



# **BrahMos**

**BRAHMOS AEROSPACE PRIVATE LIMITED**  
(Joint Venture of Ministry of Defence)

**REQUEST FOR PROPOSAL  
FOR  
SUPPLY OF  
SIEMENS NX SOFTWARE**

**BMC/IEU/003/SW/RFP/002**

**Dt. 08 Oct 2025**



**DISCLAIMER**

This RFP is neither an agreement and nor an offer by the BAPL to the prospective Bidders or any other person. The purpose of this RFP is to provide interested parties with information to submit their proposals against tender. The Bidder shall bear all its costs associated with or relating to the preparation and submission of proposal pursuant to this RFP. Wherever necessary, BAPL reserves the right to amend or supplement the information, assessment or assumptions contained in this RFP. BAPL also reserves the right to withdraw the RFP or foreclose the procurement case at any stage. The issuance of this RFP does not imply that the BAPL is bound to shortlist a Bidder for the tender. The BAPL also reserves the right to disqualify any Bidder should it be so necessary at any stage on grounds of National Security.



#### A. PREABMLE:

BRAHMOS AEROSPACE PRIVATE LIMITED (BAPL) desires to procure Siemens NX Software that support master-model concept of 3D modelling and other downstream application providing complete integration between modelling, drafting, assembly, manufacturing and finite element analysis environments.

Therefore, the techno-commercial proposal is invited from the potential industry partners who can supply Siemens NX Software and demonstrate the software capability as per the following clauses.

#### B. SCOPE OF SUPPLY:

The following software shall be supplied by the vendor under this RFP:

| S No | Software            | No. of Licenses / Qty |
|------|---------------------|-----------------------|
| 1    | Siemens NX Software | 01                    |

**Note: The Specification of this Software is attached at Annexure – I to the RFP.**

#### C. SCOPE OF WORK:

1. The vendor shall supply the software as per details mentioned in clause-B above.
2. The vendor or his authorized personnel shall install the software in the workstations as directed by as directed by AGM (Design) at the premises indicated during the Price Negotiation Meeting.
3. The vendor shall provide license keys of the software through pen drive/email.
4. The vendor shall demonstrate the usage of each module of the software to BAPL Officials post installation on the model provided by BAPL. However, the model proposed by the vendor may also be used if deemed fit by BAPL.
5. The industry partner shall supply and install the software as per the following terms and conditions.
  - a. The software and its license should be of minimum **Siemens NX 2412** (Stable Version) or Higher, whichever is the **latest version available** as on date of delivery.
  - b. License of the software shall be **perpetual / Floating/Network license** (valid for minimum 3 years (since, BAPL is a defence organization, updating of license via internet is prohibited)).
  - c. OEM's original Documentation (help center/help desk) in media device(pen drive/CD) has to be provided by the vendor along with software during installation. Documentation has to be installed independently in all workstations of BAPL Design center.
  - d. The warranty period shall be **3 years** from the date of installation of software.
  - e. The vendor shall update/upgrade the software during the warranty period for free of cost, whenever there is an upgrade available, if selected vendor fails to



provide the upgrade, BAPL reserve the right to forfeit the **Performance Security Deposit**.

- f. The industry partner shall provide comprehensive technical support through either on call or by site visit during the warranty period.
6. In case the license has to be installed in different workstation (apart from the workstation in which it is already installed initially) during the warranty period, the firm has to extend necessary support.
7. TRAINING:
  - a. The firm shall provide training on SIEMENS NX (MACH-3 INDUSTRIAL DESIGN MODULE) for 15 days. (3 weeks, 5days/week, 4hour/day). The suitable dates for training shall be informed by BAPL (AGM (Design)) to the vendor.
  - b. 01 week has to be scheduled for basic training, and 02 weeks to be scheduled for advanced training. Training schedule to be shared and finalized in concurrence with BAPL (AGM (Design)) before starting the training.
  - c. Course material and worked out examples has to be provided by the vendor for the training.
  - d. Content/deliverable of training and its schedule to be finalized in consultation with BAPL (AGM (Design))
  - e. The trainer should have minimum three-year of experience on the software. The vendor shall submit necessary document to establish their claim along with the bid.
  - f. It is the responsibility of the vendor to arrange transportation and accommodation for the trainer during the training period. However, the trainer can be provided accommodation at BAPL guest house during the training period on chargeable basis, subjected to availability.

