

**Request for Proposal
for
the Procurement of Dome Friction Stir
Welding (FSW) Machine
for KSLV-III Propellant Tank**



December, 2023

**Launch Vehicle Technology Research Division #1
Korea Aerospace Research Institute**

**169-84 Gwahak-ro, Yuseong-gu,
Daejeon, 34133, Korea**

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General Instruction to Bidders

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1. Introduction

Korea Aerospace Research Institute (KARI) is a government funded research institute, engaged not only in developing aerospace-related technologies, but also in supporting a national aerospace development policy.

KARI is performing the KSLV-III Development Program and as a part of this Development Program, KARI is desirous of procurement of the Friction Stir Welding (FSW) Machine for the Dome fabrication of the KSLV-III 1st stage Propellant Tank.

This RFP (Request for Proposal) explains the procedures to be taken by the Bidders seeking to respond to the RFP.

This RFP also details the requirements and terms and conditions for the procurement of the Dome Friction Stir Welding (FSW) Machine for the KSLV-III Propellant Tank. This RFP consists of the following documents;

- (1) General Instruction to Bidders
- (2) Appendix A. General Terms and Conditions
- (3) Appendix B. Technical Specifications and Statement of Work

Bidders are requested to submit the Proposal in accordance with the guidelines and instructions as contained in the RFP.

Bidders' Proposals shall include all data and/or information as requested by this RFP and all attachments hereto. All information contained in this RFP shall be treated as proprietary and confidential.

2. Qualification of Bidder

Bidder's qualification for this bidding is as follows;

- (1) Bidder shall have specialized knowledge and technology on the Friction Stir Welding (FSW) Machine for the Dome fabrication of the launch vehicle Propellant Tank and first-hand experience in designing, manufacturing, integrating and testing of the Friction Stir Welding (FSW) Machine specified in this RFP.
- (2) Bidder shall be in possession of all the necessary licenses, in effect as of Bid Closing Date, required for the development of the Friction Stir Welding (FSW) Machine for the Dome fabrication of the launch vehicle Propellant Tank as described in this RFP.
- (3) Bidder shall have a successful track record of delivering Friction Stir Welding (FSW) Machine for the Dome fabrication of the launch vehicle Propellant Tank.
- (4) Bidder shall complete the design, manufacturing, delivery, installation and final acceptance of the Friction Stir Welding (FSW) Machine for the Dome fabrication of the launch vehicle Propellant Tank in this RFP within nineteen (19) months at latest. If Bidder may shorten this period, a higher score is given in the technical evaluation.

- (5) Bidder should be continuously available for supporting KARI's operation and maintenance of the Friction Stir Welding (FSW) Machine for the Dome fabrication of the launch vehicle Propellant Tank.

※ The qualification of the Bidder is at Evaluation Committee's own discretion.

3. Bid Closing Date

Proposal is due January 15, 2024 **at 15:00PM**. If any part of the Proposal or bid bond as required under this RFP is submitted after the stipulated closing time as above, the entire Proposal will be rejected.

4. Submission of Proposal

The Proposal shall be hand-carried or delivered using registered mail service to the following KARI personnel or his designee:

Mr. Won-Suk LEE
Head of Overseas Contracts Office

Korea Aerospace Research Institute (KARI)
169-84 Gwahak-Ro, Yuseong-Gu
Daejeon, 34133, Korea

Tel : +82-42-860-2406
Fax : +82-42-879-4370
e-mail : wsl@kari.re.kr

The communication between KARI and each Bidder for contractual matters (Terms and Conditions) shall be controlled through the following designee:

Ms. Ye-Seul KIM
Senior Administrator of Overseas Contracts Office

Korea Aerospace Research Institute (KARI)
169-84 Gwahak-Ro, Yuseong-Gu
Daejeon, 34133, Korea

Tel : +82-42-860-2613
Fax : +82-42-879-4370
e-mail : yeseulkim@kari.re.kr

In addition to the Proposal submission as above, the point of contact for all communications for technical matters shall be

Mr. Mincheol Shin
Senior Researcher
Launch Vehicle Technology Research Division #1

Korea Aerospace Research Institute (KARI)
169-84 Gwahak-Ro, Yuseong-Gu
Daejeon, 34133, Korea

Tel : +82-42-860-2951
e-mail : mcshin@kari.re.kr

with C.C to

Mr. Joontae Yoo
Principal Researcher
Launch Vehicle Technology Research Division #1

Korea Aerospace Research Institute (KARI)
169-84 Gwahak-Ro, Yuseong-Gu
Daejeon, 34133, Korea

Tel: +82-42-860-2928
e-mail : jtyoo@kari.re.kr

Bidder shall specify in its Proposal, its single point of contact for KARI to communicate in conjunction with the RFP, Proposal, subsequent evaluation, etc. Bidder's information on the point of contact shall include the name, title/position, telephone no., facsimile no., and e-mail address.

Bidders are strictly requested to submit Proposals to KARI as follows :

- (1) Technical Proposal (including the commercial part) : one (1) original and six (6) copies
- (2) Price Proposal : two (2) originals
- ✕ The Price Proposal shall be sealed and be submitted in a separate envelope.
- ✕ Two (2) sets of Electronic files (preferably in PDF format) of the Proposal shall be additionally submitted in the form of CD-ROM or memory stick.

The Technical Proposal consists of two (2) Volumes as follows;

- (1) Volume 1 : Heritage and Experience
- (2) Volume 2 : Technical Part

And Price Proposal is specified as the Volume 3

In the Volume 1, the Bidders shall describe following contents;

- (1) Company general information such as organization, financial status, etc.,

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- (2) The heritages of manufacturing and delivery of the **Friction Stir Welding (FSW) Machine**,
- (3) The specialized knowledge and technology on the **Friction Stir Welding (FSW) Machine**,
- (4) The information of the point of contact including the name, the title, telephone number, fax number, and e-mail address, and
- (5) Export license statement for the **Friction Stir Welding (FSW) Machine**.

In the Volume 2, the Bidders shall include the descriptions for the main terminologies and basic construction of the Volume 2 is as follows;

- (1) Review and opinion about the specifications requirements indicated by KARI,
- (2) The detailed description of functions and specifications,
- (3) Qualification of each part, materials, and equipment,
- (4) Qualification Management,
- (5) Delivery plan of items and installation plan,
- (6) Detailed contents and time schedule of Pre-Acceptance Test and Final Acceptance Test,
- (7) Detailed method of warranty and performance
- (8) Contents & plan of warranty
- (9) Training plan for operation and maintenance
- (10) Contents of technical support, and warranty and maintenance plan

In the Volume 3, the Bidders shall provide total bid value with the itemized price list and the price of the system shall be broken down.

5. Bid Schedule

The following schedule is a tentative milestone for the eventual Contract and may be changed at KARI's sole discretion:

- (1) RFP Release: T0
- (2) Bid Closing Date: T1 = T0 + 18 Days
- (3) Review of Proposal, Q&A, Evaluation and Expected Date of Contract: T2 = T1 + 1 Week
- (4) Expected Contract: T3 = T2 + 1 Week

6. Validity of Proposal

Proposal shall be valid for three (3) months from the Bid Closing Date. It can be extended up to six (6) months with KARI's written notice.

7. Price Requirements

The price or rate proposed by Bidder shall be Firm and Fixed Price that is not subject to any price escalation, price change or increase of actual costs during the Contract period.

Any kinds of taxes and duties arising in connection with Bidder's work under the eventual Contract shall be Bidder's responsibility, except for the customs duties and VAT levied in Korea and the price shall be inclusive of any cost or charge incurred due to delivery of any hardware, software, equipment, spare parts, and documentation to KARI or its designated point of delivery.

The currency quoted in the Price Proposal shall be expressed in EUR however, other currency may be allowed instead. If Bidder's proposed price is in a currency other than EUR, for the conversion of the Bidder's proposed price, the 1st basic exchange rate announced by KEB Hana Bank on the price evaluation date shall be used in the price evaluation. Likewise, the currency of the Contract may be the national currency of Contractor within the estimated budget of this Bidding, if necessary. In such a case, the 1st basic exchange rate noticed by KEB Hana Bank of Korea on the price evaluation date shall be applied for the exchange rate for currency change.

