

**Contract
for
Engineering Services for Air Traffic Control
(ATC) Subsystems**

Contract No. KARI-16-0068

**Between
Korea Aerospace Research Institute
and
Contractor**

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General Terms and Conditions

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Preamble

This Contract made and entered into this XXth day of June, 2016 by and between Korea Aerospace Research Institute (“KARI”), a Korean Government-funded research institution established and operating under the laws of the Republic of Korea, with its principal office at 169-84 Gwahak-ro, Yuseong-gu, Daejeon, 34133 Korea, and _____ (“Contractor”) established under the law of _____ with its principal office at _____.

Witnesseth

WHEREAS, KARI intends to acquire Air Traffic Control subsystems and desires Contractor to provide certain software packages, training, and technical support including any technical data and information as needed; and

WHEREAS, Contractor has a knowledge and experience in the said area and retains technical expertise and highly qualified personnel to provide such services, technical data and information; and

WHEREAS, Contractor is willing to provide KARI with the software packages, training, technical support, technical data and information on the terms and conditions as set forth in this Contract.

NOW, THEREFORE, in consideration of the mutual covenants and premises, both Parties hereto have agreed to the following:

Article 1. Definitions

1.1 The terms defined in this Article shall have the meaning ascribed to them herein whenever they are used in this Contract, unless otherwise clearly indicated by the context.

“Contract” means this Contract for Engineering Services for ATC subsystems, including Appendices as attached hereto, and all amendments that may be agreed to by the Parties in accordance with the terms and conditions of this Contract.

“Contractor” means _____.

“Deliverable Data” means any design, engineering or technical data and documentation as listed in Appendix A “Statement of Work” that Contractor shall deliver to KARI, including any related data and information thereof, in the course of the provision of the Services .

“Deliverable Item” means any material, equipment or items as listed in Appendix A “Statement of Work” that Contractor shall deliver to KARI, including any related software, data, information and manuals, in the course of the provision of the Services.

“EDC” or **“Effective Date of the Contract”** means the date identified in Article 16 “Effectiveness of Contract”.

“Force Majeure” means any act of God, war, act or failure to act of any government in its sovereign capacity, fire, flood, earthquake, strike, epidemic, quarantine, embargo, nuclear incident, or any other event, unforeseeable and beyond the reasonable control without any fault by the Party relying upon the Force Majeure or its Subcontractors.

“KARI” means Korea Aerospace Research Institute.

“Party” or **“Parties”** mean KARI or Contractor, or both, according to the context.

“MIDAS Project” means the “Management on Integrated operations of Departure, Arrival, and Surface” (MIDAS) project funded by Korean government.

“ATC subsystems” mean subsystems used for Air Traffic Control (ATC) service and simulation environment.

“Services” means any technical support and engineering services, including review, analysis, calculation and any other consulting and advisory services, as listed in Appendix A “Statement of Work”, to be provided by Contractor under this Contract.

“Subcontract” means any subcontract, including purchase orders and all similar forms of agreements at any tier under this Contract.

“Subcontractor” means a contractor under any Subcontract, including suppliers.

“Third Party” means any individual or legal entity other than the Parties and Subcontractor.

Article 2. Contract Documents

2.1 This Contract shall comprise the following documents, as amended from time to time by written agreement by and between both Parties:

General Terms and Conditions

Appendices

- A Statement of Work
- B Price and Payment Schedule
- C TBD
- D TBD

2.2 In the event of any inconsistency or discrepancy between or among the Contract documents as listed in Article 2.1 above, the Contract documents shall be applied in the decreasing order of precedence.

Article 3. Scope of Work

3.1 In accordance with the requirements and scopes of work as set forth in this Contract including Appendices thereto, Contractor shall perform the Services and provide any Deliverable Item and Deliverable Data including any materials and supplies as needed as part of the Services.

3.2 Contractor shall, without any additional charge to KARI, provide KARI with such software, technical data, documentation and information as may be reasonably required by KARI to understand the output of the Contractor’s work hereunder.

3.3 Contractor shall keep KARI informed with respect to the performance of the Services, and shall comply with instructions given by KARI.

3.4 Contractor shall perform its obligations under this Contract for each phase as defined in Appendix A “Statement of Work” and as authorized by KARI. Such authorization shall be provided to Contractor prior to the start of the next phase, provided, however, that the first phase shall be deemed to have been authorized by KARI upon the EDC as stipulated in Article 16 “Effectiveness of Contract” hereof. If the authorization for the 2nd phase is not provided by KARI to Contractor as set forth herein, then this Contract shall be deemed to have been terminated for the 2nd phase(s) by KARI for convenience under Article 17.2 hereof. In such case, Contractor shall be entitled to compensation by KARI for the then-current phase(s) as provided in said Article 17.2, but shall not claim any compensation for termination damages or reimbursement for any termination costs against KARI for the 2nd phase(s) so terminated.

Article 4. Contract Price

- 4.1 For the full, satisfactory and timely performance of all obligations by Contractor in accordance with the provisions of this Contract, KARI shall pay to Contractor the Contract Price of **TBD** Korean Won (KRW **TBD**) in accordance with the terms of payment as specified in Article 5 "Terms of Payment".
- 4.2 The Contract Price is a firm and fixed amount not subject to any escalation or to any adjustment or revision for any reason whatsoever, including but not limited to the increase of actual cost incurred by Contractor in the performance of the Contract.
- 4.3 All banking charges incurred in Korea shall be borne by KARI, and those charges incurred outside Korea shall be borne by Contractor.

