

INVITATION TO TENDER – S155-208650

EGNOS GEO TRANSPONDER SERVICE REPLENISHMENT

FREQUENTLY ASKED QUESTIONS

1. *Conditions of Tender – Typo for GEO-2 Mission Schedule*

There is indeed a typo in P.9 of the conditions of the tender. The maximum OSD for GEO-2 mission in end Q4 2012 and not Q4 2011 as mentioned in the document.

2. *Statement of Work internal references are erroneous.*

A corrected version of the Statement of Work with the correct internal references has been published. See [CORRIGENDUM].

3. *Can you clarify Clause 30 of the draft Contract on Termination as there is reference to paragraph g) in 30.2 but g) does not appear as a paragraph.*

Please consider that clause 30 of the draft contract is amended as follows:

30. Termination for Contractor default

30.1 The Commission may terminate the Contract in the following circumstances:

- a) where the Commission has evidence or seriously suspects the Contractor or any related entity or person of professional misconduct;
- b) where the Commission has evidence or seriously suspects the Contractor or any related entity or person of fraud, corruption, involvement in a criminal organisation or any other illegal activity detrimental to the Communities' financial interests;
- c) where the Commission has evidence or seriously suspects the Contractor or any related entity or person of substantial errors, irregularities or fraud in the award procedure related to the procurement activities or in the performance of the Contract;
- d) where the Contractor is in breach of his obligations under article **Error! Reference source not found.** of the Contract;
- e) where a change in the Contractor's legal, financial, technical or organisational situation could, in the Commission's opinion, have a significant effect on the performance of the Contract;
- f) where the Contractor is unable, through his own fault, to obtain any permit or licence required for performance of the Contract;
- g) where the Contractor, after receiving formal notice in writing to comply, specifying the nature of the alleged failure, and after being given the opportunity to remedy the failure within a reasonable period following receipt of the formal notice, remains in serious breach of his contractual obligations;
- h) where other cases occur that give rise to Contractor default as defined in the Contract.

- 30.2 Prior to termination under point a), b), c) or e), the Contractor shall be given the opportunity to submit his observations.
- 30.3 Termination shall take effect on the date on which a registered letter with acknowledgment of receipt terminating the Contract is received by the Contractor, or on any other date indicated in the letter of termination".

4. Figure 1 of the Statement of Work shows the Operational Start Dates (OSD) for EGNOS GEO-1 (2011) and GEO-2 (2012). In the Conditions of Tender section 3.2.4.2 it is stated that the contract duration has been fixed up to 31st January 2014, with possible extension subject to availability of funds. This makes the duration of the "EC committed" Service Provision Phase quite short (around 2 years for GEO-1 and 1 year for GEO-2). Given that the Service Preparation Phase is capped at €180k, would it be possible to consider extending to 5 years (for both GEOs) the initial contract duration for the Service Provision Phase (i.e. 5 years starting from OSD)?

The initial contract duration has been set taking into account the budget available at the date of signature and the procedures governing the European Community budget approval. Thus the Commission is not considering extending the initial contract duration.

However Commission would like to emphasize again that its primary objective is to put in place the conditions for a long term EGNOS operations and service provision, compatible with securing the continuity of EGNOS Service for Safety of Life applications in the long run. In line with this the contract is contemplating a renewal clause, after its expiry in January 2014, subject only to the availability of funds.

5. Can the Commission provide the SARPS technical specifications (Document AD1)?

The Commission does not have the rights to distribute the SARPS directly. The SARPS can be purchased from the ICAO.

6. Annex 3 – Legal Entity Form

The Legal Entity form is indeed missing from the tender documentation.

"Annex 3: The tenderer's attention is drawn to the fact that a specific **Legal Entity Form** for each Member State is available at the following Internet address: http://ec.europa.eu/budget/execution/legal_entities_en.htm under the "Call for tender" section. Please note that we can only accept either original documents or certified copies, which must be less than 6 months old. In the case of a grouping, this form must only be provided by the person heading the project."

