

***COMISION NACIONAL
DE ACTIVIDADES
ESPACIALES***

**DIRECT CONTRACT
(Speciality) 31/2017**

**Configuration change for GPS Antenna for
SAOCOM Project**

Receipt of Bid: Up to: May 02nd 2017, 11 AM

**SUPPLY UNIT
751, Paseo Colon Ave. 3rd floor - Capital Federal
Ph: 54-11-4331-0074 ext. 5725
(polivera@conae.gov.ar)**



Direct Contract (Exclusive) N° 31/2017

Receipt of Bid:

Up to: May 02nd 2017, 11 AM

This Provisions and Conditions Form is composed of:

1. PARTICULAR PROVISIONS AND CONDITIONS FORM (includes the Technical Specifications of the line to be quoted)Page 3
2. ANNEX I – PARTICULAR CLAUSES CONCOMITANTS LOAN CONTRACT No. 1777/OC-ARPage 13
3. ANNEX I. QUOTE FORMPage 14
4. ANNEX II. TECHNICAL SPECIFICATIONSPage 15



Comisión Nacional de Actividades Espaciales

PARTICULAR PROVISIONS AND CONDITIONS FORM

Name of Contracting Agency	Comisión Nacional de Actividades Espaciales (CONAE), independent agency acting within the scope of the MINISTRY OF SCIENCE, TECHNOLOGY AND PRODUCTIVE INNOVATION
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SELECTING PROCEDURE

Type: DIRECT CONTRACT BY EXCLUSIVITY	N° 31	Fiscal year: 2017
Class: NO CLASS		
Method: NO METHOD		
File N°: 122/17 BID		
Commercial category: Professional and Commercial services		
Contract subject: Configuration change for GPS Antenna for SAOCOM Project		

SUBMISSION OF BID

Venue/Address	Opening Time and Date
<i>Unidad de Abastecimiento</i> CONAE 751, Paseo Colon Ave. 3rd Floor, C.A.B.A. Ph: 011 4331-0074 u_abaste@conae.gov.ar	The bid shall be sent by email or regular mail up to May 02 nd 2017, 11 AM. In case of sending the bid by regular mail, the envelope must be identified with the information about the selecting procedure and the name of the bidder.



TECHNICAL SPECIFICATIONS

Line	QTY	Unit of measurement	Description
1	1	Unit	Changing the GPS antenna configuration of the SAOCOM Project SEE TECHNICAL ANNEX III – SAO-CDH-SW-0002-A

SPECIAL BIDDING TERMS AND CONDITIONS

GLOSSARY

CONAE: NATIONAL AGENCY FOR SPATIAL ACTIVITIES. Contracting Agency.

BIDDER: It is the natural or legal person offering the bid in this procurement.

AWARDEE: It is the natural or legal person awardee of the procurement, through administrative act by competent authority.

COCONTRACTING PARTY: It is the natural or legal person that has been notified about the purchase order.

SUPPLY UNIT: It is the CONAE's Supply Unit. Operative Unit of Procurements of said Commission.

SECTION 1 – RULING FRAMEWORK. PRIORITY RULES

1.1. Every aspect that has not been set forth in this tender form shall be governed by and interpreted in accordance with the rules established by the Loan Agreement N° 1777/OC-AR, the National Administration Contract Regulations (Decree N° 1023/01), the National Administration Contract Regulations (Decree N° 1030/16), and the Provision N° 63-E/2016.

In case doubts or discrepancies stemmed from the aforesaid provisions, the following set of priority rules should be observed:

- (a) Loan Agreement N° 1777/OC-AR
- (b) Decree N° 1023/2001, and the modifications and complementary.
- (c) The provisions of the regulations approved by Decree No. 1030/16
- (d) Rules established as a result of the aforementioned decree
- (e) The procedure manual of the Procurement Regime of the National Administration issued by the NATIONAL OFFICE OF CONTRACTS or the rules issued by said National Office as the governing body
- (f) The general bidding terms and conditions
- (g) The particular bidding terms and conditions
- (h) The supplier proposal
- (i) Samples
- (j) Tender
- (k) Purchase order.

SECTION 2- ABOUT THE BIDDER



Comisión Nacional de Actividades Espaciales

- 2.1. The bidder shall be entitled to trade the goods to be procured, according to the laws in-force of the country where he is residing.
- 2.2. He shall submit true copy of the application form at the tax entity of the country of origin or equivalent proof.
- 2.3. The foreign bidder and awardee shall be excepted form the obligation of registration in the System of supplier's information.

SECTION 3- ABOUT THE QUESTIONS

- 3.1. Questions related to this procurement shall be made through email to: magarcia@conae.gov.ar
- 3.2. Questions can be asked up to TWENTY FOUR (24) hours before the fixed date for the receipt of the bid as minimum.
- 3.3. Telephone consulting shall not be accepted, and those made after deadline shall not be answered.
- 3.4. CONAE shall be able to elaborate clarifying communications to the Special Bidding Terms and Conditions, ex officio or as a reply to questions, up to TWO (2) days before the fixed date for the receipt of the bid as minimum, as per the established in the section 50 of the Decree Law N° 1030/16.

SECTION 4 - CONTENTS OF THE BID

4.1. The bid shall be composed of a clear technical description of the goods and/or services offered which shall meet the requisites set forth in section 13 of the General Bidding Terms and Conditions.

If the bidder does not submit the quote in Spanish, CONAE will translate it into Spanish and this new document shall be considered as the official translation of the quote.

In the event of any differences or disputes concerning the terms and conditions of this Tender or related to the interpretation or the execution of the signed contract, the Spanish version translated by CONAE shall prevail.

4.2. The foreign bidder shall submit the power of attorney of the bid signer, the bylaws of the company and the articles of incorporation duly certified by Notary Public and authorized by the Argentinean Consulate in the country of origin or the corresponding proceeding as per the in force international treaties; among them, the Hague Convention of 1961 about the removal of the requisite about legalization of foreign public documents. The documentation mentioned in this clause shall be demanded only upon the first submission of the bidder on a tender or procurement process initiated by CONAE. Subsequently, it shall only be necessary to attach the corresponding modifications or updates, if any.

4.3. The bidder acting as authorized agent in the country or as distributor of goods to be imported, shall make such condition clear in its bid. People representing the bidder shall submit the documents (minutes of the meetings where the Board of Directors has been appointed, minutes of the Board of Directors with distribution of positions, mandates, powers of attorney) evidencing their faculties to oblige the bidder, celebrate every act and



sign the necessary documents even the selection, unless said information is duly updated in the SYSTEM OF INFORMATION ABOUT SUPPLIERS (SIPRO).