Article 5. Terms of Payment

5.1 Payment Schedule

The Contract Price as specified in Article 4 "Contract Price" shall be paid in accordance with the schedule as set forth in Appendix B "Payment Schedule".

5.2 Terms of Payment

- 5.2.1 All invoices Contractor submits for payment shall be in triplicate signed by an authorized company official and received by KARI at least thirty (30) days before the payment due dates as specified in Appendix B "Payment Schedule". Contractor, together with the invoice, will submit to KARI the two (2) signed copies of the work acceptance certificate for the payment milestone, which justifies the completion of work under this milestone. One (1) copy of this work acceptance certificate signed by KARI shall be returned to the Contractor by the express mail.
- 5.2.2 All payments shall be made in Korean Won by telegraphic transfer to the bank account as designated by Contractor in its invoices, by the payment due dates as stipulated in Appendix B "Payment Schedule", or not later than thirty (30) days after KARI's receipt of Contractor's invoices whichever becomes later.
- 5.2.3 Notwithstanding any provisions of this Agreement, if any requisites for payment as set forth in Appendix B "Payment Schedule" has not been accomplished until each payment due date for any reasons attributable to Contractor, KARI may, with an advance notice, suspend all payments due until KARI and Contractor agree that such delayed requisites for payment has been accomplished.
- 5.2.4 In the event of KARI's suspension of payment under Article 5.2.3, Contractor shall nevertheless continue to perform its obligations under this Contract regardless of whether the existence of breach is disputed.
- 5.2.5 All the payments due to Contractor hereunder shall be converted into the U.S. dollars at the telegraphic transfer selling rate of a Korean remitting bank on the date of

remittance. Upon request from Contractor, KARI shall provide a copy of the payment receipt issued by the remitting bank.

5.3 Whenever the payment due date falls on Saturday, Sunday, KARI's non-business day or a Korean legal holiday, the payment date shall be the following business day.

5.4 Deduction of Payment

Any amounts due by Contractor to KARI under this Contract shall be paid by Contractor within thirty (30) days from receipt of KARI's invoice. Should KARI not receive the said amounts within the thirty (30) days' period, then KARI will send to Contractor a written notice referencing KARI's unpaid invoice. Should, in spite of such notice, Contractor not make such payment, then such amounts may be deducted from any payment that may be or become due to Contractor from KARI or called up from the performance bond under this Contract.

Article 6. Taxes

6.1 All payments by either Party to the other Party under this Contract, including, but not limited to, the payment of Contract Price, shall be made net, free and clear of any federal, state or local taxes, funds, stamp duties, fees, transfer taxes, duties or charges of any kind whatsoever, levied or imposed by the government or any political divisions of either Korea or [country name], whether to be withheld or not, so that such other Party may receive such payments in their entirety without any deduction.

[Note] This Article 6.1 shall be finally agreed by both Parties in accordance with Korean Tax Law and International Tax Treaty between Korea and Contractor's country.

6.2 In any event, any taxes or duties of any nature levied by Korean tax authorities on Contractor's personnel and personal effects shall be borne and directly paid by Contractor to the Korean tax authorities.

6.3 Notwithstanding any provisions in this Contract, the Contract Price payable by KARI to Contractor under this Contract shall be exclusive of Korean value-added tax (VAT), if any, which shall be treated in accordance with the provisions of the Korean VAT law.

Article 7. Representations and Warranties

7.1 Contractor represents and warrants to KARI that:

(a) Contractor shall provide the Services in a timely and efficient manner and in accordance with the-state-of-art engineering and design industry standards and practices;

(b) Each of its employees who are providing the Services shall be qualified and sufficiently experienced so as to provide the Services competently,

professionally and efficiently with the standards and practices as set forth in Paragraph (a) above;

- (c) All Deliverable Items that Contractor is providing as part of the Services shall be free from defects and errors;
- (d) Contractor shall have good title to all design, engineering or technical data or documents, and all material, equipment or items provided to KARI, including, but not limited to, the Deliverable Items and Deliverable Data, free from any and all claims, demands, liens and encumbrances on title; and
- (e) Neither part of the design, engineering or technical data or documents, and all material, equipment or items provided to KARI, including, but not limited to, the Deliverable Items and Deliverable Data, when given and in the future, shall be the subject of any Third Party infringement claim or action.

7.2 The warranty period hereof shall be twelve (12) months from the expiration or termination date of this Contract.

Article 8. Indemnity

8.1 Contractor agrees to indemnify, defend and hold KARI, and its officers, directors, employees, agents, shareholders and Subcontractors, their officers, directors, employees, agents and shareholders, harmless against and in respect of any claim, liability, obligation, loss, damage, assessment, proceeding, judgment, cost and expense (including, without limitation, reasonable attorney's costs and expenses reasonably incurred in investigating, preparing, defending against or prosecuting any litigation or claim, action, suit, proceeding or demand) (collectively, the "Damages"), arising out of or in any manner incident, relating or attributable to any inaccuracy in any representation or breach of or failure to duly perform as required under this Contract any undertaking, obligation, warranty or covenant by Contractor contained in this Contract or any negligent or willful misconduct by Contractor.