8. Bid Bond

Bidder shall establish a bid bond in favor of KARI no later than the Bid Closing Date and submit a certificate to KARI along with its Proposal. The total amount of the bid bond shall be at least five percent (5%) of the total bid price. The bond shall remain valid for three (3) months after the Bid Closing Date and if the Bid validity is extended as per Section 6, the bid bond shall also be extended accordingly. The bid bond shall be in the form of a surety bond issued by the Seoul Guarantee Insurance Company, in the form of an irrevocable standby letter of credit or bank guarantee by first class international bank, cash or other means of guarantee acceptable to KARI. In case of a surety bond, it shall be advised through "Seoul Guarantee Insurance Company". In case of cash, bank guarantee, or the irrevocable standby letter of credit, it shall be advised through "Woori Bank" (Daejeon Branch at 29 Munye-ro, Seo-gu, Daejeon, 35241 Korea, Tel:+82-42-488-9704 (Ext.312), Fax:+82-505-003-0759). The bond shall be available by KARI's request on the Seoul Guarantee Insurance Company or by KARI's draft at sight drawn on the bank, accompanied by the statement of KARI **stating that;**

- (a) Bidder has refused to enter into a Contract with the terms and conditions in the Request for Proposal, if any,
- (b) Bidder has hindered the fair bidding by fraud or misrepresentation, or
- (c) Bidder has withdrawn its Proposal after the Bid Closing Date.

The bid bond shall contain the substantial part of the terms and conditions of the bond, date of establishment, account, amount, payment terms, and date of expiry, etc. When the Contract is executed with Successful Bidder, the bid bond of Successful Bidder shall be amended to the performance bond of ten percent (10%) of the total Contract Price under the Contract as part thereof in accordance with the terms and conditions of the Contract.

The bid bonds except for that of the Successful Bidder will be released, upon the instructions of KARI, to unsuccessful Bidders, without interest, promptly after execution of the Contract between KARI and Successful Bidder. The bid bond of the Successful Bidder shall be likewise released only when KARI decides not to enter into a Contract after the selection of the Successful Bidder.

The bid bond is a critical requirement by Korean government regulation. Therefore, if any Bidder does not submit the bid bond then, such Bidder will be disqualified.

9. Questions and Modifications

Any questions as to the intent and clarity of this RFP may be submitted in writing to KARI's designees as specified in Section 4 "Submission of Proposal" by e-mail, fax or letter no later than five (5) days before the Bid Closing Date.

After the Bid Closing Date, Bidder shall not amend, modify, or supplement the Proposal, or submit any other documents to KARI, except on KARI's written request.

KARI may ask each Bidder in writing for clarifications, amendments, revisions, or supplementation of the Proposal and any other documents submitted by Bidder at any time before the execution of the Contract. KARI may also ask each Bidder to submit and file additional information or documents necessary for evaluation of the Proposal.

10. No Contractual Obligation

This RFP shall not be interpreted as an offer for a Contract or any type of guarantee by KARI. It is KARI's sole discretion whether or not to allow the Contract award to any Bidder. KARI owes no responsibility or obligation to select the Contractor among Bidders.

This RFP shall neither be construed to create an obligation on KARI to enter into a contractual instrument, nor shall it serve as a basis for any claim for reimbursement of costs for the effort to prepare, submit, amend, revise or supplement the Proposal, and other related documents expended by the Bidder regardless of whether or not the Bidder is successful in receiving an award as a result of the solicitation.

11. Acceptance and Rejection of Bids

KARI reserves the right to accept or reject this Bidding, and to amend the Bidding process at any time prior to the award of the Contract without thereby incurring any liability to the affected Bidder(s), and KARI is not under any obligation to inform the affected Bidder(s) of the ground for its action.

12. Withdrawal of Proposal

Bidder may withdraw its Proposal at any time before the Bid Closing Date. Withdrawal shall be made in writing, and shall be received by KARI before the Bid Closing Date.

13. Evaluation of Proposal

The evaluation of the Proposals will be made by the KARI evaluation committee and the following evaluation process is for information only. The evaluation committee reserves the right to modify the evaluation process and criteria without any prior notification to Bidders.

During the Bid evaluation, KARI may send to Bidders a set of questions for clarification and request any supplement to the Proposals and the evaluation will be made based on the Proposal, the answers and the supplement received from Bidders.

The evaluation consists of two (2) steps of the technical part and bidding price part and, after the evaluation of technical part, the evaluation committee will select the Qualified Bidders and perform the bidding price evaluation for the selected Qualified Bidders. The total technical evaluation score is one hundred (100) points and Bidders, who get score exceeding eighty-five (85) points in technical part, will be selected as Qualified Bidders. And then, the Qualified Bidder, who proposes the lowest price among the Qualified Bidders, will be selected as the Successful Bidder.

The table 3 represents the evaluation factors and score for the technical part.

Table 3. Itemized list for technical evaluation.

Major Classification	Detail Classification	Points	Remark
Expertise and Development Capability (25)	Expertise and experiences in designing, manufacturing, installing and successful operation of the FSW machine for producing the dome of the propellant tank	20	
	Manufacturing and delivery schedule	5	
Machine Performance (30)	Stroke capacity of machine & turn table for the dome welding (3.8~4.2m diameter dome)	10	
	Weldability for AL2219 material and 4~8mm thickness.	10	
	Tool applicability of Conventional FSW and retractable pin tool	10	
Machine Function (25)	Milling function at both ends of dome skin	10	
	Automatic control function of the welding variables and data recording during welding	10	
	Functionality and layout for side flange welding	5	
Test plan and Warranty (20)	The plan for Pre & Final acceptance test and appropriate training course	10	
	Warranty policy and maintenance plan	10	
Total		100	

14. Contract

The Contract will be effective subject to the KARI's approval thereof and the Appendix A "General Terms and Conditions" of this RFP is the Contract with the Successful Bidder. All Bidders shall note that there is no Contract negotiation under this bidding.

15. Language and Measurement Unit

The Proposal, any documents submitted to KARI under the RFP, communication and the Contract language shall be in English and measurements and quantities shall be in International System of Units.

16. Certificate and Government Approvals

Bidder shall receive any government approval and certificates (e.g. export licenses) in relevant countries necessary for Bidder's work for this RFP. Bidder's ability and plan to get such approval and certificates shall be submitted to KARI, together with any appropriate assurance letters from the relevant governments, in the Proposal. All necessary approvals and certificates for the delivery of FSW machine shall be acquired by Contractor from the relevant governments before the first payment in accordance with the payment schedule of the Contract.

17. Confidentiality

There shall be no news releases, public announcements, denials or confirmation in connection with this RFP or Contract award without prior written approval of KARI.

All elements of the RFP shall be kept confidential, and shall not be intentionally disclosed by Bidder to third parties. All documentation submitted in response to this RFP shall be marked "COMMERCIALS-IN-CONFIDENCE" on the first page of each document.

All elements of the Proposal will be kept confidential, and will not be intentionally disclosed by KARI to any third parties other than any case to meet the purpose of this RFP such as evaluation.

18. Property of Proposal

All documents submitted in response to the RFP shall become the property of KARI and will be retained by KARI.

19. Expenses

Expenses incurred by Bidder in connection with the preparation, submittal, and any subsequent clarification of Proposal are for their own account and will not be reimbursed by KARI.

20. Governing Law

This RFP and the Contract shall be construed in accordance with and governed by the laws of the Republic of Korea.

21. Arbitration

Any disputes in relation to, and under the RFP and Contract shall be resolved through arbitration in Seoul, Korea, under the Rules of the Korean Commercial Arbitration Board (KCAB).

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Appendix A. General Terms and Conditions

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Preamble

This Contract made and entered into this on January_____, **2024** 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 **[Name of Contractor]** ("Contractor") established under the law of **[Nationality]** with its principal office at **[Address]**.

Witnesseth

WHEREAS, KARI has undertaken the task of establishment of Satellite EMC Test Equipment.