Certifications and Legalizations: Every photocopied document shall be certified by Notary Public and where the demanded documentation has been submitted as a simple photocopy, this Commission shall be able to request the original documents for further collation.

SECTION 5 - TERM OF BID VALIDITY

5.1. Bidder shall maintain the bid, as a minimum, for the term of SIXTY (60) running days as of the date of bid submittal.

5.2. The term of bid validity shall be extended automatically for a period equal to the initial term and so on, with the exception that the bidder expressly states his intention of not renewing the term of the validity with at least TEN (10) running days in advance on the expiration date of each term. In this case, it shall be without execution of the bid bond.

5.3. If the offeror manifests his will not to keep his offer without complying with the deadlines committed in the proposal, it will be equivalent to exclude him from the procedure, executing the guarantee of maintenance of the offer, and notifying the non-compliance to the NATIONAL OFFICE OF CONTRACTS.

SECTION 6 - ALTERNATIVE BID

6.1 Apart from the base bids, bidders shall be able to submit alternative bids.

Decree N° 1030/2016. ARTICLE 56.- "...An alternative bid is that which fulfilling all technical specifications of the foreseen benefits in the tender form and particular conditions, provides different technical solutions thus there may exist different prices for the same product or service..."

6.2 CONAE shall be able to choose any of the two or more submitted bids, since every one of them competes with the ones submitted by the other bidders.

SECTION 7 - VARIANT BID

7.1 Apart from the base bid, bidders shall be able to submit variant bids only where these bidding terms and conditions expressly accept those in the technical specifications.

Decree N° 1030/2016. ARTICLE 57.- "...A variable bid is that which modifying technical specifications of the foreseen benefits in the tender form and particular conditions, provides a solution with an improvement which could not be possible if it had to be strictly fulfilled..."

7.2 The jurisdiction or contracting entity shall only compare the base bid of the different bidders and shall only consider the variant bid of the bidder holding the most convenient base bid.

SECTION 8 - SAMPLES

Where the submission of samples is required in the technical specifications, the term to accompany those shall be the date and hour fixed for the reception of the bid.



SECTION 9 - QUOTE

The financial bid shall be submitted within the QUOTATION FORM (ANNEX I) that is part of these bidding terms and conditions.

It shall include a real unit price, in numbers, with reference to the measurement unit established in this section.

9.1 The quotes for national products shall be made in PESOS. The value added tax (VAT) shall be included and must detail the percentage of the tax rate applied.

9.2 The quotes for foreign products, nationalized by the bidder, shall be made in PESOS or AMERICAN DOLLARS. The value added tax (VAT) shall be included and must detail the percentage of the tax rate applied.

9.3 The quotes for the products to be imported and which shall be nationalized by the contracting entity, shall be made in the currency of the country of the product, under FOB, EXW or CIF (INCOTERMS UPC-600 of the CCI), indistinctly. For CIF offers, the FOB value, the freight and insurance shall be broken down, in order to be compared with the offers made under FOB condition. For EXW offers, CONAE shall request its freight forwarder a quotation, in order to enable said comparison.

Bidders acting as authorized representatives in the country or the distributors of goods to be imported, shall make such condition clear in their bid and what is set forth in clause 15.3 of this bidding terms and conditions shall apply.

THE QUOTED PRICE SHALL BE THE FINAL PRICE THAT THE AGENCY SHOULD PAY IN ALL RESPECTS.

SECTION 10 – OFFER VALIDITY WARRANTY

10.1. The offeror must submit together with his offer a guarantee of maintenance of an offer equivalent to FIVE PERCENT (5%) of the total value of the offer, constituted in one of the forms established in Article 39 of the General Terms and Conditions. In case of being quoted with discounts, alternatives or variants, the guarantee will be calculated on the highest amount proposed.

10.2. It will not be necessary to present a guarantee of maintenance of the offer, in the cases expressly mentioned in article 40 of the General Terms and Conditions.

SECTION 11 - PLACE OF DELIVERY OF GOODS

11.1. For the bids of national products or nationalized ones by the bidder, delivery must be done in: CONAE – 751 Paseo Colon Avenue, 3rd floor (Zip Code 1063), Ciudad Autónoma de Buenos Aires, Buenos Aires, Argentina.

11.2. For bids made EXW, delivery shall be made at factory, delivery of FOB bids shall be made in port or airport of origin and CIF bids shall be delivered in Destination Port or Airport.

SECTION 12 - DEADLINE FOR DELIVERY OF GOODS.

12.1- Bid shall indicate the shortest Delivery Term as possible, expressed in consecutive days. A term no longer than 5 (five) consecutive days, starting from the first consecutive day after receipt of the corresponding Purchase Order, will be considered as Immediate.



12.2- The Delivery Term will start THREE (3) consecutive days after the communication of availability of the Purchase Order or after withdrawing it from the Supply Unit, whichever comes first.

12.3. For acquisitions performed in Ex Works, FOB or CIF condition, the Delivery Term will start from the opening of the corresponding documentary credit or wire transfer reception.

12.4. According to the provisions of article 102, section c), paragraph 1 of the regulations approved by Decree Number 1030/16, the bidder arising as awardee and not fulfilling with stated delivery terms in the bid would be subject to fine of ZERO POINT ZERO FIVE PERCENT (0.05%) of the value that has been met out of term for each working day of delay.

SECTION 13° - REQUISITES FOR GOODS BOUGHT ABROAD BY CONAE

13.1. Previous to the shipping of goods in their country of origin:

- CONAE must confirm the Commercial Invoice of the items to be shipped: such shall be evaluated according with the pro-form invoice sent.
- Packing list in Spanish or in English, with details of supply, weight and measure of bulks. Brochures and Technical Specifications of the supply shall be required whenever it may be necessary. Likewise, at request of the Customs Agent named by CONAE, all the necessary certificates required by Argentine Customs shall have to be presented under seller's responsibility such as: material, brand, origin, etc.
- Pictures of bulks, pictures of the goods inside the boxes if possible.
- In cases which the Technical Specifications require processes and quality certificates, registry of exemption, as applicable technical condition, its fulfillment shall be necessary and inexcusable condition for shipping and later reception in agreement of the supply.
- In cases indicated by the Technical Specifications: refrigeration at Customs. Chamber temperature, during the whole journey and by any means of transport.
- Load delivery special requisites.
- In case of dangerous load, presentation of DATA SHEET shall be compulsory at the moment of delivery of the goods.
- Special requisites for the handling of goods during delivery and storage.
- In case of failing to duly present the documentation in agreement with CONAE, dispatch shall not be authorised, being the Bidder responsible for any delay or lack of fulfillment in the terms.