#### **D. PRE-QUALIFICATION CRITERIA:**

Followings are the prequalification criteria for selecting a vendor under this RFP.

1. Participating vendor must be the OEM or its authorized partner for SIEMENS NX software. The vendor should submit the Authorization letter from OEM specific to this tender to this effect along with the bid.
2. The participating vendor must have supplied at least one SIEMENS NX software to any State/Central Government organization/Educational Institutes (IITs, NITs)/PSUs/ Public listed companies in India during the last 7 years.
3. The vendor shall submit the documents viz., Order Copy/Supply details/Acceptance certificate/satisfactory performance certificate from previous user (as mentioned above) along with the offer to establish their claim.
4. Such submitted documents will be subjected to the cross verification by BAPL. Any adverse or contradictory remark by the end user during this process of cross



verification by BAPL will lead to the disqualification of the bid without further discussion or correspondence.

5. Furthermore, the interested industry partner must possess above stipulated conditions on the date of technical bid opening. Any claim (due to further development in the industry in due course of time, that is, after technical bid opening) in the respect of pre-qualification criterion will not be entertained.
6. This RFP is intended for the Indian vendors and therefore the bid submitted by any "foreign industry" shall not be considered for evaluation and shall be returned as it is.

#### **E. EVALUATION OF OFFERS:**

##### **i. TECHNO-COMMERCIAL OFFER:**

The solicitation of offer will be as per "Single Stage-Two Bid System" which implies that a Request for Proposal is being issued soliciting the technical and commercial offer together.

The validity of offers (both technical and commercial) would be at least **06 months** from the date of technical bid opening date. The technical offer should not contain any details related to the price quoted by industry partner. All price details should be submitted separately only in the commercial bid.

##### **ii. TECHNICAL EVALUATION:**

The technical proposals forwarded by the Bidders will be evaluated by a Technical Evaluation Committee (TEC). The TEC will examine the extent of variations / differences, if any, in the technical proposal submitted by various Bidders with reference to the tender specification and prep area "Compliance Statement" for short listing the Bidders. The compliance would be determined only on the basis of the parameters specified in the RFP.

##### **iii. COMPLIANCE STATEMENT:**

All interested industry partners must submit clause-wise compliance statement with respect to all technical parameters and other terms and conditions of the RFP. The offer without proper compliance statement shall not be evaluated and will be rejected without any correspondence. Notwithstanding anything mentioned in the technical offer, the statements and compliances made in the "compliance statement" with respect to technical & commercial terms and conditions shall be firm and final.

##### **iv. COMMERCIAL EVALUATION OF THE BID:**

The Commercial bids of only those bidders will be opened whose technical bids have been cleared by TEC. The vendor is required to quote the single rate in the price-bid template as placed at Annexure - II which is inclusive of supply of software, demonstration, training and warranty as spelled out in the RFP.

The L-1 bidder would be determined by PNC on the basis of terms and conditions of the tender. However, it is mandatory for the bidder to submit the element-wise cost breakup along with price bid. No tax exemption certificate, whatsoever, will be provided by BAPL and therefore, the rate quoted must be inclusive of all taxes and duties and must be quoted on F.O.R BAPL basis.



**v. PRICE-BID:**

The rates offered shall be 'Firm & Fixed' with full and detailed breakup of various applicable cost elements like cost of software, demonstration, training, warranty etc. and duly indicating all the applicable Taxes & Duties along with the relevant taxation rate and value for each of the applicable Tax / Duty, till the execution of the order.