WHEREAS, KARI would like to procure the Friction Stir Welding (FSW) Machine for the Dome fabrication of the KSLV-III 1st stage Propellant Tank and desires Contractor to provide the Friction Stir Welding (FSW) Machine including technical data, technical support and service as needed; and

WHEREAS, Contractor is willing to provide KARI with the Friction Stir Welding (FSW) Machine for the Dome fabrication of the KSLV-III 1st stage Propellant Tank and necessary Services 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

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

- 1.1 **“Associates”** mean all individual or legal entities organized under public or private law, who shall act, directly or indirectly, on behalf of KARI or Contractor, or at the direction of either Party to this Contract to fulfill the obligations undertaken by such Party in this Contract, including, without limitation, the employees of each Party, their suppliers and Subcontractors.
- 1.2 **“Contract”** means this Contract for the procurement of the Friction Stir Welding (FSW) Machine for the Dome fabrication of the KSLV-III 1st stage Propellant Tank, 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.
- 1.3 **“Contractor”** means [Name of Contractor] as a Party to the Contract.
- 1.4 **“Deliverable Data”** means all information and documents related to the Friction Stir Welding (FSW) Machine required to be delivered by Contractor, at its expense, to KARI as listed in PART 2 “Technical Specifications and Statement of Work” hereof.
- 1.5 **“Deliverable Items”** means the Friction Stir Welding (FSW) Machine, software, and Deliverable Data that Contractor shall deliver to KARI under this Contract and any materials that Contractor may deliver to KARI on KARI’s request, including any additional data, information and spare parts, in the course of the provision of the Friction Stir Welding (FSW) Machine.
- 1.6 **“EDC” or “Effective Date of the Contract”** means the date identified in Article 17 “Effectiveness of Contract”.
- 1.7 **“Force Majeure”** means any act of God, war, act or failure to act of any government in its sovereign capacity except for the export license, 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 or its Subcontractors relying upon the Force Majeure.
- 1.8 **“Final-Acceptance Test”** means final inspection held at the place designated by KARI after installation of Deliverable Items in accordance with the Article 10 “Inspection and Acceptance”.
- 1.9 **“Friction Stir Welding (FSW) Machine”** means Friction Stir Welding (FSW) Machine for the Dome fabrication of the KSLV-III 1st stage Propellant Tank to be provided and installed by Contractor at the place designated by KARI.
- 1.10 **“KARI”** means Korea Aerospace Research Institute as a Party to the Contract.

- 1.11 **“KARI Furnished Item”** means the equipment and/or facility listed in PART 2 “Technical Specifications and Statement of Work”, which KARI shall provide to Contractor for the final acceptance at the site designated by KARI.
- 1.12 **“Party” or “Parties”** means KARI or Contractor, or both, in accordance with the context.
- 1.13 **“Pre-Acceptance Test”** means factory inspection held at Contractor’s site before the delivery of Deliverable Items in accordance with the Article 10 “Inspection and Acceptance”.
- 1.14 **“Service(s)”** means all professional services and labor required to be provided including, without limitation, design, development, manufacture, research, analysis, integration, training, transportation, installation, test, and warranty.
- 1.15 **“Subcontract”** means any subcontract, including purchase orders and all similar forms of agreements at any tier under this Contract.
- 1.16 **“Subcontractor”** means a contractor under any Subcontract, including suppliers and vendors.
- 1.17 **“Third Party”** means any individual or legal entity other than the Parties and the Associates.

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:
- (a) PART 1: General Terms and Conditions
 - (b) PART 2: Technical Specifications and Statement of Work
- 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 Works

- 3.1 In accordance with the requirements and scopes of work as set forth in this Contract including PART 2 “Technical Specifications and Statement of Work”, Contractor shall provide the Deliverable Items.
- 3.2 After the delivery of Deliverable Items, Contractor shall, without any additional charge to KARI, provide KARI with such technical data, documentation and information as may be reasonably required by KARI to understand the output of the Contractor’s Service hereunder. Provided, however, that the Contractor has the right to refuse such data, document and information if the Contractor considers it may prejudice the Contractor’s intellectual property right.

- 3.3 Contractor shall keep KARI informed with respect to the progress of the **Friction Stir Welding (FSW) Machine**, and shall comply with instructions given by KARI, but this instruction should be mutually agreed in advance.
- 3.4 During or before the Pre-Acceptance Test or Final Acceptance Test as set forth in Article 10 “Inspection and Acceptance”, the Contractor shall carry out training for operator(s) to be designated by KARI.

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 EURO/USD (EUR/USD TBD)** in accordance with the terms of payment as specified in Article 5 “Terms of Payment”.
- 4.2 The Contract Price as specified in Article 4.1 above shall be firm and fixed price that is not subject to any escalation or to any adjustment or revision by reason of the increase of actual costs incurred by Contractor in the performance of the work under this Contract.
- 4.3 The Contract Price as specified in Article 4.1 above shall be comprised of the following items;

Description		Price (EURO/USD)
Deliverable Item	Friction Stir Welding (FSW) Machine	
	- Welding software and license keys for welding processes, if available, including license fee. (submitted on USB)	
	Deliverable Data listed in PART 2 “Technical Specifications and Statement of Work”	
Service	Post Delivery Support	
Total Sum		

[Note] the above payment breakdown table may be adjusted by mutual agreement by KARI and Successful Bidder.

- 4.4 Contract Price shall include any federal, state or local taxes, funds, stamp duties, fees, transfer taxes, duties or charges of any kind whatsoever levied or imposed pursuant to related laws on the payment of the Contract Price under this Contract by the government or any political divisions of any country except for the customs duties and the value added taxes levied on all Deliverable Items and any charges for the customs clearance in Korea.
- 4.5 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

5.1.1 Payment shall be executed subject to the establishment of performance bond under this Article 7 “Performance Bond”.

5.1.1 The Contract Price as specified in Article 4 “Contract Price” shall be paid in accordance with the following schedule:

No.	Payment Milestone	Payment Due Date	Percentage (%)	Amount (EURO/USD)
1	EDC and the establishment of P-bond (EDC + 1M)	EDC + 2M	40	
2	PDR (EDC + 4 M)	EDC + 5 M	10	
3	Completion of Pre-Acceptance at Contractor’s site (EDC + 14 M)	EDC + 15 M	40	
4	Completion of Final Acceptance at the site designated by KARI (EDC + 19M)	EDC + 20 M	10	
Total			100	

*. EDC means the Effective Date of Contract as per Article 17 “Effective Date of Contract”.

*. PDR means the Preliminary Design Review Meeting.

*. M means calendar month.

[Note] the above payment milestone table may be adjusted by mutual agreement by KARI and Successful Bidder.

5.2 Billing Procedure

5.2.1 All invoices the Contractor submits for payment shall be in duplicate and received by KARI at least thirty (30) days before the payment due dates as specified in Article 6.1.2.

5.2.2 All payments shall be made in EURO/U.S Dollar by telegraphic transfer to the bank account as designated by Contractor in the table below. And KARI shall remit the payment by due date as stipulated in Article 6.1 or not later than thirty (30) days after KARI’s receipt of Contractor’s invoice whichever becomes later. If Contractor’s bank account information is amended, Contractor shall provide the amended information to KARI in writing on issue of its invoice.

Contractor		Contractor’s Bank	
Account No. / IBAN		Bank Address	
SWIFT code / Bank code			

5.2.3 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.

5.3 Suspension of Payment

- 5.3.1 Notwithstanding any provisions of this Contract, if any milestone has not been accomplished for any reasons attributable to Contractor, KARI may, with an advance notice, suspend the payment which is due for such milestone until KARI and Contractor agree that such delayed milestone has been accomplished.
- 5.3.2 In the event of KARI's suspension of payment under Article 5.3, Contractor shall nevertheless continue to perform its obligations under this Contract regardless of whether KARI is entitled to suspend the payment.

5.4 Deduction of Payment

- 5.4.1 All losses, costs, charges and expenses which KARI incurs or sustains by reason of any act or omission of the Contractor in the performance of the Contract and any other amounts (e.g. liquidated damages) which KARI is entitled to receive from Contractor under the terms of this Contract, may be deducted from any payment that may be or become due to Contractor from KARI provided KARI notifies Contractor of such losses, costs, charges and expenses in accordance with Article 5.4.1 and Contractor has not otherwise cured such losses.
- 5.4.2 A prior written notice given by KARI accompanied with documents stating the amount of the losses, costs, charges, expenses and other amounts referred to in Article 5.4.1 shall be prima facie evidence of the matters stated herein.