13.2. The Supplier should wait for the instructions given by CONAE to proceed to the effective deliver of the supply to the designed forwarder. Delivering the cargo without CONAE authorization will mean a breach of contract and the Supplier should reimburse the damages caused, from the moment of the delivery to the designed agent. In the same way, the Supplier should reimburse CONAE, if the former decides, without counting on the instructions of the Organism, to load the Supply through third party agents, airlines or shipping companies.



13.3. Elements sent to be consumed in Argentine Republic (Definitive Import), and/or elements which should be re-export from this country (Temporary Import), should be pack in separate packages, a Commercial Invoice should be prepared for each type of destination: definitive or temporary, and separate boardings should be made (one for the Definitive Import and other for the Temporary Import).

13.4. The Supplier will pack Goods so that they do not damage in transit to the final destination indicated in the Purchase Order. The packaging should be suitable to resist, with no limitations, rough and careless handling in transit and exposure to extreme temperatures, salt and rains in transit or during storage in open places. The size and weight of the packaging will be taken into account depending on the distance of the final destination of Goods and the lack of loading and unloading heavy equipment in all the stops until the final destination.

The wood destined to the manufacture of boxes or other elements used in the stowage of cargo of International commerce, should be subject to the International Standards for Phytosanitary Measures 15 (ISPMs) established guidelines of the Food and Agriculture Organization of the United Nations.

13.5. CONAE will supervise the fulfillment of the technical specifications for certain packages or means of transport, authorizing or rejecting the delivery in the forwarder assigned for this purpose.

ARTICLE 14° - TERM OF GOODS AND/OR SERVICES FINAL ACCEPTANCE

14.1. For technical or logistics reasons, CONAE could accept the reception of goods in a term of no more than THIRTY (30) calendar days starting from the first working day following the delivery of the good or service.

14.2. If it is necessary, CONAE will carry out inspections, so as to verify if the specifications agree with those in the contract. The inspections and tests specified in the Technical Specifications, and the place where will they be carried out, will be required by CONAE .

14.3. The inspections and tests could be carried out in the Supplier facilities, where the delivery takes place and/or in the final destination of the Goods and/or Services, in agreement to the Technical Specifications. When they were carried out in the Supplier locations, all the reasonable assistance will be offered free of charge to the representatives of CONAE, even for the plans and data about production.

14.4. In the case of civil works, installation works or any other performance that entails a period of established tests, either by performance of the service, by hidden defects, or any other condition that warrants a time of maturity of the acquired or Contracted, the reception will have conditional nature attentive to the deadlines set for each case in the Specific Terms and Conditions without altering the formation of the guarantee in the terms or forms that are established for each case.

ARTICLE 15 - INVOICING

15.1. Invoices should be sent once the acceptance of final reception of the goods and/or services subject of the agreement.



Acceptance of final reception will be given within a THIRTY (30) days term starting from the reception of goods or services subject of the agreement, pursuant to article 44 of the Tender Form and General Conditions.

15.2. They should be submitted at Av. Paseo Colón 751, Reception desk, Autonomous City of Buenos Aires, from 10 am to 4 pm. Electronic invoices could be sent at the following e-mail address: mesadeentradas@conae.gov.ar.

15.3. Suppliers should detail in their invoices: Purchase Order Number, line, item and any other necessary information for the correct identification and individualization of such expenditure.

15.4. Since CONAE is a withholding agent both of the Value Added Tax and of the Income Tax, if awarding companies are excluded from such withholding they should also submit the invoice documents confirming that situation, or on the contrary CONAE will duly perform corresponding withholdings for those concepts.

ARTICLE 16 - PAYMENT FORM AND CURRENCY

16.1. On the assumption that awarding falls on a bid stated in Argentine PESOS (\$), payment to the awardee will be performed in that currency and through wire transfer within 30 working days from the invoice reception (previous agreement of final acceptance), according to National General Treasury rules.

16.2. If awarding falls on a nationalized bid stated in Foreign Currency, payment to the awardee will be performed in Argentine Pesos and through wire transfer within 30 working days from invoice reception (previous agreement of final acceptance), according to National General Treasury rules and the selling exchange rate of BANK OF THE ARGENTINE NATION in force at the moment of the corresponding bank accreditation.

BANK ACCOUNT INFORMATION. For the purposes of receiving the payment for the delivered goods and services given they should inform their bank account number in national currency, current or savings account, which should be opened in one of the banks joint to the system, authorized to work as paying agent, named below:

1. BANK OF GALICIA AND BS. AS. Inc.
2. BANK OF ARGENTINE NATION
3. BANK OF BS. AS. PROVINCE
4. BBVA FRANCES BANK Inc.
5. BANK OF BS. AS. CITY
6. PATAGONIA BANK Inc.
7. SAN JUAN BANK Inc.
8. SANTANDER RIO BANK Inc.
9. HSBC ARGENTINA BANK Inc.
10. CREDICOOP LIMITED COOPERATIVE BANK
11. MACRO BANK Inc.
12. CHACO NEW BANK Inc.
13. SANTA FE NEW BANK Inc.
14. SUPERVIELLE BANK Inc.
15. HIPOTECARIO BANK Inc.
16. CITI BANK N.A.



17. SECURITIES BANK Inc.
18. TIERRA DEL FUEGO PROVINCE BANK
19. TUCUMÁN BANK Inc.
20. ENTRE RÍOS NEW BANK Inc.
21. CHUBUT BANK Inc.
22. NEUQUÉN PROVINCE BANK Inc.
23. ITAÚ ARGENTINA BANK Inc.
24. INDUSTRIAL AND COMMERCIAL BANK OF CHINA (ICBC)
25. FORMOSA BANK Inc.
26. CÓRDOBA BANK Inc.

Since Treasury payments are performed through wire transfer informed by the supplier, this requirement should be fulfilled to receive payments as a creditor.

Beneficiary registration. Within the term fixed for that purpose, following forms duly completed should be submitted:

- ANNEX I to Joint Resolution account N° 12/06 of the NATIONAL GENERAL ACCOUNTING AND 5/06 of NATIONAL GENERAL TREASURY – PAYMENTS BENEFICIARIES. REGISTRATION/ MODIFICATION / REACTIVATION APPLICATION – Should be completed and accompanied by Beneficiary CIF record.
- ANNEX to Joint Resolution account N° 37/08 of NATIONAL GENERAL ACCOUNTING and 8/2008 of the NATIONAL GENERAL TREASURY – AUTHORIZATION OF NATIONAL TREASURY TO PERFORM PAYMENTS IN BANK ACCOUNT - Which should be completed and certified by the authority of the bank where the account is situated.

16.3. For the offers of products to be imported as indicated in section 9.3 of this tender, payment will be performed under some of the foreign circulating documents (irrevocable letter of credit or wire transfer). Payment currency will be the same expressed in the bid.