To facilitate assessment of reasonability of price quoted, the Bidder shall indicate split-up details of the cost elements of the Basic price. No increase shall be permissible on any account after finalization of the order / till delivery and execution of the order. Price quoted should on F.O.R. Destination basis, for delivery at BAPL premises inclusive of all charges including transit insurance.

**vi. L-1 OFFER:**

The lowest bidder shall be decided based on the Total Basic Cost indicated in the Price Bid. Order shall be placed on only one firm after due negotiations for all the items based on the sum total of all the cost elements of price bid details.

**vii. CONTRACT CONCLUSION / PLACEMENT OF ORDER:**

The successful conclusion of commercial evaluation & CNC will be followed by contract conclusion /placement of order.

**viii. CURRENCY OF PAYMENT:**

This RFP is meant for Indian Vendors, and therefore, Indian bidders should submit their bids in Indian Rupees and all payment shall be made in Indian Rupee.

**F. STAGES OF SUPPLY:**

| <u>Stage</u> | <u>Deliverable</u>                                                                                 |
|--------------|----------------------------------------------------------------------------------------------------|
| Milestone-1  | Supply & installation of software as per clause-B and demonstration on each module of the software |
| Milestone-2  | Training on the software as per Clause: C.7                                                        |

Note: After successful completion of all the deliverable in each milestone by the vendor, AGM(Design) or his authorized representative shall issue a job completion certificate.

**G. DELIVERY SCHEDULE:**

Delivery schedule is as under:

| <u>Sl. No</u> | <u>Delivery Schedule</u>                                                                                                                                                                        |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Milestone-1   | To be completed within 04 months from the date of placement of PO Note: The exact date of supply and installation of software shall be informed to the vendor by BAPL within the stated period. |
| Milestone-2   | To be completed within 04 months from the date of completion of Milestone-1                                                                                                                     |





## H. PAYMENT TERMS:

This RFP is meant for Indian Vendors, and therefore, Indian bidders should submit their bids in Indian Rupees. And all payment shall be made in Indian Rupee. The following schedule for the payment shall be adopted after completion of each milestones.

| <u>Sl.No</u> | <u>Payment terms</u>                                                                                                                                                        |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Milestone-1  | 80% of base contract price including taxes and duties on successful completion of supply, installation of software and demonstration on each module of the software at BAPL |
| Milestone-2  | 20% of base contract price including taxes and duties on successful completion of training of software as per clause no:C.7 of this RFP.                                    |

Note:-The firm shall submit Job completion certificate issued by AGM (Design) / BAPL or his authorized representative along with final bill of each milestone while claiming for payment.

**H. PERFORMANCE SECURITY DOCUMENT:** The firm will be required to furnish a **Performance Guarantee** as per format in **Annexure-III** for a sum equal to 5% of the contract value within 30 days of receipt of the purchase order. Performance Guarantee should be valid for the complete contract period plus warranty period and 03 months claim period.

**I. SUBMISSION OF BIDS:** Firms need to deposit their bid documents along with Compliance Sheet **by 17 Oct 25**. No extension whatsoever will be granted by the BUYER. The Tender Documents needs to be deposited at BAPL HQ within envelope superscribing the following details:

**TENDER DOCUMENT NUMBER:**  
**AGM (COMMERCIAL)**  
**BRAHMOS HEADQUARTERS COMPLEX**  
**16, CARIPPA MARG, Kirby Place**  
**Delhi Cantt, New Delhi -110010**

## J. Pre-Bid clarification:

(a) Prior to preparation of the **Techno-Commercial Bid**, clarifications regarding the technical terms & conditions, if any, be obtained from the **AGM (Design), New Delhi** mail: [design@brahmos.com](mailto:design@brahmos.com), within **03 working days** from the date of RFP.