Article 6. Taxes

- 6.1 In the event taxes are charged in Korea, KARI shall be fully responsible for payment of such taxes. Contractor shall be fully responsible for the payment of all applicable taxes imposed outside Korea including any customs duties and charges.
- 6.2 Neither Party shall be responsible for paying the customs duties, and related taxes, fee, or charges for the personnel and the personal effects of the other Party.
- 6.3 The Contractor shall further comply with instructions KARI may issue from time to time in order to facilitate any exemption or reductions from customs duties and other taxes that might be levied on KARI and shall impose the same obligations on the Subcontractor.
- 6.4 With respect to the Post-Delivery Support as set forth in Article 4.3, in case Korean corporation tax is required to be withheld from amounts paid or payable to Contractor under this Contract (herein referred to as 'Applicable Tax'), KARI shall withhold the Applicable Tax and pay on behalf of Contractor the relevant Korean taxing authority in accordance with applicable Korean law and international tax treaty between Korea and Contractor's government.
- 6.5 In case KARI pay the Applicable Tax on behalf of Contractor, KARI shall forward proof of the withheld Applicable Tax to the Contractor within ninety (90) days of payment.

Article 7. Performance Bond

- 7.1 Contractor shall establish a performance bond within one (1) week after EDC in favor of KARI in the value of ten percent (10 %) of the Contract Price, in the form of an irrevocable and unconditional standby letter of credit available by KARI's draft at sight.
- 7.2 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 by Contractor's breach as specified in Article 18.2.

Whenever any amount has been withdrawn by KARI due to the case of (a) or (b) above, the performance bond shall be replenished.

- 7.3 The performance bond under this Article shall be issued by a first class international bank acceptable to KARI. The performance bond shall be drawn in favor of KARI and advised through the Woori Bank (Daejeon Branch at 29, Munye-ro, Seo-gu, Daejeon, 35241 Korea, Tel: +82-42-488-9704, Ext. 312 / Fax : +82-505- 003-0759) and available with such bank by presentation and shall remain valid until the end of the warranty period in accordance with Article 11 "Representations and Warranties".
- 7.4 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 8. Delivery

- 8.1 General
- 8.1.1 Contractor agrees that delivery or provision of time and place under this Contract, whether specifically provided for or not, or in subsequent amendments thereto, are of the essence of this Contract.
- 8.1.2 Contractor shall deliver Deliverable Items in accordance with the defined schedule and method as set forth in PART 2 "Technical Specifications and Statement of Work", and the delivery shall be deemed to have occurred only when the Deliverable Items has been delivered to the place designated by KARI irrespective of whether or not the Final Acceptance testing is conducted.
- 8.1.3 Contractor shall bear any charges or costs of whatsoever nature that are incurred in relation to delivery or provision hereunder until such delivery or provision is duly made under this Contract to the place designated by KARI.

8.2 Delivery to KARI

8.2.1 Contractor shall deliver any Deliverable Items under the terms of DPU site designated by KARI (Delivered at Place Unloaded in accordance with the Incoterms 2020) in accordance with the delivery schedule of this Contract and Partial shipment shall not be allowed.

8.2.2 To obtain import certificate, Contractor shall notify KARI by e-mail (address: "mcshin@kari.re.kr" for Mr. Min-Cheol Shin and "yeseulkim@kari.re.kr" for Ms. Ye-Seul KIM) fourteen (14) calendar days prior to each shipment with one (1) set of proforma invoice and packing list specifying the number of boxes, name of Items, unit price, and size and volume of each container or box to be shipped. As soon as each shipment as provided for in this Article is made, Contractor shall send one (1) copy each of the following shipping documents to KARI by e-mail;

- (a) Clean on board vessel bill of lading/or airway bill,
- (b) Commercial invoice (including the custom authorization no.)
- (c) Packing list with harmonized system codes,
- (d) Weight and measurement list,
- (e) Contractor's Inspection Report,
- (f) Export License, if any, and
- (g) Certificate of Origin, if possible.

Article 9. Delays in Performance

9.1 Excusable Delay

9.1.1 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.

9.1.2 The Party whose performance of obligations hereunder has been affected by any events of Force Majeure shall notify the other Party within ten (10) working 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.

9.1.3 Notwithstanding Article 9.1.1 above, any such delay that has not been notified to the other Party pursuant to Article 9.1.2 above shall not be excused for any reason whatsoever. Notwithstanding Article 9.1.1 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 Article 9.1.2 shall not be excused for any reason whatsoever.

9.2 The Party who has received or was entitled to duly receive the notice of events of Force Majeure under Article 9.1.2 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.

9.3 Non-Excusable Delay

- 9.3.1 In the event that, unless otherwise excused by virtue of this Contract or the governing or applicable law, Contactor delays the Final Acceptance Test of the Deliverable Items as stipulated under this Contract or Final Acceptance is failed as the result of not meeting the requirements of this Contract at KARI site, Contractor shall pay for liquidated damages to KARI as a result of such delay in accordance with Article 9.2.2.
- 9.3.2 Contractor acknowledges and agrees that the timely completion of the Final Acceptance Test as stipulated under this Contract is essential to KARI, and that such delay as provided for in Article 9.3.1 hereof may cause substantial financial loss or damage to KARI's right, interests and benefit, which may not be assessable or recoverable. Both Parties therefore specifically agree that in the event of such loss or damage caused by delay attributable to Contractor, its Subcontractor or any of its agents, Contractor shall pay KARI as liquidated damages zero point zero seven five percent (0.075%) of Contract Price per delayed day of Final Acceptance starting after agreed grace period of ten (10) days has elapsed. If such delay does not exceed ten (10) days from the Final Acceptance due date, the liquidated damages for such delay will be waived. In no case, however, shall the aggregated liquidated damages for the delayed Final Acceptance exceed thirty percent (30%) of the Contract Price; provided, however, that if the liquidated damages calculated by the aggregated number of days of delay under this Article, excluding those days of delay excused by KARI in writing, exceed ten percent (10%) of the Contract Price, KARI may terminate this Contract for Contractor's breach pursuant to Article 18.2. Notwithstanding the foregoing sentence, if KARI makes decision to maintain this Contract instead of termination, the liquidated damages shall continually be imposed up to thirty percent (30%) of the Contract Price and, on KARI's written request, Contractor shall establish the additional performance bond with the amount corresponding to the liquidated damages, accordingly. This additional performance bond shall be valid until the due date of Final Acceptance as set forth in Article 10 "Inspection and Acceptance"
- 9.4 This Article shall not affect other remedies, rights, privileges, interests, benefits of KARI under this Contract or the governing or applicable law. Contractor agrees that any right of KARI under this Article is not an alternative or substitute to other remedies, rights, privileges, or interests of KARI.
- 9.5 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 10. Inspection and Acceptance

- 10.1 Pre-Acceptance (Test)
- 10.1.1 KARI shall have the right to carry out by itself or to appoint another qualified inspector for inspection of the Friction Stir Welding (FSW) Machine and general progress during the manufacture, packing and preparation for shipment of the Friction Stir Welding (FSW) Machine.
- 10.1.2 In the event that KARI desires to dispatch its inspector or its authorized inspector for inspection of the Friction Stir Welding (FSW) Machine, Contractor shall make due arrangement for free access of the inspector to Contractor's workshops or Subcontractor's workshops at reasonable time. Each Party shall bear its own costs related to these inspections.

10.1.3 KARI shall be entitled to refuse to accept the Friction Stir Welding (FSW) Machine partially or totally if the factory inspection (pre-acceptance test) as aforesaid in the Article 10.1 reveals that the Friction Stir Welding (FSW) Machine is not in accordance with the Contract specifications, requirements or approved detailed descriptions, drawings and/or technical data involved. In such case, Contractor shall repair, replace or modify, free of charge, the Friction Stir Welding (FSW) Machine in question to bring it into conformity with the Contract specifications, requirements or approved detailed descriptions, drawings and/or technical data, as aforesaid, and shall notify KARI when the same is ready for new inspection or test which shall be carried out under the same terms and conditions as the original inspection and pre acceptance test. Such re-inspection is welcomed by the Contractor, however the cost such as travel and accommodation expenses will be borne by KARI. The failure of KARI to detect non-conformity with the Contract specifications, requirements or detailed descriptions, drawings and/or technical data during the inspection or test shall not relieve Contractor of any of its obligations under this Contract.