7. Financial Proposal: EGNOS GEO Transponder Service Provisioning Phase Target Price: We assume the price given refers to a single transponder (i.e. L1 or E5). Option 2 (including two transponders) would roughly cost twice as much. Please confirm.

The presented target price is provided only for information purpose and will not be used for the evaluation of the proposal. As described in the evaluation criteria, the cost criteria marking will result from a direct comparison between the different offers. The target price does not refer to Option 1 or Option 2 but represents an average cost that is expected to be allocated for GEO-1 and GEO-2 within the EGNOS total budget. This target price also includes the uplink services from the 2 stations.

8. EGN-GEO-SPEC-0.1.1: Transmit Coverage: The map in Figure 5 does not include Georgia and Azerbaijan. Is it a requirement to cover all ECAC countries?

The figure presents indeed the ECAC 96 FIR coverage were Georgia and Azerbaijan were not included. This is the current status of the EGNOS Mission Requirements. However, considering the extension of the EGNOS service, inclusion of these additional countries within the transmit coverage is a desirable requirement.

9. EGN-GEO-SPEC-0.1.2 Receive Coverage / EGN-GEO-SPEC-0.2.2 NLES Site Location Requirements: Providing uplinks which are spaced by 50 km or more for the uplink coverage is not an issue. But is the full coverage of EU 27 + Switzerland and Norway mandatory?

There is misinterpretation of the requirement. The requirements can be rephrased as follows: The receive coverage shall ensure the reception of the uplink signals from 2 stations (to be proposed by the bidder) located in the territory of EU27 + Norway/Switzerland and separated by a minimum distance of 50 km.

10. No Reference: Ku-Band Downlink Coverage: No requirements stated. Please comment.

For the interface type 3 (in Option 1), the Ku downlink coverage shall be such that the Ku downlink signals can be received by the NLES stations (dedicated Rx antenna on the Hosting Site).

11. EGN-GEO-SPEC-0.1.7 Gain to Noise Temperature Ratio: Considering that there could be a trade-off between the satellite G/T and NLES station EIRP do we have the freedom to propose other values for satellite G/T and NLES station EIRP?

Specifications are provided in the Annex 1 for the satellite G/T and uplink station EIRP. The bidder may propose other values for these two parameters provided that:

- the link budget is maintained
- the bidder can show benefits (costs, complexity) in the overall design by modifying these parameters.

12. EGN-GEO-SPEC- 0.1.9 Carrier Frequency Stability: These requirements for the short term and lifetime stability do not seem to be in line with commercial payload technologies. Please confirm if this is a payload level requirement or a system level requirement with on-ground (NLES) frequency corrections as indicated in EGN-GEO-SPEC-0.2.10 NLES RF Uplink Frequency Tunability.

The short term and long term frequency stability are payload requirements (respectively 1E-11 over 1 to 100 sec and 2E-7 over satellite lifetime).

13. EGN-GEO-SPEC- 0.1.17: Antenna Gain Variation: This requirement suggests that an iso-flux antenna is required. This would rule out certain cost-effective options and currently this technique is not used on all EGNOS payloads and other SBAS payloads. Please confirm.

The requirement is probably misleading. The requirement on the gain variation only applies locally and over time at each point of the coverage and not globally. The allowable gain variation over time in each point of the coverage is 1 dB. This includes for example antenna pointing losses.

14. EGN-GEO-SPEC-1.1.1 Option 1 Satellite to Ground Interfaces Alternatives: In Option 1, Interface 1 and 2 seem to suggest that the C-band downlink is optional. It is also indicated that the latest generation on INMARSAT payload do not have this feeder downlink function. In Option 2 there is no requirement for the Ku-band downlink. Providing a downlink at Ku-band entails additional cost. Please confirm that Ku-band downlink in Option 1 is not a requirement?

The only requirements for the bidder is to provide an interface that satisfies one of the 3 types. The reason behind is to ensure the possibility of re-using the current NLES design. If the bidder wants to provide Interface type 1 for option 1, it is indeed not requested to provide Ku or C band downlink.