Article 9. Suits for Infringement

9.1 In the event that any suit, claim, action or proceeding against KARI and its Subcontractor arises from allegations that any proprietary rights to be provided by Contractor hereunder constitute infringement of any patent, copyright, trade secret, know-how, or any other proprietary right of any Third Party, Contractor shall defend KARI's and the Subcontractor's right, title and interest to the same against such suit, claim, action, or proceeding at Contractor's expense and shall hold KARI and its Subcontractor harmless from any damages or losses of any kind including without limitation legal fees. If as a result of such suit, claim, action or proceeding, the proprietary rights or any part thereof is held to constitute an infringement and the use of said proprietary rights, or any part thereof, is enjoined, Contractor shall promptly, at its option and expense, either procure for KARI and its Subcontractor the right to continue using said proprietary rights, or the part thereof, or replace the same with non-infringing proprietary rights acceptable to KARI.

Article 10. Delays in Performance

10.1 Excusable Delay

- (a) Neither Party shall be responsible to the other Party for any delay in performing its obligations under this Contract due to any events of Force Majeure.
- (b) The Party whose performance of obligations hereunder has been affected by any events of Force Majeure shall notify the other Party within ten (10) days thereafter by sending a detailed statement and sufficient evidence with respect thereto, and promptly of any subsequent change in the circumstances, if any. The affected Party shall exercise its best efforts under the circumstances to remove or remedy the events of Force Majeure and the effects thereof and resume full performance hereof as soon as possible.
- (c) Notwithstanding Paragraph (a) above, any such delay that has not been notified to the other Party pursuant to Paragraph (b) above shall not be excused for any reason whatsoever. Notwithstanding Paragraph (a) above, any delay of performance of the affected Party falling due after any delay, failure or incompleteness in exercising the pertinent best efforts to remove or remedy the pertinent events of Force Majeure or the effects thereof pursuant to Paragraph (b) shall not be excused for any reason whatsoever.
- (d) The Party who has received or was entitled to duly receive the notice of events of Force Majeure under Paragraph (b) above may suspend performance of its obligations, which shall be due subsequent to such events of Force Majeure, until the other Party has effected such delayed performance to the full extent after and in view of such events of Force Majeure.

10.2 Non-Excusable Delay

- (a) In the event that, unless otherwise excused by virtue of this Contract or the governing or applicable law, Contractor delays the provision of Services or delivery of any Deliverable Items or Deliverable Data as stipulated in this Contract, or performance of its other obligations under this Contract, Contractor shall be responsible for damages incurred by KARI as a result of such delay.
- (b) Contractor acknowledges and agrees that the timely provision of Services or delivery of any data and documentation as stipulated in this Contract or its performance of its other obligations under this Contract is essential to KARI, and that such delay as provided for in Paragraph (a) above may cause substantial financial loss or damage to KARI's rights, interests, privileges and benefits, profits, which may not be assessable or recoverable. Both Parties therefore specifically agree that in the event of such loss or damage, Contractor shall pay KARI, as liquidated damages, zero point two five (0.25%) of the Contract Price for each day of such delay; provided, however, that if such delay does not exceed thirty (30) days, the liquidated damages for such delay will be waived. In no case, however, shall the aggregate accumulated liquidated damages under this Contract for the delayed Services, Deliverable Data or Deliverable Item

exceed ten percent (10%) of the Contract Price, provided, however, that if the aggregate number of days of delay under this Article, excluding those days of delay excused by KARI in writing, should exceed forty (40) days, KARI may terminate this Contract for Contractor's material breach.

- (c) For the purpose of this Article, any action or omission of Contractor's Subcontractor, agent, or servant, *de facto* or *de jure*, shall be deemed to be Contractor's own.

Article 11. Performance Bond

- 11.1 Contractor shall establish a performance bond in favor of KARI in the value of ten percent (10%) of the Contract Price as stipulated in Article 4 "Contract Price", within fifteen (15) days after the EDC, in the form of an irrevocable standby letter of credit.
- 11.2 The letter of credit shall be drawn in favor of KARI and advised through the Woori Bank (Address: Daejeon Branch at Moonye-ro, Dunsan-dong, Seo-gu, Daejeon, 302-173 Korea, Tel.: +82-42-488-9704, Ext. 312 / Fax : +82-505-003-6200 / e-mail : the_banker@wooribank.com). The entire amount covered by the performance bond shall be payable to KARI on demand together with KARI's written statement to the effect:
- (a) that there was a default of the Contractor in the performance of the Contract (including Subcontractor's default under the Subcontract), or
 - (b) that any amount KARI is entitled to receive from Contractor has not been paid by Contractor to KARI through any other means, or
 - (c) that this Contract was terminated as specified in Article 10.1.
- 11.3 The performance bond shall expire thirty (30) days after the warranty period as stipulated in Article 7.2 and shall be fully released by the instruction of KARI upon satisfactory completion of the Contract or on its expiry date.
- 11.4 It is hereby agreed between the Parties that payment from the performance bond under this Article shall not affect any other of KARI's rights, privileges, interests or remedies under this Contract or the applicable law.

Article 12. Legal Compliance and Governmental Authorizations

- 12.1 Contractor and its employees shall comply with all applicable legal requirements of any place in which any part of the work or Service under this Contract is to be done and with the legal requirements of public, municipal and other authorities in any way affecting or applicable to any work performed by Contractor and its employees.
- 12.2 Unless otherwise provided for herein, Contractor shall at its own expense obtain any permits, licenses, approvals or certificates including any other requirements for import or export necessary for the performance of the work or Service under the Contract. Contractor shall perform the work or Service in accordance with the conditions of any applicable permits or licenses, approvals or certificates.