10.2 Final-Acceptance (Test)

10.2.1 KARI shall make the final inspection (Final Acceptance Test) after the Friction Stir Welding (FSW) Machine is installed at the designated site by KARI at Contractor's expense according to the requirements of the inspection and acceptance procedure under this Contract. For the final inspection, KARI shall provide KARI Furnished Items to Contractor in time. The detailed schedule of such inspection shall be decided through mutual negotiation by the Parties, if necessary.

10.2.2 In case of the failure to meet guaranteed operating specifications or if the tests reveal defective or faulty materials, design and/or workmanship attributable to Contractor and/or its Subcontractors, Contractor shall, at its own cost including airfreight, insurance, duties and taxes for customs clearance in Korea, promptly make all necessary redesign, supply and/or workmanship required to remedy such faults or defects in order to assure that the Deliverable Items are conformable to the requirements set forth in this Contract specification. Once the defects have been corrected, the tests shall be repeated as many times as necessary until the design specifications as aforesaid are into conformity. Costs incurred in connection with any repeated tests, whether direct or indirect, shall be borne by Contractor. If there is any type of rework or extra work not attributable to the Contractor's failure, then the cost occurred will be quoted and be borne by KARI.

Article 11. Representations and Warranties

11.1 Contractor represents and warrants to KARI that:

- (a) Contractor shall provide the Deliverable Item and Service 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 performing the Service shall be qualified and sufficiently experienced so as to provide the work competently, professionally and efficiently with the standards and practices as set forth in paragraph (a) above;
- (c) All Deliverable Items that Contractor shall provide under this Contract shall be free from all defects in workmanship and materials and shall comply with the specifications and requirements of this Contract;

- (d) Contractor shall have good title to all design, engineering or technical data or documents, and all material, and the Friction Stir Welding (FSW) Machine provided to KARI, including, but not limited to, any other Deliverable Items and Deliverable Data, free from any and all claims, demands, liens and encumbrances on title;
- (e) Neither part of the design, engineering or technical data or documents, and all material, and the Friction Stir Welding (FSW) Machine provided to KARI, including, but not limited to, any other Deliverable Items and Deliverable Data, when given and in the future, shall be the subject of any Third Party infringement claim or action; and
- (f) The warranty will not cover the damage or failure due to improper operation, lack of maintenance, unauthorized alteration, normal wear and tear, and abnormal use.

- 11.2 The warranty period hereof shall be twenty four (24) months from the installation date of the Friction Stir Welding (FSW) Machine at the designated site by KARI.
- 11.3 KARI shall notify Contractor and allow Contractor to access to the Friction Stir Welding (FSW) Machine to assure proper handling and use under the warranty. Any action performed by Contractor under the terms of this warranty clause will not extend the warranty period.
- 11.4 Upon the receipt of written notification from KARI that Deliverable Item delivered by Contractor is defective of non-conforming, Contractor shall, for the period agreed by both Parties, immediately repair or replace, at Contractor's expense, such Deliverable Item so as to comply with the above warranties. The Contractor shall not be entitled to any additional costs incurred or to recover any damages suffered due to defect in the Deliverable Item or rejection of the Deliverable Item by KARI.

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 and 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 and Service 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 necessary for the export of Deliverable Item and for the performance of the work and Service under the Contract. Contractor shall perform the work and 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 direct or indirect consequences of any violation of law by the other Party, its Subcontractors or their officers, employees, agents or servants.
- 12.4 Contractor shall be responsible for obtaining all non-Korean 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 Deliverable Items to be provided to KARI by Contractor under this Contract are subject to export control regimes of the Contractor's country for the purpose of non-proliferation of dual use articles and technology, KARI hereby assures and certifies that KARI will use the Deliverable Items and Deliverable Data only for peaceful purposes and, as an end user, except as specifically authorized by prior written approval of the relevant authorities of the Contractor's country, will not re-export, re-sell or otherwise dispose of the Deliverable Items and Deliverable Data outside the Republic of Korea or to any Third Party. 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 If any license or consent from Contractor or any Third Party is required to ensure KARI's right in this Article, Contractor shall grant and shall have such Third Party grant such license and consent to KARI and KARI's Associates.
- 14.2 Subject to Article 14.1 above, Contractor shall retain ownership rights in its prior existing standards, reference materials, drawings, and engineering tools, used in connection with the Friction Stir Welding (FSW) Machine under this Contract.

Article 15. Suits for Infringement

- 15.1 In the event that any suit, claim, action or proceeding against KARI and its Associates 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 KARI Associates' right, title and interest to the same against such suit, claim, action, or proceeding at Contractor's expense and shall hold KARI and KARI Associates' 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 KARI's Associates the right to continue using said proprietary rights, or the part thereof, or replace the same with non-infringing proprietary rights acceptable to KARI and KARI's Associates.
- 15.2 The Contractor owns the intellectual property right of the Friction Stir Welding (FSW) Machine and KARI and KARI's Associates shall not copy the design or allow any Third Party to copy the design for any purpose without prior written approval from the Contractor.

Article 16. Confidentiality

- 16.1 Each Party agrees to keep secret and confidential all information obtained pursuant to this Contract from the disclosing Party, which is designated as confidential by the disclosing 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.

- 16.2 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 representatives of KARI, be published or disclosed to any Third Party, or used by Contractor, except for the purpose of implementing this Contract.
- 16.3 The obligations undertaken by the Parties pursuant to this Article 16, 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 or expiration 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.
- 16.4 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 17. Effectiveness of Contract

- 17.1 The effective date of this Contract ("EDC") is the date the duly authorized representatives of the Parties have signed this Contract.
- 17.2 Any amendment to this Contract shall be effective upon signature by the duly authorized representatives of both Parties.

Article 18. Termination

- 18.1 Termination for Events of Force Majeure
- 18.1.1 In the event that the excusable delay under Article 9 "Delay in Performance" exceeds three (3) months for any single Event of Force Majeure or six (6) months in the aggregate for all Events of Force Majeure, KARI, at its sole discretion, may declare frustration of this Contract, and terminate the whole or any part of this Contract by sending a seven (7) days prior notice to the Contractor.
- 18.1.2 In the event that the Contract is terminated for Events of Force Majeure, Contractor shall be entitled to the payments received and payments due as of the date of termination, in which case Contractor shall return fifty percent (50%) of the amount paid by KARI under this Contract. KARI shall return the Deliverable Item to Contractor, and Contractor shall return all of the KARI furnished items in its original configuration, if any.

18.2 Termination for Breach

18.2.1 KARI may, by written notice to the Contractor, terminate the whole or any part of the Contract, if any of the following circumstances occurs;

- (a) The Contractor fails to deliver any Deliverable Item under the Contract in accordance with the delivery schedule, or
- (b) The Contractor fails to obtain the export license in accordance with Article 12 “Legal Compliance and Governmental Authorization”, or
- (c) The Contractor fails to perform any substantial Service under the Contract or fails to progress with the Service within the time specified and in accordance with the terms of the Contract, or
- (d) The Contractor fails to remedy any or all defects and non-conformity on the Deliverable Item in accordance with Article 11 “Representations and Warranties”.

18.2.2 In the event of the circumstances in Article 18.2.1, KARI may notify the Contractor and may suspend any further performance of its obligation under this Contract. If the Contractor fails, within ten (10) days from the dispatch of the notice, to produce and notify KARI of reasonable evidence of its intent and ability to effect due performance of the obligation in breach within sixty (60) days from due dispatch of written notice, then KARI may terminate this Contract with seven (7) days’ prior notice of termination.

18.2.3 In the event this Contract is terminated for Contractor’s breach, the Contractor shall return all the amounts paid by KARI under the Contract and also pay same amount covered by performance bond as a termination charge to KARI. If Contractor fails to pay such termination charge within a period of one (1) month after termination date, KARI shall call up the performance bond in accordance with Article 7 “Performance Bond”. In addition, KARI shall return the Deliverable Item to Contractor, if any and Contractor also shall return all of the KARI Furnished Items in its original configuration, if any.