Letter of credit mentioned in the previous item will be confirmed by some of the Argentine National Bank branches abroad or by some of the banks having commercial relations with that entity.

16.4. CONAE could evaluate other payment proposal offered by the offerors but it is not obliged to accept it.

ARTICLE 17 - ANTI CORRUPTION CLAUSE

Giving or offering money or any donation will be decisive cause of rejection, without further proceedings of the proposal or bid, in any phase of the proceeding or of the full rights contract cancellation so as to:

- a). Public officers and employees with competence referred to a tender or contract perform or stop doing something related to their functions.
- b). Or so that they take advantage of the influence of their position before other public officer or employee with the described competence, so that they perform or stop doing something related to their functions.
- c). Any person that takes advantage of his relation or influence under some public officer or employee with the described competence, so that they perform or stop doing something related to their functions.



Those who have committed such acts in direct or indirect interest of the contractor, whether as administrator representatives, partners, chief executives, managers, agents, employees, contract workers, business consultants, trustees or any other natural or legal person will be considered perpetrators of this conduct.

These unlawful conducts will have consequences even when they have been executed as an attempt.

ARTICLE 18 - NON DISCLOSURE CLAUSE

Interested and possible offerors will use technical information included by CONAE in this Tender Form and Particular Conditions and that they eventually have access at the moment of contract execution, to submit their quotation and fulfilling with respective contract obligations, exclusively, and could not be used – such information – with purposes different to those foreseen in the request.

Simply by accessing to technical contents of the request by different formal means legally predisposed, the pure and simple recognition that Argentine Republic National Commission for Space Activities (CONAE) is the exclusive owner of all the applicable and derivative rights of the technical information mentioned is implied.

ARTICLE 19 - COMPETENT JURISDICTION

Eventual divergences deriving from this contract will be submitted to Federal Court for Administrative Law Disputes located at Autonomous City of Buenos Aires, waiving to any other jurisdiction that could correspond to them.



ANNEX I: CONCOMITANT SPECIAL CLAUSES.

LOAN CONTRACT No. 1777/OC-AR – SATELLITE AND TERRESTRIAL OBSERVATION BASED APPLICATIONS SYSTEM DEVELOPMENT PROGRAM (PROSAT), CHAPTER IV.

CLAUSE 4.02. Acquisitions (a) Acquisition of goods, related services and works. The acquisition of goods, services or works enumerated on the list of eligible expenses described on the aforementioned Clause 4.01, shall be conducted in compliance with the laws in force in the Republic of Argentina, provided that it meets the standards of competence, economy, transparency, publicity, equality, efficiency and due process thoroughly described in GN-2278-3, from April 13th 2006 (footnote N°7), which the Executing Entity affirms knowing, and that the following conditions are observed:

- (i) Every works contract shall include a price redetermination methodology; both the price and the methodology should be admissible to the Bank;
- (ii) In order to be able to tender bids or to be awarded a contract, offerors shall not be required to comply with any of the following eligibility conditions: (A) to be registered in Argentina; (B) to have an agent in Argentina; (C) to be a business partner or a subcontractor of an Argentine firm.
- (iii) Invitations to submit offers, bidding documents, tender opening documents, and offer evaluation reports shall be published on a sole, free access website that should be admissible to the Bank;
- (iv) Contracts with foreign contractors and providers shall include the international arbitration procedure as a method to settle controversies that the parties cannot solve by mutual agreement.
- (v) Once the opening of tenders has been publicly conducted, no information on the analysis, clarification and evaluation of bids as well as awarding recommendations should be disclosed to offerors or to parties that are not officially involved in this process until the actual tender has been awarded; and
- (vi) The offeror who submits the lowest bid shall not be required to lower its price as a condition for awarding.



ANNEX II: QUOTATION FORM

Contract type:

Proceeding number:

Objective:

Offeror Name and Surname or Corporate Name:

Description	Unit Price	Total Price
R 1:		
Total amount		\$

Delivery Term	
Delivery Place	
Payment method	
Bid validity period	
Tasks/ goods warranty	
True copy of the registration form at the tax entity of the country of origin or equivalent certification	

SIGNATURE AND PRINTED NAME
(Attorney with sufficient legal capacity)



Comisión Nacional de Actividades Espaciales

TECHNICAL ANNEX III
SAO-CDH-SW-00002-A

STATEMENT OF WORK

SAOCOM GPS ANTENNA CONFIGURATION CHANGE



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1. OBJECTIVE

The objective of this document is to define all activities needed to:

1. update of GPS Assembly (SAOCOM 1A/1B) and GPS EGSE taking into account the new angular position of GPS antenna configuration respect to zenith as for the first configuration
2. Additional analysis for multipath effect and SAR Chirp interference test to identify if they are the potential risk of the degradation of the performances due to the two effect.

NOTE : "GPS Assembly" consists of GPS Receivers, Filters, Antennas and RF Cables

2. SCOPE OF THE SUPPLY

The scope of this SOW is define all the activities need to finalize and predict the final performances of the GPS system assembly integrated in the SAOCOM Satellite 1A and 1B taking into account the SAOCOM configuration that was different respect to when was procurement the GPS assembly in the 2009.

3. REFERENCE AND APPLICABLE DOCUMENTS

3.1 REFERENCE DOCUMENTS

AD.1	SAO-TASI-TNO-0002	SAOCOM GPS Filter Technical note
AD.2	SAO-TASI-TPR-0012	GPS FM2 with L2 Filter integrated Interference (SAR signal) Test Procedure
AD.3	SAO-TASI-MOM-0031	SAOCOM GPSR CHIRP session tests in L'Aquila from 23 to 27 January 2017
AD.4	SAO-ANT-TS-00053-B	GPS with integrated filter L2 FILTER CS evaluation test
AD.5	SAO-TASI-TN0-0005	Technical Response to CONAE RFQ 002513
AD.6	[SAO-AOC-RS-00002-B	Requirement to GPS filter

3.2 APPLICABLE DOCUMENTS

RD.1	SAO-PAS-PR-00001	SUBCONTRACTORS NON CONFORMANCES MANAGEMENT SYSTEM
RD.2	SAO-PAS-PR-00002	ACCEPTANCE AND DELIVERY OF PRODUCTS
RD.3	SAO-SYS-PL-00001	CONFIGURATION AND DOCUMENTATION MANAGEMENT
RD.4	SAO-SYS-PR-00002	CHANGES, DEVIATIONS AND WAIVERS PROCESSES
RD.5	SAO-PAS-RS-00001	SAFETY AND PA REQUIREMENT DOCUMENT (SPARD)
RD.6	SAO-SYS-LI-00001	SAOCOM MISSION GLOSSARY OF TERMS AND ACRONYMS
RD.7	SAO-SYS-PR-00007	RECEIPT, STORAGE AND DISPATCH OF MATERIALS, PRODUCTS OR GOODS
RD.8	SAO-SYS-PL-00021	SCHEDULE MANAGEMENT PLAN
RD.9	SAO-TASI-SPE-0002	Lagrange for SAOCOM Instrument Requirements Documents



4. GENERAL REQUIREMENTS

Design or/and selection of deliverables of this SOW shall respect the requirements specified in the following paragraphs.