- 12.3 No Party shall be responsible in any way for the consequences, direct or indirect, of any violation of law by the other Party or its Subcontractors or their officers, employees, agents or servants. Each Party shall keep the other Party, its officers, employees, agents, contractors, Subcontractors and assignees harmless and indemnify them against all losses, damages, liabilities, demands (whether in contract or tort or foreseeable or not, or direct or consequential) and all expenses legal or otherwise (including attorney's fees) including but not limited to damages to property, injury to persons (including sickness and death) and economic loss, arising from or as a consequence of such violation.
- 12.4 Contractor shall be responsible for obtaining all governmental authorizations necessary for the performance of the Contractor's obligations hereunder in a timely manner.

Article 13. Non-Transfer and Use Assurances

- 13.1 In case that any part of the Services, Deliverable Items or Deliverable Data to be provided to KARI by Contractor under this Contract are subject to export control regimes of the exporting country for the purpose of non-proliferation of dual use articles and technology, KARI hereby assures and certifies that KARI will use the said articles and technical data only for peaceful purposes and, as an end user, except as specifically authorized by prior written approval of the relevant authorities of the exporting country, will not re-export, re-sell or otherwise dispose of the articles and technical data outside the Republic of Korea or to any other person except KARI's Subcontractor for the purpose of MIDAS Project. If requested by Contractor, KARI shall execute and issue to Contractor a non-transfer and end use certificate containing the said KARI's assurances.

Article 14. License and Ownership of Data and Information

- 14.1 Contractor hereby grants to KARI an irrevocable, non-exclusive, and world-wide right to use Deliverable Item, Deliverable Data and the result of Service for the MIDAS Project and other projects during and after the Contract without payment of additional compensation to Contractor or any other Third Party. In the event that any party other than Contractor claims or threatens to claim infringement by KARI with respect to such use of Deliverable Item, Deliverable Data and the result of Service, Contractor shall defend, hold harmless, and indemnify KARI from such infringement claims. If any license or consent from Contractor or any Third Party is required to ensure KARI Subcontractor's right to use Deliverable Item, Deliverable Data and the result of Service for the MIDAS Project, Contractor shall grant and shall have such Third Party grant such license and consent to KARI Subcontractor through KARI, which license and consent shall not be unreasonably withheld.
- 14.2 Subject to Article 14.1 above, Contractor shall retain ownership rights in its prior existing standards, computer programs, reference materials, drawings, and engineering tools, used in connection with the Services under this Contract.

- 14.3 Contractor shall return all data and information furnished by KARI to the extent requested upon completion of the Services or termination of this Contract. Contractor may, however, retain and use copies thereof for internal purposes only in furtherance of its know-how and in meeting any requirements placed on Contractor by its government authorities and agencies. Contractor releases KARI from any and all liabilities to Contractor with respect to the use of such information for purposes other than those of Contract. Furthermore, Contractor shall defend, indemnify and hold KARI and its Subcontractor harmless from any and all Third Party claims that may arise as a result of such use.

Article 15. Confidentiality

- 15.1 Each Party agrees to keep secret and confidential all information obtained pursuant to this Contract from the other Party, which is designated as confidential by the other Party. The Parties agree to take all necessary precautions in a manner acceptable to the Party furnishing the confidential information in order to keep secret and confidential such information and to restrict its use outside and beyond the scope of this Contract; provided, however, that the above shall not apply to information which is or becomes part of the public domain or obtained from an independent source through no fault of the disclosing Party, nor shall the above restrict or prohibit the disclosure of such information to competent government authorities as is required to bring about the purposes intended by this Contract.
- 15.2 Any information derived from KARI's property in connection with this Contract, shall be kept secret and confidential and shall not, without the consent in writing of an authorized officer of KARI, be published or disclosed to any Third Party, or made use of by Contractor, except for the purpose of implementing this Contract.
- 15.3 The obligations undertaken by the Parties pursuant to this Article 15, shall survive termination of this Contract and shall remain in effect and be binding on the Parties for a period of five (5) years after the termination of this Contract except for such information as shall become part of the public domain or is received from an independent source through no fault of the Party wishing to disclose.
- 15.4 Contractor shall obtain the prior written approval of KARI concerning the content and timing of news releases, articles, brochures, advertisements, prepared speeches, and other information releases, proposed to be made by such Party concerning this Contract or the work performed or to be performed hereunder. KARI shall be given a reasonable time to review the proposed text prior to the date scheduled for its release.

Article 16. Effectiveness of Contract

- 16.1 The effective date of this Contract ("EDC") is the date on which all of the following conditions have been satisfied:
- (a) The duly authorized representatives of the Parties have signed this Contract; and

- (b) The appropriate governmental authorities of the Republic of Korea and the Contractor's country have duly approved this Contract, if required.

16.2 Any amendment to this Contract shall be effective upon signature by the duly authorized representatives of both Parties and the approval of such amendment by the government of the Republic of Korea and the government of the Contractor's country, if required.