18.3 Termination for Special Circumstances

18.3.1 KARI may terminate this Contract anytime upon or after due dispatch of notice of such effect, without any other conditions, in the event that the Contractor falls within any of the following categories:

- (a) the Contractor has fallen bankrupt or insolvent, or
- (b) the Contractor passed a resolution for its reorganization (bankruptcy related), dissolution, liquidation or winding-up, or
- (c) a court order for proceedings for the bankruptcy, reorganization (bankruptcy related), dissolution or winding-up of the Contractor has been applied for by any person and such application has not been dismissed within sixty (60) days.

18.3.2 If the Contractor is in default pursuant to Article 18.3.1, the Contractor shall immediately inform KARI thereof. KARI may then terminate the Contract with reasonable prior written notice.

18.3.3 In the event this Contract is terminated by Article 18.3.1 above, Contractor shall return all amount paid by KARI under the Contract. The Contractor shall be entitled to keep all of the items procured and manufactured by Contractor under this Contract as of the date of termination and also shall return all of the KARI furnished items in its original configuration, if any.

18.4 Termination for Convenience

18.4.1 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 payments received and payments due as of the date of termination, out of the aggregate payments as set forth in the Article 5 "Terms of Payment" hereof.

Article 19. Resolution of Disputes and Governing Law

19.1 In cases any 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.

19.2 If the Parties cannot resolve such controversy or claim in accordance with Article 22.1 above, it shall be finally settled by arbitration under the rules of arbitration of the Korean Commercial Arbitration Board (KCAB) and the place of arbitration shall be Seoul in Korea. 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.

19.3 The validity, performance, construction, and effect of this Contract shall be governed by the laws of Korea.

Article 20. Notice

20.1 All notices, requests, demands, approvals, reports, invoices, and other correspondence to be provided pursuant to this Contract shall be in writing and shall be deemed to have been duly given to the Party to be notified;

- (a) on the date of delivery if delivered in person;
- (b) on the date of dispatch if by email or facsimile;
- (c) on the date of receipt if by registered airmail or overnight courier.

All notices shall be addressed to the appropriate Party at its address as follows:

- a) If to KARI : Korea Aerospace Research Institute
169-84 Gwahak-ro, Yuseong-Gu
Daejeon, 34133 Korea

Technical Matter

Attn.: Mr. Mincheol Shin
Dep't: Launch Vehicle Technology
Research Division #1

Tel.: +82-42-860-2951
Fax: N/A
e-mail : mcshin@kari.re.kr

Contract Matter

Attn.: Ms. Ye-Seul KIM
Dep't: Overseas Contract Office

Tel: +82-42-860-2613
Fax: +82-42-879-4370
e-mail : yeseullim@kari.re.kr

- b) If to Contractor : **Name of Contractor**
Address

Technical Matter

Attn.: **TBD**
Dep't: **TBD**

Tel.: **TBD**
Fax: **TBD**
e-mail : **TBD**

Contract Matter

Attn.: **TBD**
Dep't: **TBD**

Tel: **TBD**
Fax: **TBD**
e-mail : **TBD**

- 20.2 Each Party may change its address for notice by notice given to the other Party in the manner set forth above. Any notices given as provided herein shall be considered effective on the date delivered in accordance with Article 20.1.

Article 21. Miscellaneous

21.1 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 any Party without the prior written consent of the other Party, which consent shall not be unreasonably withheld.

21.2 Language and Units

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 documentation including Deliverable Data shall be recorded in units of metric system.

21.3 Entire Agreement

This Contract embodies the entire agreements between both 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. Neither oral explanation nor oral information by any of the Parties shall alter the meaning or interpretation of this Contract.

21.4 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.

21.5 Subcontract

Each Party shall be fully responsible for the work of its Subcontractors under this Contract, and such subcontracting shall not relieve that Party of its obligation under this Contract.

21.6 Headings

The headings and titles in this Contract have been inserted for convenience of reference only and shall not be deemed a part hereof or affect the construction or interpretation of any provision hereof.

21.7 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. Any remaining part of this Contract shall not be influenced by such ineffectiveness.

21.8 Non-Waiver

The failure or delay of any Party to require any 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.

21.9 Disclaimer of Agency

This Contract or performance under this Contract shall not be interpreted or deemed to constitute any Party the agent of the other Party. Neither Party shall have the authority to commit the other Party or its Subcontractor in any manner or to incur any obligation on behalf of or in the name of the other Party or its Subcontractor.

21.10 Limitation of Liability

The aggregate liability of Contractor under this Contract for any and all claims, losses, liabilities, costs, including Contractor's liability for default under the Contract or damages arising out of or resulting from the Contract shall be limited to one hundred and thirty percent (130%) of the Contract Price. Contractor shall not, under any circumstances, have any liability to KARI for any indirect, special, consequential and/or incidental or punitive damages resulting from the performance, non-performance or bad performance of this Contract, including but not limited to the loss of profits, the loss of revenues, loss of capital and any other similar loss. However, in case of Contractor's act of intentional, gross negligence or willful misconduct, the foregoing sentence shall not apply for.

21.11 Time Limits

Unless otherwise indicated, any time limits to which this Contract binds Contractor or KARI shall be counted in calendar days from the day following that of the event marking the start of the time limit, and shall end on the last day of the period specified. When the last day of a time limit is a Saturday or Sunday, or a legal holiday in the country in which the particular contractual performance is required, such time limit shall be extended to the first working day following.

21.12 Change

In the event that any changes during the performance of this Contract, within the general scope of this Contract, which add or delete Deliverable Items, Services, change the method of Deliverable Items, adjust the Contract period or affect any other requirement of the Contract are requested by either Party, those change requests shall be submitted in writing to the other Party. If such change causes an increase or decrease in the Contract Price, that information shall be included in the change request or shall be identified by the other Party within thirty (30) days of receipt of the request for change. The Party receiving the change request shall ask the other Party to discuss the change request within ten (10) days after receipt of it. Both Parties shall discuss such a matter and reach an agreement within thirty (30) days from the date of commencement of the discussion. In the event the both Parties reach an agreement on any changes requested by either Party in due time, then this Contract shall be amended, otherwise this Contract shall be performed as unchanged.

IN WITNESS WHEREOF this Contract has been issued in two (2) signed English originals of equivalent validity, executed on behalf of KARI and the Contractor by their respective persons authorized on that behalf.

Korea Aerospace Research Institute

Name of Contractor

By : _____

By : _____

Name : Dr. Sang-Ryool LEE

Name :

Title : President

Title :

Appendix B. Technical Specification & Statement of Work

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Technical Specification

I. General

The **Friction Stir Welding (FSW) Machine** is intended for the domes of KSLV-III 1st stage propellant tanks. Although there are 4 different types of domes for the 1st stage tanks, but the outer diameter, radius and welding lines are consistent across all of the domes. Approximately 4 to 6 domes are expected to be produced annually.