Deviation of these requirements shall be clarified in quotation stage.

4.1. SUPPLY MODALITY

Except opposite indication in the Particular Requirements, paragraph 6 of this document, this contract is considered in the modality "Turn-Key". Special training, software, tools, or gauges necessary for the normal employ or operation of deliverables, not considered in this document, shall be informed and offered as annex in the quotation. Commissioning activities, if necessary, shall be considered in quotation and planning.

4.2. SCHEDULE AND DELIVERY TIME COMPLIANCE

All necessary tasks to perform the deliverables requested in this document shall be planned in concordance with the milestones planning described in the Particular Requirements in this document.

The Contractor/Supplier shall include in the proposal a preliminary planning (Gantt chart) detailing control points and deliverables to be provided as evidence of project advancement. The lead time (in continuous days) shall be detailed in the Gantt chart. Long lead items shall be detected and reported in a particular list at quotation stage.

Final milestones schedule shall be agreed with SAOCOM project team at purchase order placement. Detailed Gantt chart shall be delivered as part of first data package.

Consumable products with expiration date shall be supplied having into account that a 75% of the life cycle shall be available at receipt date of materials at CONAE installations.

4.3. CONTRACTOR TEAM AND ORGANIZATION

The Contractor shall provide the organization chart of the project team affected to this work, indicating expertise and hourly dedication (part time / full time), as well contact information. Training certificates can be requested in the particular requirements or by SAOCOM Mission/Product Assurance in any stage of project development, if necessary.

4.4. REPORTING

Problems, failures or non-conformances detected during production of deliverables to supply, shall be reported as soon as possible to SAOCOM Project Team, as detailed in SUBCONTRACTORS NON CONFORMANCES MANAGEMENT SYSTEM (See paragraph 3).

Engineering changes proposals, request for deviations, and request for waivers shall be reported to SAOCOM Project Team as detailed in CHANGES, DEVIATIONS AND WAIVERS PROCESSES (see paragraph 3).

The Contractor shall reports periodically to the corresponding CONAE Technical Lead, the progress achieved on the current working schedule.

The following items shall be reported monthly in a table form:

- The actual start date of activities started.
- The percent of advance of the activities started.
- The actual finish date of activities completed.

Evolution of major project events selected as key milestones are reported in conjunction with the above information in the form of a (Monthly) Milestone Status List. This list shows the



achievement of key milestones visualized in traffic lights, when GREEN defines that the milestone will be reached noticeably before the planned date; YELLOW defines that the milestone will be reached with +/- 10 days of planned date. And RED defines that the milestone will be achieved after 10 days of due date. The default status is YELLOW.

4.5. PACKAGING AND SHIPPING CONDITIONS

Providing that it is possible, the special conditions for the managing and the storage of the products to provide will be informed at the quotation stage.

The deliverable of this SOW will be delivered only with the acceptance of the SAOCOM's Project Team as defined in the procedure ACCEPTANCE AND DELIVERY OF PRODUCTS (See paragraph 3, Applicable Documents).

The Contractor will assure the appropriate processing on the Receivables and Deliverables products to assure the correct handling and storage, following the document:

SAO-SYS-PR-00007 Receipt, storage and dispatch of materials, products or goods

As well as the applicable documents indexed in this one. The Contractor shall arbitrate the means and resources necessary to be able to fulfill with the logistic management in all its stages.

4.6. WARRANTY TERMS

Except opposite indication in the Particular Requirements of this document, all products supplied shall be warranted by a minimum period of 1 year and beginning this period after the final acceptance by SAOCOM project team. The inability to fulfill with this requirement shall be discussed at quotation stage.

5. PARTICULAR REQUIREMENTS

5.1. Antenna reference frame

The antenna visibility, and ultimately the GPS receiver performance, is directly dependent on two aspects:

1. Antenna reference frame orientation w.r.t. platform reference frame
2. Platform attitude

The impact on GPS SW and performance depends if the platform orientation is "static" or "dynamic" during the SAOCOM orbit in the science acquisition data mode. With respect to the previous baseline on which the LAGRANGE has been tested (Zenith pointing attitude) a new evaluation on visibility, elevation and link budget is needed in order to estimate the receiver performance.

If the attitude is "dynamic", as the current TAS-I information indicate, the modification requires to provide the correct antenna pointing vector and to provide a new TC interface (TC: "0x39 Set/Request Receiver Attitude"), where the platform attitude information is in the form of quaternion and expresses the spacecraft body axes orientation with respect to ECEF frame (WGS-84). This TeleCommand has to be sent "periodically" from the SAOCOM On-Board Computer to the GPS receiver.



Figure 1: SAOCOM platform attitude, solar panel position and GPS antennas

TASI shall perform the requested tasks in two steps:

- Step 1 in TAS-I premises
- Step 2 in INVAP premises at Bariloche site where the S/C integration is performed



5.2. SAR Instrument Interference Chirp Test

The objective of this test is to re-perform the interference tests on the GPS receiver, including the additional filter, to verify that the GPS is compliance with the requirement specified in the CONAE document Requirement to GPS filter (A.D.6).

This test is under GPS assembly responsibility, for the given/provided interference at the antenna port. This interference must not affect GPS normal (already known, required and agreed) performance in L1 and L2, as done in missions before (e.g. ROSA) in order to reject known out of band interference.

The environment and levels at the GPS antenna port input have been specified. The test requirements are specified in this document. Is the intention of CONAE and this document to receive from GPS assembly subcontractor the agreement and feedback to this document, including related test procedure, with enough time in order to arrive to the TRR, with all the main information agreed and ready between parties.

The susceptibility measurements will be performed with the DUT configured in its most sensitive operative modes in order to demonstrate that susceptibility margins exist under worst case conditions. The level of the interference shall be as specified by requirements. The System shall be evaluated by monitoring its continuous telemetry on the EGSE synoptic/logbook and by comparing specific parameters wrt fixed limits or reference statistics (calculated before disturb injection).