Article 17. Termination

17.1 KARI may terminate this Contract upon written notice to Contractor:

- (a) if Contractor commits a material breach of any of its obligations under this Contract which shall not be remedied within thirty (30) days from the giving of written notice requiring such breach to be remedied;
- (b) if the aggregate number of days of delay for Service, Deliverable Item or Deliverable Data should exceed forty (40) days as set forth in Article 10.2, excluding days of delay excused by KARI in writing.
- (c) if Contractor or its creditors or any other eligible party shall file for its liquidation, bankruptcy, receivership, reorganization, dissolution or similar proceedings, or if Contractor is unable to pay any debts as they become due, has explicitly or implicitly suspended payment of any debts as they became due (except debts contested in good faith), or if Contractor's creditors have taken over its management, or if the relevant financial institutions have suspended Contractor's clearing house privileges.
- (d) if Contractor becomes incapable for a period of sixty (60) consecutive days of performing any of its obligations under this Contract because of Force Majeure; or

In the event of such termination, Contractor shall return to KARI all materials, data and documentation provided by KARI, at no cost to KARI. In addition, Contractor shall return to KARI all the amounts received from KARI up to the date of such termination, and KARI shall return all results of Services provided by Contractor under this Contractor up to the date of such termination, in the manner of "as is".

In the event of the termination pursuant to Paragraphs (a), (b) and (c) above, Contractor shall also pay ten percent (10%) of the Contract Price as specified in Article 4 "Contract Price" as liquidated damages, not as a penalty.

17.2 KARI may terminate this Contract, in whole or in part, at any time for its convenience, upon reasonable prior written notice to Contractor. In case of such termination for convenience, Contractor shall be entitled to the amount paid and payable up to the date of such termination.

17.3 In the event of the termination pursuant to this Article, KARI, at its sole discretion, may retain the result of Services which have already been or are supposed to be provided by Contractor up to the date of such termination by paying the Milestone

payments which have already become due up to the date of such termination Any and all terms and conditions of this Contract shall apply to such Services as if it had not been terminated.

Article 18. Resolution of Disputes and Governing Law

- 18.1 In case any dispute, controversy or claim arises out of or in relation to this Contract or with respect to a breach hereof, the Parties shall seek to resolve the matter amicably through discussions between themselves. In the event of any disagreement between KARI and Contractor about the interpretation of the provisions or definitions used in this Contract, the interpretation of KARI shall govern until and unless otherwise decided by arbitration conducted pursuant to the following provisions.
- 18.2 The arbitration panel shall consist of three (3) arbitrators, two (2) of which appointed by each Party, respectively, and the remaining one (1) by an agreement by those arbitrators appointed by the Parties. In the absence of such appointment or agreement within the period determined by the Korean Commercial Arbitration Board (KCAB), the KCAB, at its sole discretion, shall appoint to fill the vacancy. The proceedings shall be conducted in English. The award rendered by the board shall be final and binding on the Parties and may be entered in any court of competent jurisdiction for execution.
- 18.3 Notwithstanding any other provision in this Contract, any Party may seek preliminary injunctive relief from any court of competent jurisdiction, pending the final award of the arbitration.
- 18.4 The validity, performance, construction, and effect of this Contract shall be governed by the laws of Korea.

Article 19. Notice

- 19.1 All notices required or permitted to be given hereunder shall be made in writing, and shall be valid and sufficient if dispatched by registered airmail (postage prepaid), delivered personally, or sent by facsimile to the following addresses:

(a) If to KARI:

Address: Korea Aerospace Research Institute
169-84 Gwahak-ro, Yuseong-gu
Daejeon, 34133 Korea

For Contractual Matter

For Technical Matter

Attn: Mr. Won-Suk LEE
Senior Administrator
Tel.: +82-42-860-2406
Fax : +82-42-860-2666

Attn: Ms. Hyoun Kyoung Kim
Senior Engineer
Tel.: +82-42-860-2371
Fax : +82-42-860-3540

e-mail : wsl@kari.re.kr

e-mail : kimhk@kari.re.kr

(b) If to Contractor:

Address: [Company name]
[Address]

For Contractual Matter

For Technical Matter

Attn:

Attn:

[Title]

[Title]

Tel.:

Tel.:

Fax :

Fax :

e-mail :

e-mail :

19.2 Each Party may change its address for notice by notice given to the other Party in the manner set forth above.

19.3 Notices given as herein provided shall be considered effective seven (7) days after the registered postage pre-paid airmailing thereof or the day of actual receipt thereof, whichever occurs first, or on the day of personal delivery, or the day of sending if by facsimile.

Article 20. Miscellaneous

20.1 Entire Agreement

This Contract embodies the entire agreement of the Parties with respect to the subject matter hereof and supersedes and cancels any and all prior understandings or agreements, oral or written, in relation hereto, which may exist between the Parties. No oral explanation or oral information by any of the Parties shall alter the meaning or interpretation of this Contract.

20.2 Assignment

This Contract and each and every covenant, term and condition hereof shall be binding upon and inure to the benefit of the Parties and their respective successors, and neither this Contract nor any rights and obligations hereunder shall be assignable or delegable directly or indirectly by either Party without the prior written consent of the other Party.

20.3 Unenforceable Terms

If any term or provision of this Contract shall for any reason be invalid, illegal or unenforceable in any respect, this Contract shall be interpreted and construed as if such term or provision had never been included herein. In such a case, any remaining part of this Contract shall not be influenced by such ineffectiveness

20.4 Non-Waiver

The failure or delay of any Party to require performance by the other Party of any provision of, or of any right or obligation under, this Contract, shall not constitute a waiver thereof, nor shall such affect that Party's right to thereafter require performance of such or any other provision, right or obligation.

