

Clarifications/FAQs On NavIC Receiver Module Development Contract

SAC/ISRO Indent Number: SAC/HPUR/2017003080

Frequently Asked Questions (FAQ)

1. Can we apply for all categories in one proposal itself?
Ans. (See point-3 and Annexure-1 of our tender RFP)
For each receiver category, a separate proposal is required to be submitted in the prescribed format.
2. Given that there are only 6 satellites of IRNSS do we need to meet the requirements based on this requirement?
Ans. IRNSS/NavIC is a seven satellite constellation designed to provide Position, Navigation and Timing Services over Indian & surrounding region. Minimum 4 satellites are sufficient to give PNT solution while additional satellites will help improve GDOP and hence, overall accuracies.
3. Should the modules come with enclosures and power supply boards for testing?
Ans. (See point-7 and Annexure-3 of our tender RFP)
Yes, but Power Supply Board will be separate enclosure/module external to the Receiver module. Please also note the following test requirements :
(a) Vendor is required to provide 5 (Five) Nos. of Test units with Receiver-Module and associated circuitry, if any, for product performance evaluation.
(b) Test Units should have necessary provisions (connectors, test points, turrets etc.) for providing power supply, inputs and taking-out Outputs.
(c) SAC/ISRO will carry out the acceptance tests using its NavIC & GPS Signal Simulators and field trials at Ahmedabad and Bengaluru with Live satellite signals. Vendor representative may also be allowed to participate in these testing and trials on request.
4. Do the additional interfaces be available on the receiver card or can we have them in a separate board?
Ans. (See Annexure-2 and Annexure-3 of our tender RFP)
It is always desirable and better to accommodate additional features to the extent possible on the same module or ASIC.
5. To what level, design details need to be disclosed? What components need to be in source format and what components can be delivered in binary format?
Ans. (See points 7 & 8 of our tender RFP)
Vendor is required to submit all the information necessary and sufficient to enable a third party to independently take up the production of these receiver module(s) without any help from Original Designer/Vendor. It may include hardware details like Schematic, PCB Layout & Gerber files, complete BOM of COTS & custom components and source for getting it, etc. and Software details like C/assembly source code, VHDL code etc. of the processing software etc. with all supporting files need to be submitted.

6. The position error estimate given is 3D, which would also include vertical component. Given that there is a clock issue in IRNSS how do we achieve such accuracies?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

A well designed Receiver should be able to achieve the stated accuracy performance, which has already been achieved earlier by ISRO's in-house designs. As indicated, receiver modules will be thoroughly evaluated with both live signals and NavIC Simulator. BTW, there is no cause of worry about IRNSS clocks.

7. Given that GAGAN doesn't transmit any corrections for IRNSS, why is that the 3D position error reduced for NAVIC + GAGAN receiver?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

GAGAN transmits corrections only to improve the GPS solution. The NAVIC + GAGAN module should be understood as hybrid NAVIC + GPS with GAGAN receiver module. The 3D position error specified for NAVIC + GAGAN receiver is very much achievable.

8. For the differential NAVIC Rx, should we support both L5 and S bands? Do we also need to develop the modules (both hardware and software) for transmission and reception of difference information?

Ans. (See Annexure-2 of our tender RFP)

Yes, You need to support both L5 and S band and all relevant technologies associated with differential positioning, in order to achieve the specified accuracies.

9. Would SAC bear the cost of getting FPGA converted into ASIC and make these devices available in public domain for sale? Would the participating companies get royalty from the sale of these devices?

Ans. (See Annexure-2 of our tender RFP)

SAC prefers and feels that ASIC solution is ideal for meeting the receiver requirements. In any case, SAC/ISRO is not in the business of fabricating devices and selling it, so the question of bearing the cost of converting FPGA into ASIC doesn't arise. Vendor can always make money by selling this ASIC to potential users.

10. The given power targets are not achievable unless we go for an ASIC – but wouldn't that defeat the purpose of putting out tender requiring development details to be made public?

Ans. (See Annexure-2 of our tender RFP)

SAC agrees that ASIC solution from the vendor is ideal for meeting the receiver requirements. Internal design details of ASIC need not be disclosed but detailed internal ASIC block schematic & specifications and source for buying such ASIC need to be disclosed, so that any third party can independently take up the production of these receiver module(s). Vendor can always sell this ASIC to potential users. The aim of this tender is to involve multiple vendors in realisation of cost effective NavIC receiver ASIC/Modules (like GPS chipsets) within the country and enable widespread proliferation of NavIC receiver products and potential applications in the country.

11. Would SAC provide the infrastructure for testing – this includes but not limited to simulators, surveyed locations, test field, beacons etc?

Ans. (See points-6 & 7 and Annexure-3 of our tender RFP)

SAC will carry out the acceptance tests using its own NavIC & GPS Signal Simulators and field trials at Ahmedabad and Bengaluru with Live satellite signals. Vendor Rep. may also be allowed to participate in these testing and trials on request.

12. What is the definition of acquisition sensitivity – is it the point when the receiver fails to acquire a satellite or fails to acquire enough number of satellites to give a fix?

Ans. (See Annexure-2 of our tender RFP)

Acquisition sensitivity is the minimum signal level upto which the receiver can acquire a satellite.

13. What is the definition of tracking sensitivity – is it the point when the receiver says that it is unable to maintain further lock on the signal (due to reduced signal strength) or is it the point when receiver is unable to maintain enough of satellites in track to give a fix?

Ans. (See Annexure-2 of our tender RFP)

Tracking sensitivity is the signal level upto which the receiver can maintain lock on the signal (due to reduced signal strength).