It shall be verified that the system does not exhibit unforeseen responses when it is subjected to the specified injected conducted noise, i.e. that:

- no malfunctions are present
- degradation of performance are not evidenced
- variations of TLM monitors occur within tolerance

The interference shall be time-maintained for a sufficient time slot in order to have a sufficient number of telemetry responses to be sure that possible effects are evidenced.

The same interference may be injected more times if the EGSE needs more than one time slot to measure all the required parameters.

The interference level shall be increased from lower to higher value, defined based on HW hazard limitations and/or degradation of performance, what occurs first. Once the anomaly occurrence, the injected signal level shall be decreased down again to the level for which the anomaly disappears.

The interfering signal (in terms of modulation, repetition rate, sweep rate, single frequency, etc.) is defined in this document.

The threshold level and each pertinent data shall be recorded.

The injected signal vs. frequency (plots or tables) shall be recorded.

No-susceptibility condition means that the system configuration shall be the same before and after the injection of noise.

In particular, the system stability shall be evaluated looking at specific monitored telemetries, as summarized in the step by step procedure.



5.3. Multipath Analysis and Suggestion of Accommodation

Although modern GPS receivers achieve high pseudorange accuracy in line-of-sight (LOS) conditions, multipath remains a dominant source of ranging error in GPS signals. Multipath interference occurs when the user device receives reflected signals in addition to the direct LOS signal. These interference signals are generally reflected from the no desirerate reflexing the GPS signal from the specific part of the satellite (i.e. Solar Array , Mechanical parts) near to the GPS antenna receivers

Two kinds of multipath exist: specular multipath arising from discrete, coherent reflections from smooth surfaces, and diffuse multipath arising from diffuse scatterers and sources of diffraction.

Multipath signals are generally considered undesirable in the GPS because they destroy the correlation function shape used for time delay estimation, but can be useful in some cases (for example, for acquisition).

The actual multipath performance of a given signal and receiver combination depends on various parameters of both, including the signal-type modulation, code chipping rate, the pre-correlation bandwidth and filter characteristics, the number of received multipath signals, the relative power of multipath signals, the path-delay, chip spacing between correlators, and the type of discriminator and algorithm used for code and carrier tracking.

The activity required is to evaluate the multipath effect on the SAOCOM satellite performed by CONAE and if impact the GPS performances performed by TAS-I.

6. TASKS DESCRIPTION AND TECHNICAL SPECIFICATIONS

TASI shall perform the requested tasks in two steps:

- Step 1 in TAS-I premises
- Step 2 in INVAP premises at Bariloche site where the S/C integration is performed

6.1. Activities to be performed in TASI premises:

A. To implement the GPS Assembly configuration according to the GPS antenna position on SAOCOM satellite and to perform the delta analysis and tests according to the following tasks:

1. To revise the SAOCOM configuration and antenna position on the basis of CONAE information about platform attitude, observation modes and antennas configuration on the platform.
2. To evaluate the impact on the GPS S/W and performance, identify and implement modification needed based on the information available at point 1.
3. Perform Delta TRR and Delta Acceptance of GPS Assembly SAOCOM 1B for the modification implemented at point 2.

3.1 Perform also an additional chirp interference test



4. Delta EIDP delivery, Delta TRB/DRB and Shipment for GPS Assembly SAOCOM 1B

5. Evaluate the multipath effect on the SAOCOM satellite and evaluate impacts on the GPS performance.

6.2. Activities to be performed By TAS-I in INVAP premises:

B. Delta Acceptance

1. Delta Acceptance on SAOCOM 1A in INVAP Premises

6.3. DETAIL OF TASKS TO BE PERFORMED

6.3.1. TASK A: ACTIVITIES IN TAS-I PREMISES

6.3.2. Point 1: Impact Assessment, Analysis

INPUT

- Definition of platform reference frame (platform mechanical ICD – CONAE TO CONFIRM)
- GPS antenna 1 and 2 reference frame (platform mechanical ICD – CONAE TO CONFIRM)
- Information about the platform attitude vs. SAOCOM platform operative modes(1) in form of :
 - attitude law (if analytic)
 - quaternions time series (or equivalent attitude representation w.r.t. ECEF or ECI J2000) representative of the platforms modes in which the GPS receiver is operational.
- Capability of on-board computer to provide periodic quaternion (or equivalent attitude representation) information to the GPS Receiver (rate and type of information)

ACTIVITY

Based on previous teleconferences the expected activities are:

- Analysis of platforms modes in which the GPS receiver is operational
- Retrieval of orientation of antenna 1 and 2 reference frame w.r.t. platform reference frame (definition of rotation matrix of antenna 1 and antenna 2 vs. platform reference frame)
- Analysis of platform reference frame
- Simulation of expected visibility on the selected operative modes (in STK, Matlab)
- Assessment of implementation impacts on GPS receiver

OUTPUT

[TN 1]: Technical Note on Impact Assessment and Analysis of the SW Changes



Note (1): Intended as the operative modes in which the GPS Rx is operating

6.3.3. Point 2: Implementation of SW Modifications and Test Scenarios

INPUT

- [TN 1] prepared at Point 1

ACTIVITY

Based on previous teleconferences the expected activities are:

- Implementation in SAOCOM GNSS Rx EEPROM Antenna 1 and 2 orientation parameters
- Implementation in SW of TC 0x39 (“Set Request Attitude Parameters”)
- SW loading on SAOCOM 1B Flight Model
- Preparation of Test Scenario on Spirent Simulator based on Inputs provided by CONAE at Point 1.
- Update of TAS-I TE (Ganesh Test SW) in order to simulate the TC 0x39 commands from SAOCOM OBC on the basis of the above scenario
- Implementation in SW to put the counter rollover in EEPROM therefore the customer will have the opportunity to update the counter rollover when it occurs.

NOTE1: In order to perform the requested SW modifications the SAOCOM GNSS Rx and DSP 21020 emulator is used.

NOTE2: Depending on inputs provided in Point 1 (Platforms Modes), the new attitude scenarios will be defined. Their duration will be defined in this phase.

NOTE3: The number of test to be done therefore has to be agreed prior to start Point 3.

NOTE4: The implementation of the update of test procedure and generation of the new scenario will be performed in TASI premises while the upload on GPS EGSE will be executed by CONAE/INVAP in INVAP premises.

OUTPUT

- TN 1: Update of [TN 1] with a paragraph of implemented modifications
- Update of SAOCOM GPS User Manual
- Update of SAOCOM GPS Rx Test Case and Procedure
- SAOCOM GPS Rx SW CIDL



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- Spirent Simulator Scenarios files to be included in Satellite EGSE
- Update of SAOCOM GPS EGSE procedure (SAO-TASI-PRC-0005)

6.3.4. Point 3: Perform Functional Performance and Delta TRR and Acceptance Test (TRB)

INPUT

- Activities performed at point 1 and 2

ACTIVITY

The task requires to perform the:

- SAOCOM 1B Functional performance to test the SW modification
- SAOCOM 1B Delta Acceptance test of GPS Assembly.