20.5 Disclaimer of Agency

This Contract shall not be deemed to constitute any Party the agent of the other Party.

20.6 Subcontract

Contractor shall not subcontract any Services or works hereunder to any Third Party without KARI's prior written approval, which approval shall not unreasonably be withheld, provided that Contractor shall be fully responsible for such Subcontract and shall not be relieved of its obligations hereunder.

20.7 Language and Unit

This Contract is executed in English and all documents, drawings, plans and any other writings as well as communication between the Parties shall be in English. Weight and measurement for Deliverable Item and Deliverable Data shall be recorded in units of metric system.

20.8 Amendment

No amendment or change hereof or addition hereto shall be effective or binding on any of the Parties unless reduced to writing and executed by the respective duly authorized representatives of each of the Parties.

20.9 Headings

The headings in this Contract have been inserted for convenience of reference only and are not to be used in construing or interpreting this Contract.

IN WITNESS WHEREOF, the Parties have caused this Contract to be executed by their respective duly authorized officers as of the date first above set forth.

Korea Aerospace Research Institute

Contractor

By: _____

By: _____

Name: Gwang-Rae CHO Ph.D

Name: _____

Title: President

Title: _____

Appendix A. Statement of Work

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Appendix B. Payment Schedule

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Payment Schedule

No.	Payment Milestone *	Payment Due Date	Amount (KRW)	Percentage (%)
1	EDC	EDC + 1 M	<u>TBD</u>	10%
2	After Delivery of Software Packages, Training, and Technical Support for FDPS, FDO, CWP, and TSS	EDC + <u>TBD</u> M	<u>TBD</u>	TBD%
Total for the 1st phase			<u>TBD</u>	TBD%
3	After Delivery of Software Packages for HASW, PLT, and DRS	EDC + <u>TBD</u> M	<u>TBD</u>	TBD%
4	After Training and Technical Support for HASW, PLT, and DRS	EDC + <u>TBD</u> M	<u>TBD</u>	TBD%
Total for the 2nd phase			<u>TBD</u>	TBD%
Total			<u>TBD</u>	100%

* Each Payment Milestone corresponds with “4. Deliverables and Schedule” of Appendix A “Statement of Work”.

KARI PROPRIETARY

Technical Specifications of
Engineering Services for ATC Subsystems



June 17, 2016

Korea Aerospace Research Institute

KARI PROPRIETARY

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1. General

1.1 Background

The “Management on Integrated operations of Departure, Arrival, and Surface” (MIDAS) project is a Korean government funded R&D project and the Korea Aerospace Research Institute (KARI) is the main contractor of that. The purpose of the MIDAS project is to acquire advanced air traffic management technologies to increase both efficiency and safety in terminal and airport. The scope of the project includes not only the development of core technologies and decision support tools such as AMAN/DMAN (Arrival Manager/Departure Manager) but also the validation of them through Human-In-the-Loop (HITL) simulation.

The objective of this RFP is to select “contractor” which is capable of providing engineering services for the air traffic control (ATC) subsystems, which will be parts of HITL simulation systems. The tasks of engineering services consist of technical data transfer, training and technical support on the system. (Refer to the 2.2 Description of Tasks for the details.)

1.2 Qualification of Bidders

The bidders shall be ISO 9001 certified. The bidders shall have experience in developing both ATC systems and ATC simulation systems for at least five years and there shall be more than one relevant system in operation.

2. Technical Requirements

2.1 System Requirements

The ATC subsystems consist of the followings.

- Flight Data Processing System (FDPS)
- Flight Data Operator (FDO) Position
- Controller Working Position (CWP)
- Traffic Simulation System (TSS)
- Pseudo Pilot (PLT)
- Data Recoding/Playback System (DRS)
- High Availability Processing Software (HASW)

The subsystems above shall be capable of being interfaced with Surveillance Data Processing System (SDPS) and AMAN/DMAN developed by KARI. The subsystems except TSS and PLT shall be capable of being used for real ATC operations.

All subsystems shall be able to be run at linux operating system (Redhat 7.x or higher, CentOS 7.x or higher)

The detail requirements for each are described in the following sections.

2.1.1 FDPS

Flight Data Processing System shall have the following functionality

- ATS messages handling in accordance with [ICAO 4444], [ICAO 4444 – 1]
- System Flight Plan (SFPL) handling in accordance with [FDPD_AREA], [FDPD_APPROACH]
- Trajectory prediction (4D TP) with meteorological data processing, BADA based on EUROCONTROL Total Energy Model (TEM), Airspace structure in accordance with [TP]
- Flight Data Processing and Distribution (FDPD) in accordance with [FDPD_AREA], [FDPD_APPROACH]
- System Support Coordination (SYSCO) - AIDC/OLDI in accordance with [ICAO 4444], [OLDI]
- SSR code management (ORCAM) in accordance with [ORCAM]
- RPL(Repetitive Flight Plan) data handling

- Flight plan and track correlation (COR) in accordance with [FDPD_AREA], [FDPD_APPROACH]
- Monitoring Aids (MONA) in accordance with [MONA]
- Medium Term Conflict Detection (MTCD) in accordance with [MTCD]
- Flight Plan Track (FPL Track) in accordance with [FDPD_AREA], [FDPD_APPROACH]

