (other government organizations) are able to access the thematic maps easily. 	<ol style="list-style-type: none"> 1. Number of the thematic maps made 2. Types of thematic map made 3. Questionnaires to the users 	
(Project Purpose B) IGRM understands how to utilize advanced satellite data such as ASTER and/or PALSAR in environmental or hazardous area study.	<ol style="list-style-type: none"> 1. V and VI of the fields of technology transfer are acquired by the C/Ps concerned. 	<ol style="list-style-type: none"> 1. Monitoring sheet for technology transfer 	<ol style="list-style-type: none"> a. C/Ps acquire the method of thematic mapping with field verification. b. Personnel and budget are allocated to continue operations for thematic mapping after the Project ends. c. System for distributing the thematic maps is established.
(Output B) <ol style="list-style-type: none"> 1. System for utilizing satellite data is established. 2. Equipment and advanced satellite data are managed and maintained properly. 3. IGRM geologists understand how to utilize advanced satellite data such as ASTER and/or PALSAR in environmental or hazardous area study. 	<ol style="list-style-type: none"> 1. (Same as Output A) 2. (Same as Output A) 3. (Same as Project Purpose B) 	/	/
(Activities) 3-1. Teach C/Ps how to conduct environmental analysis by ASTER and/or PALSAR data 3-2. Teach C/Ps how to conduct hazardous area detection and analysis by ASTER and/or PALSAR data 3-3. Teach C/Ps how to conduct field survey to verify the results of environmental and hazardous area analysis	Inputs		Pre-conditions
	Japanese side a. Dispatch of Experts (Long-term) -Chief advisor -Coordinator -Digital image processing -Geological remote sensing (Short-term) -Environmental analysis -Hazardous area analysis c. Training of C/P in Japan d. Provision of Equipment -RS data processing system -Field survey equipment -ASTER data	Argentine side a. Buildings and Facilities b. Allocation of C/P c. Preparation of Equipment d. Local Costs	

Plan of Operations for the residual period

ANNEX-13

OUTPUT	ACTIVITY	Calendar Year		2003				2004				in charge		REMARKS
		TARGET	JFY	2003				2004				Japan	Argentina	
				I	II	III	IV	I	II	III	IV			
A1. System for utilizing satellite data is established.	1-1 Allocate staff as planned			████████████████████				████████████████████				CA	P/M	
	1-2 Make the plan of operations			- - - - -				- - - - -				CA	P/M	
	1-3 Make the budgetary plans			████████		████████			████████			CA	P/M	
	1-4 Make and implement the monitoring and evaluation plan				████████		████████			████████		CA	P/M	
	1-5 Operate the joint coordinating committee											CA	P/M	
A2. Equipment and satellite data are managed and maintained properly.	2-1 Make and implement equipment operation and maintenance plan			████████████████████				████████████████████				Expert both	RS/GIS DRG	
	2-2 Establish and operate data management systems			████████████████████				████████████████████				Expert Image P.	RS/GIS	
	2-3 Procure and install necessary equipment			████████████████████				████████████████████				Expert both	RS/GIS DGR	
	2-4 Allocate budget for operation and maintenance of the equipment			- - - - -				- - - - -				CA	RS/GIS DGR	
	2-5 Teach C/Ps how to operate and maintain of the equipment			████████████████████				████████████████████				Expert both	RS/GIS DGR	
A3. IGRM geologists have enough technology to utilize advanced satellite data such as ASTER and/or PALSAR on geological and thematic mapping for mineral exploration.	3-1 Training for hard ware and soft ware			████████████████████				████████████████████				Expert Image P.	RS/GIS	
	3-2 Introduce interpretation examples by using ASTER simulation data			████████████████████				████████████████████				Expert Geology	RS/GIS DGR DGR M	
	3-3 Teach C/Ps how to process ASTER data			- - - - -				- - - - -				Expert Image P.	RS/GIS	
	3-4 Teach C/Ps how to utilize ASTER DEM			████████████████████				████████████████████				Expert Geology	RS/GIS DGR	
	3-5 Teach C/Ps how to make alteration mineral maps and lithologic maps by silica content			████████████████████				████████████████████				Expert Geology	RS/GIS DGR DGR M	
	3-6 Teach C/Ps how to conduct field survey for alteration mineral mapping and lithologic mapping by silica content			████████████████████				████████████████████				Expert Geology	DGR DGR M	
	3-7 Teach C/Ps how to perform integrated geological interpretation by ASTER data			████████████████████				████████████████████				Expert Geology	IGRM	
	3-8 Teach C/Ps how to analyze PALSAR data			████████████████████				████████████████████				Short T. Expert	RS/GIS	
	3-9 Teach C/Ps how to analyze Hyperspectral data			████████████████████				████████████████████				Short T. Expert	RS/GIS	
A4. Usefulness of the remote sensing technology is understood by the persons concerned and users through seminars and workshops.	4-1 Hold seminars and workshops			- - - - -				- - - - -				CA	P/M	
B.3 IGRM geologists understand how to utilize advanced satellite data such as ASTER and/or PALSAR in environmental or hazardous area study.	1. Teach C/Ps how to conduct environmental analysis by ASTER and/or PALSAR data				████████							Short T. Expert	RS/GIS DGAA	
	2. Teach C/Ps how to conduct hazardous area analysis using ASTER and/or PALSAR				████████							Short T. Expert	RS/GIS DGAA	
	3. Teach C/Ps how to conduct field survey to verify the results of environmental and hazardous area analysis				████████							Short T. Expert	DGAA	