14. In case both the sensitivity definitions pertain to single satellite measurement, what is the use of such a measure as a receiver quality–given that the main functionality of the receiver is to give out position fixes?

Ans. (See Annexure-2 of our tender RFP)

Both acquisition and tracking sensitivities pertain to single satellite measurement but are standard figure of merit parameters to evaluate any navigation receiver worldwide. These determine the availability or otherwise of position fix in various scenario.

15. Are acquisition and tracking sensitivity 50 percentile or 95 percentile numbers? Is it acceptable to have lower sensitivity specs. such as -140dBm Acq.& -152dBm tracking?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

Both the acquisition and tracking sensitivity numbers consider 90% as probability of detection and 10% as probability of false alarm. Vendor is required to meet the specifications listed in the tender RFP.

16. How are the TTFF numbers specified – is it average / 50 percentile or 100 percentile? At what power levels should we validate these numbers?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

TTFF specified is the worst case value. These numbers can be validated at nominal 42dBHz C/No and also at low C/No 36 dBHz.

17. Are there any specifications for TCXO or crystal oscillator to be used? Are we free to choose according to our design choice?

Ans. (See Annexure-2 of our tender RFP)

You are free to choose TCXO or crystal osc. to meet the overall receiver design goals.

18. Is it assumed that the modules will have onboard / on-chip non-volatile memory / time maint.circuitry? How are different designs differentiated based upon these requirements?

Ans. (See Annexure-2 of our tender RFP)

Vendors are expected to use their innovative skills and ingenuity to realise the module with minimal use of external components/circuitry, thereby achieving the stated specifications. ASIC solution would be ideal for such requirements.

19. Can power consumption spec. be relaxed to 1.5W for both Single Freq. L5 Rx and NavIC + GAGAN?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

Vendor is required to meet the power consumption specs. listed in the tender RFP.

20. Which protocol version of NMEA 0183 should be followed – the latest V4.10 includes GPS/GLONASS / GALILEO and doesn't specify other systems.

Ans. (See Annexure-2 of our tender RFP)

The latest protocol of NMEA0183 is to be followed considering that only the talker ID for IRNSS will be changed. IRNSS will soon be incorporated in NMEA standard.

21. What is the Antenna requirement for these modules?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

The module should be capable of supporting both Active Antenna and Passive types of Antenna (Single or Dual Band as per receiver type) and must have minimum one RF input. Typical Cable length for antenna will be around 2 meters.

22. Whether Module size, weight and form factor are specified and critical?

Ans : (See Annexure-2 of our tender RFP)

There are no specified values for Module size, weight and form factor but these are critical and expected to be as lower or optimum as possible.

23. How are the following parameters being defined as innovative features –

a) Number of channels – does this refer to the ability of the receiver to generate measurements or the ability of the receiver to assign a hardware instance to a particular satellite?

b) Environmental specs – given that this is a commercial product would we get more points if we comply with industrial grade specifications?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

Number of channels is a basic feature. The ability to assign a hardware channel to a particular signal is an innovative feature. A rugged product is always better than a commercial product.

24. Are there any specific receiver module dynamics requirements to be supported?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

There are no specified values for receiver module dynamics requirements but vendor is expected to specify the velocity, acceleration and jerk specs. as implemented.

25. Are RS-422 / Ethernet / USB /SPI /RS-232 etc. interfaces required in receiver modules?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

These are not mandatory but desirable features for catering to many other innovative and custom applications which may necessitate such interfaces like (Bluetooth, RS-232, RS 422, Ethernet, USB, SPI etc.)

26. What are the applications for which these modules will be used?

Ans. (See Annexure-2 and Annexure-3 of our tender RFP)

The idea is to enable widespread proliferation of NavIC based receivers for various applications related to location based services, transportation, vehicle tracking, etc. These products will act as catalysts towards humble but firm beginning towards rolling out of positioning and navigational services in the country.

27. Would a purchase order for followup receiver units be given at the quantities prescribed?

Ans. (See points-5 & 7 of our tender RFP)

Not guaranteed at present but there could be near future requirements dictated by market forces. But Vendor has to confirm that it is feasible to produce the prescribed qty. at designated price. It also ensures the production viability of solution.

28. Any special consideration for fully indigenous product and indigenously developed chipset based solution?

Ans. (See Points 2 & 5 and Annexure-2 of our tender RFP)

No, there is no provision for such considerations. Indian companies may design their own chipset/circuit or use foreign chipset/board to offer the receiver solutions.

29. What are the incentives to start ups to participate in this tender?

Ans. (See points-1, 4, 7 & 9 of our tender RFP)

While there are no separate/special incentives for start-ups, there is a provision of advance payment upto 25% against bank guarantee for short listed participants. Any new design idea is always welcome as we have the provision to select and give lump sum payment for max. 10 different designs, in each receiver category. Moreover, the best receiver module in each category can win a cash incentive!

30. The tender has been floated for five different categories of receivers. However, provision to quote has been given for only one type of receiver in the price bid.

Ans. (See Points 5, 7 & 9 of our tender RFP)

As such there is nothing like quoting prices as the lump sum payment and incentive values have already been decided and specified in the contract. Vendor have to submit only their technical bids and agree to the payment terms and conditions specified in tender RFP. Provision for each category of receiver will be made.

31. Will there be a pre-bid meeting to discuss technical queries and IP Issues?

Ans. (See points 11 & 12 of our tender RFP)

If required, SAC/ISRO will consider arranging such a meeting with our technical evaluation committee.

32. What will be the Basis for Short Listing of Developers?

Ans. (See Points-4 & 5 and Annexure-2 of our tender RFP)

Detailed Technical Evaluation of vendor's proposal including Design approach, Realization Plan and preparedness for design sharing will be among the major factors governing short listing.