Flight Data Processing System shall have the following capacity

- Number of passive FPLs: 4000
- Number of Active FPLs: 500

2.1.2 FDO

Flight Data Officer Working Position shall have the following functionality:

- FDO shall display the following lists of ATS messages:
 - List of received ATS messages
 - List of sent ATS messages
 - List of received ATS messages with errors
- FDO shall display the list of Flight Plans (both active and passive)

Flight Data Officer Working Position shall have the following capacity

- Number of received/sent messages per a day: 10000

2.1.3 CWP

Controllers Working Position shall have the following functionality:

- CWP shall display surveillance data obtained from SDPS and surveillance sensors:
 - System tracks from SDPS
 - Plots and mono sensor tracks from PSR, SSR, MLAT/WAM and ADS-B
 - Ground tracks from ASDE
- CWP shall receive System FPLs from FDPS and combine System FPLs with System Tracks based on SFPLs and System Track numbers.
- CWP shall receive and present SNET, MONA and MTCD warnings in a track labels.

- CWP shall display AIP information in a graphical form.
- CWP shall adapt and display airport configuration in a graphical form for airport controllers.
- CWP shall be able to be used for not only enroute/approach controllers but also airport controllers.
- CWP shall display airport configuration map using KARI data format.
- CWP shall have a functionality to attach and detach labels(callsign to track data) manually at ground targets.
- CWP shall have a functionality to add information to the data block without source code modification.
- CWP shall present SFPL's route in a graphical form. It shall be possible to change a route with a help of a mouse manipulator.
- CWP shall also display SFPLs as a formatted string in a list or as an Electronic Strip.
- CWP shall display the following type of SFPLs lists:
 - Pending list
 - Control list
 - Terminated
 - Departure list
 - Arrival list
- CWP shall receive and present data from AMAN/DMAN systems. These data shall be presented in a track label. It shall be possible to display any text data received from AMAN/DMAN at any field of track label based on adaptation parameter. If AMAN or DMAN send advisories in the form of routes, CWP shall display them.
- Label anti-overlap functions shall be compatible with [LABEL ANTI-OVERLAP]
- CWP shall present air situation picture in a 3D space in accordance with WGS-84 model of the Earth.

Controllers Working Position shall have the following capacity

- Number of System Tracks: 1200
- Number of Active SFPLs: 500

2.1.4 TSS

Traffic Simulation System shall have the following functionality:

- TSS shall simulate trajectories of the aircraft based on corresponding Flight Plans organized in exercises.
- Aircraft dynamics shall be based on BADA performance model.
- It shall be possible to change flight level, the route or the dynamics of the aircraft from the PLT working position.
- The following procedures shall be simulated:
 - Flying along the route
 - Parallel offset
 - Orbit, Holding
 - SID/STAR/Approach procedures
 - Missed approach
 - ILS approach
 - PBN approach
- TSS shall simulate surveillance system and shall send corresponding plots to the replica of an ATC system. (to SDPS)
- Plots for a surveillance system shall include:
 - flights in enroute and approach area
 - flights on the ground
- TSS shall simulate FPL messages and shall sent these messages to the replica of an ATC system. (to FDPS)
- TSS shall simulate aircraft operational database(AODB) system and shall send corresponding data to DMAN system.
- TSS shall send simulated time to the replica of an ATC system
- TSS shall replay the recorded data in the form of KARI format as well as standard data formats such as ASTERIX and ICAO ATS message.

Traffic Simulation System shall have the following capacity

- Maximum number of simulated aircraft in one exercise: 500
- Number of Exercise: shall be limited by capacity of HDD, but not less than 1200
- Maximum number of simulated surveillance sensors: 30

2.1.5 PLT

Pseudo-Pilot Working Position shall provide the following control functions:

- Control Assigned Aircraft
- Change Aircraft Heading (with selectable rate of change)
- Change Aircraft Altitude (with selectable rate of change)
- Change Aircraft Ground Speed, Indicated Air Speed, Mach Number (with selectable rate of change)
- Change SSR Code
- Squawk IDENT/Standby
- Simulate Complete or Intermittent Transponder Failure
- Execute ILS Approach
- Execute GLS Approach
- Execute Missed Approach Procedures
- Execute Conventional/RNAV SID/STAR
- Execute Holding Patterns(including orbits)
- Proceed toward a Navigational Fix
- Resume Own Navigation (to a fix)
- Remove Aircraft or Flight Plan
- Transfer or Accept Control of Flight to or from other Pseudo-Pilots
- Transmit Special Codes (e.g. A7500, A7600, A7700)

Pseudo-Pilot Working Position shall have the following capacity

- Maximum number of simulated aircraft in one exercise: 500

2.1.6 DRS (+ DRS Client)

Digital Recording System shall have the following functionality:

- DRS shall record all digital information (surveillance plots, system tracks, SFPLs, SNET, MONA and MTCD messages, messages from AMAN/DMAN) transmitted in the internal LAN.
- DRS Client (installed on CWP) shall make screen capture of monitors (4 times per a second) and store them in a standard file format (*.avi or compatible).
- It shall be possible to playback the recorded data based on the simulated time.

Digital Recording System shall have the following capacity

- DRS shall keep recorded data for 31 days.