The number of test to be done therefore has to be agreed AT TRR.

TASI proposes to perform the following sequence of tests (taking into account the new attitude of the antenna):

- Functional Performance Test

This activity will allow to TASI to verify the functional performance of the GPS assembly. This step is needed before to perform the activities in INVAP premises.

NOTE: No Thermal Vacuum or Vibration test will be performed.

Note (2):

TEST DESIGN: Signal Processing	
TEST CASE	FM
Code and Carrier measurements accuracy (2)	<input type="checkbox"/>
TEST DESIGN: Orbital Performance Verification	
TEST CASE	FM
Navigation Processing and Raw Measurements with Attitude Configuration 1	<input type="checkbox"/>
Navigation Processing and Raw Measurements with Attitude Configuration 2 (3)	<input type="checkbox"/>

During Functional test of FM models all tests are reduced in time duration (only one orbit; no inter-channel bias will be performed)

Note (3): only 2 scenarios are foreseen to stimulate the new attitude scenarios



- Delta Acceptance Test

This activity will be performed only after the completion of TASK B point 1.

The details of the tests to be performed are provided hereafter:

TEST DESIGN: Signal Processing	
TEST CASE	FM
Code and Carrier measurements accuracy(4)	<input type="checkbox"/>
PPS Synchronisation	<input type="checkbox"/>
TEST DESIGN: Chirp Interference	
Code and Carrier measurements accuracy (*)	<input type="checkbox"/>
TEST DESIGN: Orbital Performance Verification	
TEST CASE	FM
Navigation Processing and Raw Measurements with Attitude Configuration 1	<input type="checkbox"/>
Navigation Processing and Raw Measurements with Attitude Configuration 2 (5)	<input type="checkbox"/>

NOTE: No Thermal Vacuum or Vibration test will be performed

During the evaluation of the impacts and performance due to antenna new attitude, TASI will evaluate if some test of acceptance (ATC) have to be rerun and if the length of the tests have to be changed.

The acceptance validation and the outcome results will be performed and provided with the requirements applicable document (AD1).

Note (4): During Functional and Delta-Acceptance test campaign of FM models all tests are reduced in time duration (only one orbit)

Note (5): At the moment 2 scenarios are foreseen to stimulate the new attitude scenarios

OUTPUT

- Mom of Delta TRR
- Mom of Delta TRB
- Delta Acceptance Test Report



6.3.5. Additional Chirp Interference Test and updated WC analysis

TASI is required also to perform an additional test with the Chirp interference as defined in test procedure SAO-TASI-TPR-0012[RD2] final issue agreed with CONAE and INVAP.

All activities will be performed following tasks and steps described in:

- SAO-TASI-MOM-0031 with annexes [RD3]
- SAO-TASI-TPR-0012 [RD2]
- SAO-ANT-TS-00053-A [RD4]

This activity is divided in two steps:

- Testing Sessions /Assessment that will be held in TASI premises with the participation of CONAE and INVAP people
- Chirp interference test execution in TAS-I Gorgonzola premises during the Delta Acceptance test campaign

In order to perform the required test TASI need to rent/ buy the test equipment described in the test procedure.

During the second step session the following additional test is required:

1. The Blank pulse Test using the dedicated switch to interrupt the signal at the GPSR signal input
2. The Blank pulse Test using the dedicated switch to interrupt the signal at the L2 signal input
3. Same setup, same chirped signal than in SAR band, same bandwidth 50 MHz, use only one test case, the one with the higher duty cycle (not less than 10%), not centered in 1275 MHz but centered in L1 band. Start from -130 dBm up to finding degradation 3dB susceptibility threshold or before damage level what occurs first. Inform value please.
4. Interference white noise centered in L1 with bandwidth 300 MHz CW. Measure output of L1 diplexer with RBW 200 Hz. Start from -130 dBm (no degradation) up to finding degradation 3dB susceptibility threshold

OUTPUT

The chirp interference test results will be included in the Delta Acceptance Test Report

Updated WC and derating analysis taking into account the maximum interference pulsed signal level received by the GPS Receiver at L1 and L2 Input. The analysis will be contain also the following information regarding the Maximum input signal at the receiver input in band and out band as follows:

- Nominal Operation
- Maximum without degradation
- Maximum with degradation of performances
- Maximum with the permanent degradation
- Maximum level to broken the receiver

6.3.6. Point 4: Delta EIDP and Delivery of SAOCOM 1B



INPUT

- Delta TRB MoM

ACTIVITY

When the SAOCOM 1B Delta acceptance TRB will be declared successful a Delta DRB will be held and formal Items delivery with the complete EIDP will be provided.

- Provision of Delta EIDP
- Shipment of SAOCOM 1B Assembly

OUTPUT

- Delta EIDP
- Shipment Documents

6.4. Point 5: Multipath Analysis and Suggestion of Accommodation

INPUT

- CONAE GPS antennas Multipath Analysis with the following information:
 - SAOCOM GPS Antenna measurements (Radiation Diagram co-polar cross-polar L1/L2 Far Field, Directivity and Gain) in form of file, based on the SAOCOM configuration and Antenna real performances.

The Output for the CONAE Multipath Analysis are:

Output of Accomodation study Run 1:

- Maps (i.e. not “cuts”) full azimuth and elevation coverage of amplitude error in L1 (far field, error of E field of antenna standalone w.r.t. antenna “installed” in satellite)
- Maps (i.e. not “cuts”) full azimuth and elevation coverage of amplitude error in L2 (far field, error of E field of antenna standalone w.r.t. antenna “installed” in satellite)
- Maps (i.e. not “cuts”) full azimuth and elevation coverage of phase error in L1 (far field, error of phase radiated field of antenna standalone w.r.t. antenna “installed” in satellite)
- Maps (i.e. not “cuts”) full azimuth and elevation coverage of amplitude error in L2 (far field, error of phase radiated field of antenna standalone w.r.t. antenna “installed” in satellite)

Output of Accomodation study Run 3:

- Maps (i.e. not “cuts”) full azimuth and elevation coverage of amplitude error in L1 (far field, error of E field of antenna standalone w.r.t. antenna “installed” in satellite)
- Maps (i.e. not “cuts”) full azimuth and elevation coverage of amplitude error in L2 (far field, error of E field of antenna standalone w.r.t. antenna “installed” in satellite)
- Maps (i.e. not “cuts”) full azimuth and elevation coverage of phase error in L1 (far field, error of phase radiated field of antenna standalone w.r.t. antenna “installed” in satellite)
- Maps (i.e. not “cuts”) full azimuth and elevation coverage of amplitude error in L2 (far field, error of phase radiated field of antenna standalone w.r.t. antenna “installed” in satellite)