II. Classification of Dome Welding Part

As below figure, The domes have two welding lines. The welding lines are named as (1) center flange welding (CFW), (2) Y frame welding (YFW)

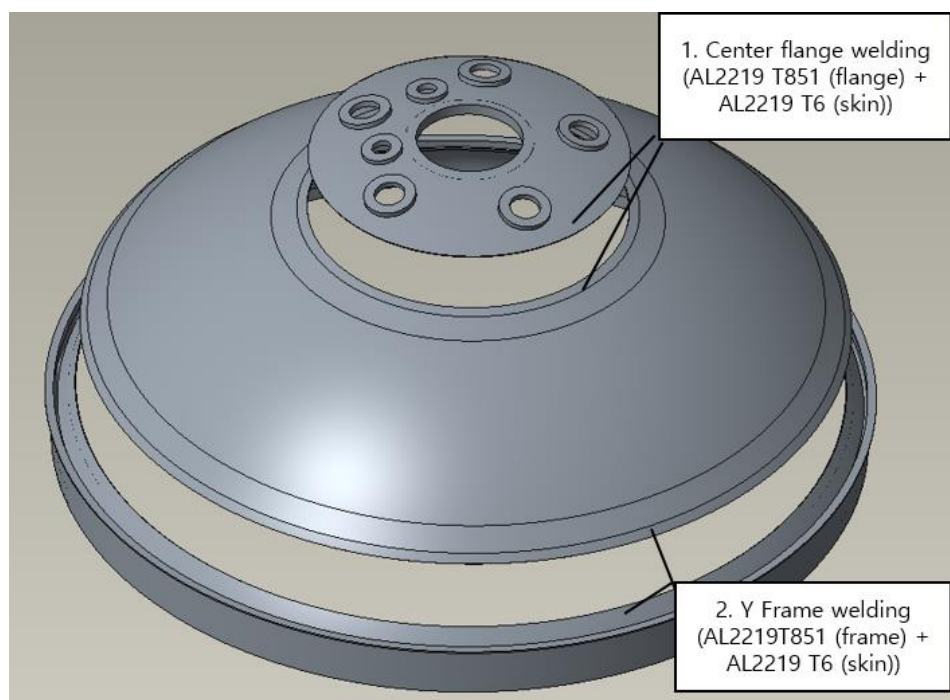


FIG 2.1 Classification of welding lines

The center flange and Y frame parts are manufactured by machining. The dome skin is produced through spin forming and machining. As a result, all holes for inserting flanges prior to FSW can be pre-made.

III. Design of Dome

The design of the (1) CFW and (2) YFW are common to all domes. So the diameters and locations of welding lines are consistent to all domes.

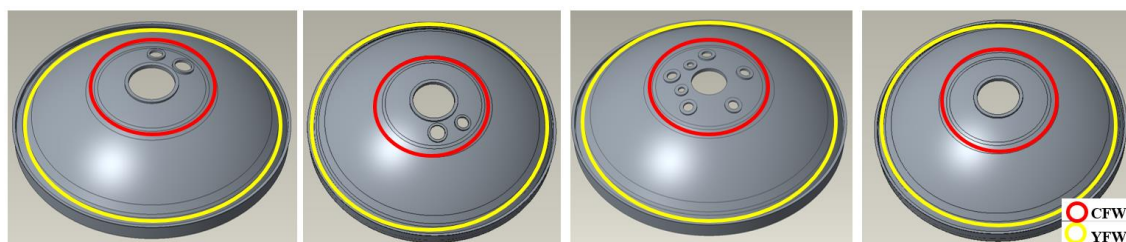


FIG 2.2 Four (4) Dome type with same welding lines

Only thickness and tail length of Y frame may vary depending on the dome type.

Dome outer Diameter ranges from 3800mm to 4200mm but it is not yet finalized. Therefore, an FSW machine suitable for 3800mm to 4200mm is required.

The following are current dimensions.

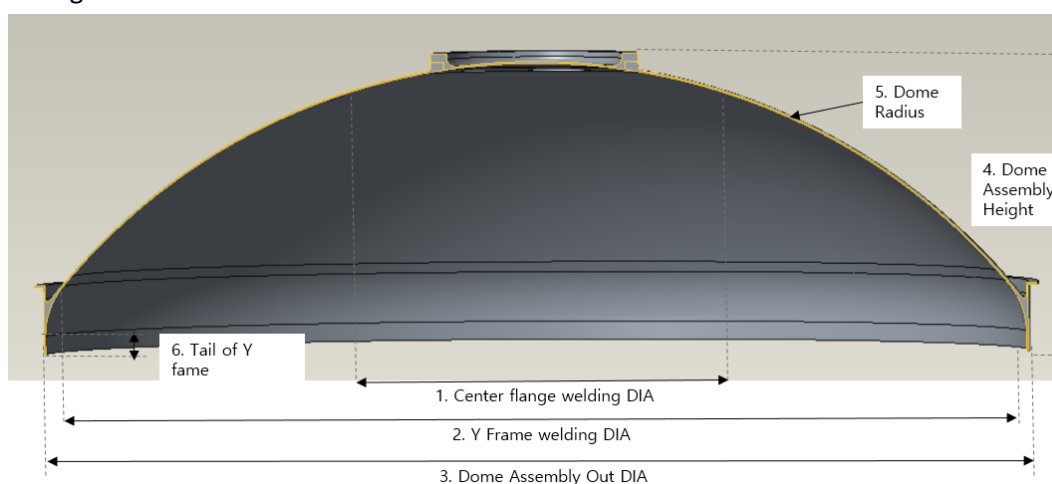


FIG 2. Dimensions of Dome

Name	welding parts	Quantity per dome	Welding Dia. [mm]	welding Think. [mm]
(1)CFW	Center Flange (AL2219 T851) + Skin (AL2219 T62)	1	1500	4~10
(2)YFW	Skin (AL2219 T62) + Y frame (AL2219 T851)	1	3500~3600, 3800~4000	
others	(3) Dome assembly Out DIA: 3800 ~ 4200 mm (4) Dome Assembly Height: - Dia 3800 : 1100~1350 mm (Two kind of Y frame tail length(6)) - Dia 4200 : 1200~1300 mm (Two kind of Y frame tail length(6)) (5) Dome radius : 2375 ~ 2625 mm			

Table 2. dimensions of the dome (November 10, 2023)

Below is the concept drawing of the Y frame part in case of 3800mm DIA. If the interference is a problem during welding, minor modifications are possible as your recommendation.

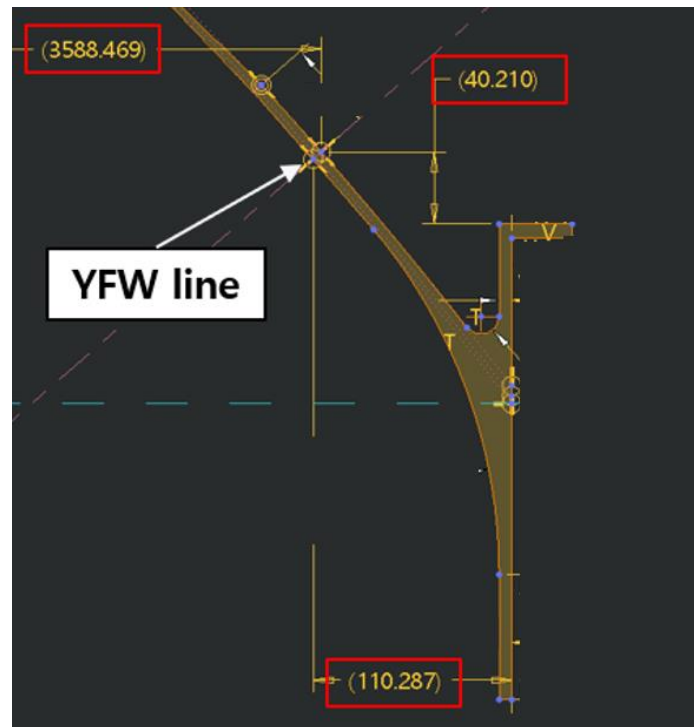


FIG 2.4 Dimensions of Y frame (TBD. May 18, 2023)

IV. Essential Functional Requirement of the Friction Stir Welding (FSW) Machine

The **Friction Stir Welding (FSW) Machine** must be capable of welding the dome specified above chapter. The essential functional requirements are as follows.

1. FSW tool: Both Fixed and retractable pin tool (RPT) should be available.
2. Milling function with vacuum suction: The **Friction Stir Welding (FSW) Machine** should be capable of milling at both ends of dome skin to adjust the dome skin length. It should also include a suction system to remove chips during the milling operation.
3. Bolt holes for PAUT (Phased Array Ultrasonic Testing) equipment interface: The **Friction Stir Welding (FSW) Machine** must include designated bolt holes to interface with the Phased Array Ultrasonic Testing (PAUT) equipment in the future. The specific hole pattern will be determined (TBD)
4. Functionality and layout for future side flange welding: The current plan includes welding lines limited to CFW and YFW of the dome. However, there is a possibility of adding side flange welding (SFW) in the future (TBD) and KARI will procure additional fixture. Therefore, the existing layout (including that welding machine, rail, turn-table) should be adaptable to accommodate potential SFW.