15. EGN-GEO-SPEC-1.1.4 Interface 3 Transponder Description: Ku-band downlink frequency is quoted as 12748 MHz. This does not allow the service provider to optimise the overall frequency plan from the payload design point of view and from the operational point of view. Please confirm.

There is indeed a missing footnote in the text. The proposed downlink frequency of 12748 MHz has been indicated since it corresponds to the current ARTEMIS payload downlink frequency. The bidder is may change this value in case potential optimisation in the frequency allocation.

16. EGN-GEO-SPEC-1.2.9 Interface 3 NLES RF Characteristics Polarisation for Ku Uplink and Downlink is quoted as RHCP/RHCP. We believed the polarisation for Artemis is linear. Most Ku-band satellites use linear polarisation and we would prefer linear polarisation. Please confirm.

There is indeed a typo in the text. For Interface type 3 in option 1, the uplink Ku polarization is Linear X and the downlink Ku polarization is linear Y.

17. Annex 1 of SoW, P.16, Table 1: The bandwidth is specified to be > ' MHz for L1. In the same document (p28/29, Table 8), the target for the bandwidth is specified to be 20 MHz. Please explain.

The minimum requirement for the downlink bandwidth (at 0,5 dB) is 4 MHz. For Option 2, which is more advanced payload, the desired required would be to extend the bandwidth to 20 MHz in order to improve the service.

18. Annex 1 of SoW, P.16, EGN-GEO-SPEC-0.1.8/0.1.9: Frequency stability. It is assumed that all stability requirements relate to the stability of the on-board local oscillator and do not address the carrier frequency stability of the uplink. Is the assumption correct?

Yes. The requirement is a payload requirement. See also question 12 of the FAQ.

19. Annex 1 of SoW, Paragraph 5, the interface of the EGNOS payload to the ground are summarized for Option 1. It is not understood that in the case of a C-Band uplink, a C-band downlink is not necessary (Option 1, IF 1). However in the case of a Ku band uplink, a corresponding Ku-band downlink is required (Option 1, IF3). It is not clear why Option 2 with Ku uplink shall be different from Option 1, IF 3. Please explain why, in some cases, this downlink in Ku is requested in addition to the L-band downlink. Please specify the details of the Ku band downlink. Is Ku downlink permanent, or, as e.g. for calibration purposes. If non permanent, what typical utilisation frequency and duration is expected?

For Option 1, the main philosophy is to adapt to the existing NLES interface, which are of types 1, 2 and 3. At this stage, in order to allow maximum re-use of the existing RF adapters,

it is important to ensure a payload compatible with these interfaces. During the requirements review, it may be decided to drop the downlink Ku band.

For Option 2, we accept an evolution in the interfaces (also considering a higher bandwidth) and therefore it is possible to revisit already this stage the requirements on the RF interfaces.

The Ku downlink is permanent as it is pure transposition of the Ku uplink signal.

20. In order to better understand the system design GSA is asked to provide link budgets for the various links in the system. The link budget should clearly identify the performances of the up and downlinks, the aggregate link performance as well as the minimum required link quality. In order to have full understanding, the link budgets are required for the following links: Option 1: C1/L1, C1/C2, Ku1/L1, Ku1/Ku2; Option 2: C5/L5, Ku5/I5, C5/E5b, Ku5/E5b, C5/E5, Ku5/E5.

It assume that all information provided in the Technical Annex and associated reference and applicable document is sufficient for the bidder to perform link budget. Minimum operating performances are defined in AD1 and RD2. Can the bidder clarify what issue he wants to solve with a link budget coming GSA.

21. Annex 1 (Technical Specification) – System F Design. Does the transmission of EGNOS SIS a linearity requirement for the transmission channel (e.g. can the uplink and payload TWTs be operated close to saturation?

NLES Transmit linearity requirements are expressed in EGN-GEO-SPEC-0.2.17

Payload Transmit linearity requirements are expressed in EGN-GEO-SPEC-0.1.11 and EGN-GEO-SPEC-0.1.19.