2.1.7 HASW

High Availability Processing Software shall have the following functionality:

- HASW shall support triple redundancy (active – hot standby – hot standby).
- HASW shall be independent of applications.
- HASW shall be configurable using adaptation files.
- HASW shall have a functionality to display the current state of each application.
- HASW shall have a functionality to start, stop and restart each application.

2.1.8 Others

- Interface and output data shall be configurable by users without source code modification.
- Airport configuration and AIP information shall be configurable by users without source code modification.

2.2 Description of Tasks

The contractor shall provide engineering services for the ATC subsystems whose requirements are described in section 2.1. The followings are the services to be supplied by the contractor.

2.2.1 Technical Data Transfer

- “Technical data” means software packages and technical documents to be supplied by the contractor to KARI.
- Software packages shall include software executables, libraries, and adaptations. The subsystems which the software packages are targeted are as follows.
 - FDPS
 - FDO
 - CWP
 - TSS

- PLT
- DRS
- HASW
- Technical documents for the system and/or each software shall include the followings.
 - System/Subsystem Specifications
 - Interface Control Document(or Interface Requirement Specification)
 - Adaptation File Descriptions
 - Test Procedures and Reports
 - User/Maintenance Manuals
- The technical data to be delivered shall be compatible or above the requirements specified in section 2.1.

2.2.2 Training

- “Training” means the training service to be supplied by the contractor.
- The contractor shall supply a full training program which deals with all of the technical data to be delivered by the contractor.
- The bidder shall establish a training program plan for the training courses to execute the training for the trainees from KARI.
- The training program plan for each training course shall include the following contents and shall be described in the SOW in the proposal.
 - Training Purpose
 - Detail Contents of Training
 - Training Place
 - Training Duration
 - Trainer’s Career
 - Training Aids
 - Number of Trainees

2.2.3 Technical Support

- “Technical Support” means the services of contractor’s engineers to assist the KARI’s engineers for the designated period in Korea or outside Korea.

- The technical supports that the contractor shall serve include, but are not limited to the followings.
 - Software adaptation for air traffic control environment of Korea
 - Software installation and integration
 - Software updates needed to integrate AMAN/DMAN of KARI
 - Technical support via e-mail and telephone line during working hours
- For the whole period of the contract, the contractor shall provide technical support via e-mail and telephone with no limit.
- KARI may visit contractor’s site for technical support and discussions at KARI’s own expense and the contractor shall support the visits.
- The details of the technical support, such as number of technical assistants, man hours, how and where to support and so on shall be proposed in the SOW in the proposal by the bidder.

2.3 Deliverables and Schedule

- The deliverables and schedule are as follows.
- The deliverables should be delivered using online service such as web, FTP or e-mail.
- The Year 1 and 2 in the table are defined as follows.
 - Year 1: Contract – Feb. 28, 2017
 - Year 2: Mar. 1, 2017 – Feb. 28, 2018

No.	Deliverables/Activities	Schedule
1	FDPS Software Package	Year 1
2	FDO Software Package	Year 1
3	CWP Software Package	Year 1
4	TSS Software Package	Year 1
5	PLT Software Package	Year 2*
6	DRS Software Package	Year 2*
7	HASW Software Package	Year 2*
8	Technical Documents for the System (ex. ICD)	Year 1
9	Technical Documents for FDPS, FDO, CWP, and TSS	Year 1
10	Technical Documents for PLT, DRS, and HASW	Year 2*
11	Training	Year 1 and 2

12	Technical Support	Year 1 and 2
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* No. 4, 5, 6, and 10 shall be delivered “early” Year 2.

- The detail schedule for the deliverables shall be proposed by the bidder.

3. Referenced documents

Reference	Document
[FDPD_AREA]	OPERATIONAL REQUIREMENTS FOR FLIGHT DATA PROCESSING AND DISTRIBUTION CORE FUNCTIONS (AREA Control) // OPR.ET1.ST03.1000-ORD-01-00
[FDPD_APPROACH]	Operational Requirements for Flight Data Processing and Distribution Core Functions (Aerodrome and Approach Control) // OPR.ET1.ST03.2000-ORD-01-00
[ICAO 4444 - 1]	Amendment No. 1 to [4444]
[ICAO 4444]	ICAO Doc 4444 Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM), fifteenth (15) edition.
[LABEL ANTI-OVERLAP]	Requirements for the Implementation of Automatic and Manual Label Anti-Overlap Functions. EEC Note No.21/00. Project HRS/HSP 006 (Core Requirements for ATM Working Positions)
[MONA]	Operational Requirements Document for EATCHIP Phase III ATM Added Functions Volume 1 - Monitoring Aids, EUROCONTROL Document OPR.ET1.ST04.DEL01.1 Edition 2.0
[MTCDD]	Operational Requirements Document for EATCHIP Phase III ATM Added Functions Volume 5 - Medium Term Conflict Detection, EUROCONTROL Document OPR.ET1.ST04.DEL01.5 Edition 2.0
[OLDI]	EUROCONTROL Specification for On-Line Data Interchange (OLDI). EUROCONTROL-SPEC-0106. Edition 4.1. Edition date 16.01.2008.
[ORCAM]	Originating Region SSR Code Assignment Method (ORCAM) Improvement Study. Edition 1.0. Edition date 30.09.2004.
[TP]	EUROCONTROL Specification for Trajectory Prediction// EUROCONTROL-SPEC-0143

“End of Documents”