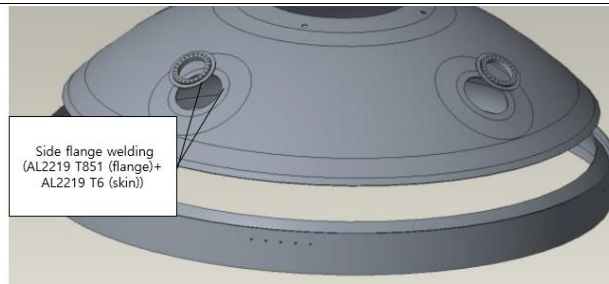


FIG 2.5 Side Flange Welding (TBD. Oct. 30, 2023)

5. Monitoring Camera system for welding observation: A monitoring camera system is required to observe welding operations.
6. Welding test jig for specimen welding: A welding test jig should be included for specimen welding purposes. The jig must be capable of welding specimens with a minimum length of 500mm
7. Automatic control of the welding variables and Data recording: The system should enable automatic control of welding variables, including the force and RPM of the tool, RPM of the turntable, and temperature monitoring etc. Additionally, it should record relevant data during welding processes.
8. Air gun for chips and dust removal: An air gun is necessary for blowing out chips and dust during welding process.
9. Turntable for installing fixtures : A turntable for welding the dome described above should be included. The turntable must have sufficient load capacity and Diameter so that it can be operated with additional fixtures installed in the future.

Statement of Work

1. Overview

- (1) This Statement of Work (SOW) defines the tasks to be performed by the Contractor to provide **Friction Stir Welding (FSW) Machine**. Along with this SOW, the Contractor shall perform all tasks necessary to completely install and successfully operate **Friction Stir Welding (FSW) Machine**.
- (2) The main undertakings of the project are to perform the installation, Final Acceptance Test, quality guarantee and training of **Friction Stir Welding (FSW) Machine**, etc.
- (3) All the descriptions in this SOW are minimum requirements.

2. Procedures of the Work

The Contract shall be progressed with six (6) steps for **Friction Stir Welding (FSW) Machine** as follows:

- (1) Design, manufacture, assembly and integration;
- (2) Factory acceptance test (Pre-Acceptance Test) & safety plan verification;
- (3) Transportation;
- (4) Installation at the place designated by KARI;
- (5) Final Acceptance Test at the place designated by KARI according to test procedure; and
- (6) Training.

3. Scope of Work

The Contractor shall provide the work as follows;

- (1) Engineering work of the **Friction Stir Welding (FSW) Machine**,
- (2) Manufacture, assembly and delivery of the Deliverable Items,
- (3) Parts and particular instruments necessary to operate the **Friction Stir Welding (FSW) Machine**,
- (4) Installation and Final Acceptance Test at the place designated by KARI,
- (5) Contract management, site operation, cooperation with KARI,
- (6) Basic principle, operation, warranty, maintenance, repair, safety and training for the **Friction Stir Welding (FSW) Machine**,
- (7) Provision of relevant information and documents designated as Deliverable Data, and
- (8) Other necessary matters required for installing the **Friction Stir Welding (FSW) Machine** as KARI **Furnished Items**.

4. Work Schedule

The Contract shall submit the detailed work schedule and specially, the work schedule at KARI site shall be confirmed by KARI for avoiding overlap with KARI's other schedules.

The Contractor should have a preliminary meeting for design review with KARI before setting the schedule about manufacturing and If design change in the middle of manufacturing is required, the change should be followed by the negotiation with KARI.

5. Training

A. Training for the use of the functions:

During or before final acceptance test, the Contractor should carry out training for operator(s) who is(are) going to be designated by KARI. Training and verification on delivery of Deliverable Items shall be provided with more than one (1) week by Contractor's well experienced engineer. The timing of training may be adjusted by mutual agreement after Contract.

B. Training for the Production

At the beginning of the production starting, the contractor should provide engineering support for the production at the plant where machine installed. The Contractor should carry out training for operator(s) who is(are) going to be designated by KARI. Training and supports for the production should be provided with more than one (1) week by Contractor's well experienced engineer. The timing of training may be adjusted by mutual agreement after Contract.

6. Delivery and Installation

The transportation and installation are responsibility of the Contractor. The Contractor should provide transportation, unloading, unpacking, and packing boxes disposal. The installation plant will be designated by KARI. However, the crane for installing the equipment will be provided by KARI. Foundation drawings and requirements for the installation of the **Friction Stir Welding (FSW) Machine** should be provided within EDC + 3 months.

After completing the installation by Contractor, the Contractor shall perform the test working of the **Friction Stir Welding (FSW) Machine** (Final Acceptance Test) with KARI's presence and demonstrate to KARI that there is no problem on the **Friction Stir Welding (FSW) Machine**.

7. Acceptance Test for FSW

The **Friction Stir Welding (FSW) Machine** must undergo two types of acceptance tests: the Pre-Acceptance Test and the Final Acceptance Test.

A. Pre-Acceptance Test :

Following the completion of manufacturing, the Pre-Acceptance Test must be conducted at the Contractor's plant before EDC+14 month. During this test, the Contractor should demonstrate, in the presence of KARI representatives, that the **Friction Stir Welding (FSW) Machine** meets the specifications and requirements under this Contract. The welding test for AL2219 plate (provided by KARI as KARI Furnished Item) using both fixed and RPT tools should be included at this test and ensuring compliance with the qualifications outlined in standard EN ISO 25239-4 Clause 6. The test plan should be submitted and approved at least two (2) months before the test.

B. Final-Acceptance Test:

After the **Friction Stir Welding (FSW) Machine** is installed at the place designated by KARI, Final-Acceptance Test should be carried out on-site before EDC+ 19 month. The Contractor is responsible for demonstrating that the proposed specifications are satisfied during this test as well. The welding and milling test must be successfully conducted with AL2219 plate (provided by KARI as KARI Furnished Item). Both tool (fixed and RPT) should be approved in accordance with qualification of the standard EN ISO 25239-4 Clause 6. The test plan should be provided and approved by the Contractor to KARI at least two (2) months before the delivery.

The Contractor should provide drawings and technical support necessary for future dome fixture design, production and installation, if required.

8. Warranty

The Contractor should carry out followings for the warranty of the Deliverable Items after delivery of it;

- (1) The **Friction Stir Welding (FSW) Machine** shall be warranted for the duration of twenty-four (24) months from the installation date at the place designated by KARI without any operational faults.
- (2) The warranty covers the replacement of faulty parts, the labor required for repair, traveling cost, staying cost and all associated necessary costs.
- (3) The Contractor shall submit the written plan for repair within forty-eight (48) hours after the reception of the notification of fault. The Contractor shall completely finish the repair within thirty (30) days after the reception of the notification of fault.
- (4) For an urgent service during important production period, the deadline for action is five (5) days from the reception of the notification of service. To meet the deadline of the urgent service, KARI will notify the Contractor of the production start date and the period two (2) weeks before the production start date.

9. Deliverable Items

Contractor shall deliver the following hardware, software and documents written in English at EDC + 16 months.

A. Hardware: **Friction Stir Welding (FSW) Machine**

B. Software: Welding software and license keys for welding processes, if available, including license fee. (submitted on USB),

C. Deliverable Data :

- (1) Two (2) hardcopies of final FSW Machine construction drawings;
- (2) Two (2) hardcopies of facility drawings related with the installation of the FSW Machine;
- (3) Two (2) hardcopies of detailed manual for operation;
- (4) Two (2) hardcopies of detailed manual for maintenance;
- (5) Two (2) hardcopies of user's detailed manual of the design software for welding process; and
- (6) List of spare parts and their suppliers.

10. KARI furnished items

The items below are provide by KARI for successful installation and test. The additional necessary items can be provided by mutual agreement.

- (1) Construction of the foundation conforms to the drawing provide by the contractor including:
 - A. Reinforcement plate;
 - B. Anchoring interface between the foundation and the machine;
- (2) The Crane for the unloading and installation of the Friction Stir Welding (FSW) Machine;
- (3) The lubrication oil for the machine with necessary type and quantities according to the specification provided by the Contractor;
- (4) The test coupons of Aluminum for welding test and milling test;
- (5) Necessary utilities and connection cables such as compressed air, electrical power and communication signals.