Operating the tubes with back-off or depend on the performances of the chosen technology and its ability to meet the requirements (Linearizers present or not, SSPA vs. TWTA...)

22. Annex 1 (Technical Specifications), section 3.2.2, Figure 4 – NLES Uplink Station Design. Can the NLES Customer Furnished equipment for both sites provide an interface (contact, serial, network) that could be used to determine "unavailability of EGNOS service" in order to trigger the uplink switching between the 2 sites? Also this would be used to record the service availability vs. time in the M&C system and to trigger alarms.

The EGNOS system foresees an automatic NLES switch algorithm. The EGNOS CPF takes care of sending the EGNOS data to the active the NLES. As described in the Annex A of the IRD, a monitoring serial link is foreseen from the RF station to the NLES core computer to monitor the performances of the RF station.

23. Annex 1 (Technical Specifications), section 3.2.2, Figure 4 – NLES Uplink Station Design.

The interface described on Figure 4 is an RF interface (RF adapter interface towards the RF station). In paragraph 3.2.1.2, a potential evolution to have the interface at IF level is described. In this case more detailed discussions will be required between the winner of this tender and the EGNOS ground segment provider.

24. Annex 1 (Technical Specifications), section 3.2.2, Figure 4 – NLES Uplink Station Design. Where will the requested L-Band Rx antenna on the NLES site be connected to/ used for?

As defined in AD3, the L-band RX antenna is connected the RF adapter for calibration purposes.

25. Please note that the SOW CORRIGENDUM provided still contains a number of instances of "Error! Reference Source not found"

CORRIGENDUM has been replaced and correct tagging EGN-GEO-SOW-x.y.z is restored.

26. Related to question 5, "the document identified as Technical Specifications AD1: EGNOS SIS Specifications from SARPS – The document shall be purchased from ICAO". Is this document the document DO229 version C that can be procured by RTCA?

The SARPS document from ICAO is the applicable document for the description of the signal. The MOPS document from RTCA (DO229 version D) is normally kept in line with the SARPS.

27. Could you give the direct reference (in the web or somewhere else) to buy the SARPS?

The SARPS for Radio Navigation Aids (Annex 10, Vol. 1) can be procured at the following address http://www.icao.int/icao/en/m_publications.html -> section "Online Ordering" at the cost of 310\$

28. . NLES RF service Specifications: Nominal uplink EIRP: It is understood that there is no requirement to operate the NLES power amplifiers with output backoff if only one frequency is transmitted (L1 or E5). Therefore the Nominal NLES EIRP should corresponds to the station saturated EIRP. The reference document Tech_Spec_RD4 ICD ARTEMIS_NLES ARTEMIS_GEO.pdf on page 16 says "HPA output level shall be well below HPA saturation for NLES maximum operating EIRP". If the power amplifier is used for one of signals (L1 or E5), there is probably no reason to require linear operation. Please clarify and if required specify the needed backoff level. This is important for the NLES station sizing.

The NLES transmission linearity requirements are defined in EGN-GEO-SPEC-0.2.17. The proposed solution for the HPA selection and output back-off definition shall be such that:

- The channel characteristics defined in EGN-GEO-SPEC-0.2.17 are met.
- The overall signal in space characteristics defined in the SARPS are met (especially for what concerns the code/carrier coherency, carrier phase noise and spurious emissions).

29. The NLES interface with the EGNOS baseband equipment provided as CFI: Please confirm that the NLES interface with the CFI "baseband" equipment will be made at RF frequency, as is suggested on block diagrams on pages 14, 19 and 23 of the Tech_Spec_RD4 ICD ARTEMIS_NLES ARTEMIS_GEO.pdf. Frequency converters will then be part of the CFI hardware.

The baseline interface as defined in section 3.2.1.1 of the Technical Specifications is an interface at RF level. In this case the frequency converters are delivered as a CFI. However it is said in section 3.2.1.2, that the Contractor shall present his views on the possibility to implement the interface at IF level.