NOTE: The Japanese fiscal year starts in April and ends in March.

List of Attendance at the Meetings

Argentine Side

(1) Undersecretariat of Energy and Mining

Mr. Jorge Mayoral	Undersecretary of Mining and President of SEGEMAR
SEGEMAR	
Dr. Pedro Alcantara	Executive Secretary (Secretario Ejecutivo)
Dr. Roberto N.F. Page	Director of Geology and Mineral Resources Institute (Instituto de Geología y Recursos Minerales : IGRM)
Dr. Graciela Marín	Acting Director of Remote Sensing and GIS Division Unidad de Sensores Remotos y Sistema de Información Geografica), IGRM
Dr. José E. Mendía	Director of Regional Geology Direction (Dirección de Geología Regional : DGR), IGRM
Dr. Antonio Lizuain	Coordinator of Regional Geology Direction (Dirección de Geología Regional : DGR), IGRM
Dr. Eduardo Zappettini	Director of Geological and Mining Resources Direction (Dirección de Recursos Geológico Mineros : DGRM), IGRM
Dr. Omar R. Lapidó	Director of Environmental and Applied Geology Direction (Dirección de Geología Ambiental y Aplicada : DGAA), IGRM
Dr. Carlos Gabriel Asato	Staff of Remote Sensing and GIS Division, IGRM

(2) Ministry of Foreign Affairs

Mr. Martin Rivolta	Director of Bilateral Cooperation
Ms. Andrea De Fornasari	Staff of Bilateral Cooperation

Japanese side

(1) Implementation Study Team

Mr. Toshio Okazaki	Leader
	Special Adviser, Mining and Industrial Development Cooperation Department, JICA
Dr. Hirokazu Kato	Technical Transfer Planning Director, Institute of Geoscience, Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology
Mr. Kenichi Kumagaya	Consultant
Ms. Akiko Ozawa	Remote Sensing Technology Geologist, International Cooperation Division, Japan Mining Engineering Center for International Cooperation
Ms. Yuriko Doi	Project Management Staff, Second Technical Cooperation Division, Mining and Industrial Development Cooperation Department, JICA

(2) JICA Argentine Office

Mr. Masao Takai	Resident Representative
Mr. Seiji Kato	Deputy Resident Representative
Mr. Juan Carlos Yamamoto	Staff

(3) Experts

Mr. Katsumi Yokokawa	Leader
Mr. Koji Yamaguchi	Coordinator
Mr. Itoshi Kono	Geological Remote Sensing
Mr. Manabu Kaku	Digital Image Processing