CONAE Multipath Analysis performed in two time before and after Multipath improvement and according to the following schedule:



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1. Multipath without any improvement and modification (SAOCOM baseline) : delivery by CONAE To + 3 W
2. Multipath with improvement and modification (SAOCOM baseline) : delivery by CONAE: To + 6 W

ACTIVITY

The activity required to evaluate By Thales the impact the GPS performances due to the multipath effect on the SAOCOM satellite. Thales is also to perform the following additional evaluation/improvement

- **Multipath Evaluation/improvement**
 - Contributions to system level for antenna accommodation analysis (mechanical accommodation, interference - RFI - analysis), basic multipath rejection characteristics and necessity of choke ring
 - Re-execution of the GPS performance analysis based on the above improvement and the new Multipath analysis performed by CONAE

OUTPUT

[TN 2] Technical Note of Multipath effects on SAOCOM GPS performances including accommodation suggestions.

6.5. TASK B: ACTIVITIES IN INVAP PREMISES

6.6. Point 1: Delta Acceptance on SAOCOM 1A in INVAP Premises

INPUT

- New SAOCOM GPS SW Release
- Spirent Scenarios developed at Point 2
- CONAE EGSE, INCLUDING ANTENNA TEST CAP(if needed)

ACTIVITIES

Is required to perform a Delta TRR and Delta Acceptance of the SAOCOM 1A GPS Assembly integrated on the satellite using satellite EGSE already updated by TASI.

ASSUMPTION 1: Only One Test Cap is Available

ASSUMPTION 2: It is assumed that the only access to accept the GPS Assembly on SAOCOM 1 A is the GPS Antenna and NOT the Rx connectors

ASSUMPTION 3: The SAOCOM OBC has already implemented the TC 0x39 towards the GPS Rx

- Delta TRR Meeting
- New SAOCOM GPS SW Release is loaded on SAOCOM 1A GPS Assembly
- Loading of Spirent Scenarios developed at Point 2 (by CONAE)
- Run of Delta Acceptance on SAOCOM 1A integrated on SAOCOM Platform (see Table below)



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- Delta TRB Meeting
- Delta EIDP Delivery and Delta DRB for the EGSE and GPS Assembly SAOCOM 1A
- Including formal delivery of EGSE and the GPS Assembly SAOCOM 1A with the complete EIDP

The details of the Delta Acceptance tests to be performed are provided hereafter:

TEST DESIGN: Orbital Performance Verification	
TEST CASE	FM
Navigation Processing and Raw Measurements with Attitude Configuration 1 on Antenna 1	<input type="checkbox"/>
Navigation Processing and Raw Measurements with Attitude Configuration 2 on Antenna 1(6)	<input type="checkbox"/>
Navigation Processing and Raw Measurements with Attitude Configuration 1 on Antenna 2	<input type="checkbox"/>
Navigation Processing and Raw Measurements with Attitude Configuration 2 on Antenna 2(7)	<input type="checkbox"/>

OUTPUT

An update of the following documentation SAOCOM 1A:

- SAOCOM 1A Delta Acceptance Test Case and Procedure
- SAOCOM 1A Delta Acceptance Test Report
- SAOCOM 1A Delta DRB Meeting MoM
- SAOCOM 1A EIDP

Note (6): At the moment 2 scenarios are foreseen to stimulate the new attitude scenarios

Note (7): At the moment 2 scenarios are foreseen to stimulate the new attitude scenarios

7. MILESTONES, DELIVERABLES LIST and PAYMENT SCHEDULE

7.1. Milestones

N.	Item	Delivery
1	Kick Off (Chirp test Procedures)	TO
	Test Report Chirp Interference Test	TO + 5w
2	TN 1 issue	TO + 5w
3	Submittal of updated TN1 and new issue of the agreed SAOCOM 1B Delta TRR documents	TO + 7w
4	a. TN 2 issue 1 Without Improvement SAOCOM Baseline configuration	TO+6w
	b. TN 2 issue 2 With SAOCOM Improvement configuration	TO+12w
5	SAOCOM 1B Test Report	TO + 21w
6	SAOCOM 1B Delta EIDP and Delivery	TO + 23w
7	SAOCOM 1A Delta Acceptance Test Report	TO + 16w
8	SAOCOM 1A Delta EIDP	TO+17w



7.2. DELIVERABLES LIST

Deliverables	Note
Activities in TASI Premises	
TASK A	
Point 1: Impact Assessment, Analysis	
[TN 1]: Technical Note on Impact Assessment and Analysis of the SW	
Point 2: Implementation of SW Modifications and Test Scenarios	
Update of [TN 1] with a paragraph of implemented modifications Update of SAOCOM GPS User Manual (SAO-TASI-MAN-0002) Update of SAOCOM GPS Rx Test Case and Procedure SAOCOM GPS Rx SW CIDL Spirent Simulator Scenarios files to be included in Satellite EGSE Update of SAOCOM GPS EGSE procedure (SAO-TASI-PRC-0005)	
Point 3: Perform TRR and Functional performance Delta Acceptance Test (TRB) Additional Chirp Interference Test W.C. and Derating Analysis	
Test Report (SAOCOM 1B) W.C. and Derating Analysis	Delta TRR Review Delta TRB Review
Point 4: Delta EIDP and Delivery of SAOCOM 1B	
<u>Delta EIDP SAOCOM 1B:</u> - COC (RX, Filters, cables) - Shipping Document - AS BUILT Configuratyion Status List - Acceptance test reports (Filters, GPS Assembly) - Packing, Handling and Trasportation - ICD & Manual - List Of NCR/RFW	Delta DRB Review
Point 5: Multipath Analysis and Suggestion of Accommodation	
[TN 2] Technical Note of Multipath effects on SAOCOM GPS performances including accommodation suggestions	
Activities in INVAP Premises	
TASK B	
Point 1: Delta Acceptance on SAOCOM 1A in INVAP Premises	



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SAOCOM 1A Delta Acceptance Test Case and Procedure SAOCOM 1A Delta Acceptance Test Report SAOCOM 1A Delta EIDP	Delta TRR Review Delta TRB Review Formal Delta DRB Review
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7.3. PAYMENT SCHEDULE

N.1	Milestone	Percentage	Accumulated
1	Kick Off	30%	30%
2	Chirp Interference Test Report	20%	50%
3	SAOCOM 1B Delta EIDP and Delivery	20%	70%
4	SAOCOM 1A Delta EIDP	30%	100%