(b) Prior to preparation of the **Techno-Commercial Bid and Price Bid**, clarifications regarding the commercial terms, if any, be obtained from **AGM (Commercial), New Delhi**, mail: [contracts@brahmos.com](mailto:contracts@brahmos.com) within **03 working days** from the date of RFP.

**The Pre-Bid Meeting is mandatory and will be scheduled on 13 Oct 25. Interested Bidders to forward the interest for participation in the meeting on [design@brahmos.com](mailto:design@brahmos.com) with a copy to [contracts@brahmos.com](mailto:contracts@brahmos.com)**



(Abhishek Panigrahi)  
**AGM (Commercial)**

*Panigrahi* 08 Oct '25  
**Abhishek Panigrahi**  
**AGM (Commercial - Production Control)**  
**BrahMos Aerospace**

**TECHNICAL SPECIFICATION****For SIEMENS NX (MACH-3 INDUSTRIAL DESIGN) SOFTWARE**

No. BMC.IEU.001.SW.002

| S.No                               | Description                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><u>General Capabilities</u></b> |                                                                                                                                                                                                                                                                                                                                          |
| 1.                                 | Software should support master-model concept of 3D modelling and other downstream application providing complete integration between modelling, drafting, assembly, manufacturing and finite element analysis environments.                                                                                                              |
| 2.                                 | Software should support working in both managed and an unmanaged environment from the same hardware-system and same software-installation. Here, Managed environment means using a PDM system; while unmanaged environment means using simple file-system for storing all CAX-data.                                                      |
| 3.                                 | Files should be visible from the operating system with thumbnail-previews when working in the MS Windows unmanaged environment.                                                                                                                                                                                                          |
| 4.                                 | Software must not have any history of overbearing kernel or CAD-data structure 4 changes within the last 3 major versions.                                                                                                                                                                                                               |
| 5.                                 | There should be no reason to believe that any specialized "migration service" would be required for bringing data in to the latest version from any of the preceding two major versions of the software.                                                                                                                                 |
| 6.                                 | There should be no reason to believe that any specialized "migration service" would be required for bringing data in to the latest version from any of the preceding two major versions of the software.                                                                                                                                 |
| 7.                                 | The software should support parametric as well as non-parametric ways of modelling in the same environment.                                                                                                                                                                                                                              |
| 8.                                 | The software should support history-based and history-free ways of modelling in the same environment. User should be able to toggle between history-based modelling and history free (direct) modelling while in the part modelling or assembly modelling environment. This toggle should happen without closing of the working session. |
| <b><u>User interaction</u></b>     |                                                                                                                                                                                                                                                                                                                                          |
| 9.                                 | Capability to fully customize all toolbars, menus, right-click 'pop-up' menus, and icon panels.                                                                                                                                                                                                                                          |
| 10.                                | Users should be able to re-define the icon for any command.                                                                                                                                                                                                                                                                              |





| S.No                    | Description                                                                                                                                                                                                                                                                                                                                                |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.                     | Users should be able to rearrange, re-organize, group or ungroup the commands with complete flexibility                                                                                                                                                                                                                                                    |
| 12.                     | Users to be able to define or re-define short-cut keys / keyboard accelerators / 'hot-keys' for any command with complete flexibility.                                                                                                                                                                                                                     |
| 13.                     | Users should be able to save chosen customized user-interface as a 'profile'. Other users should be able to access and use these profiles at the click of a button.                                                                                                                                                                                        |
| 14.                     | Complete flexibility of user to define radial toolbars corresponding to all three mouse buttons, thus providing access to up to nine commands with minimal mouse-movement                                                                                                                                                                                  |
| 15.                     | Availability of a fully customizable right-click pop-up menu to minimize mouse-movement                                                                                                                                                                                                                                                                    |
| 16.                     | To minimize the time needed to access the right command, a context-sensitive toolbar should appear next to the cursor-location when any entity is selected on the screen. This toolbar should contain the commonly used commands for that specific type of entity. The toolbar contents should also change automatically when other entities are selected. |
| 17.                     | Such context sensitive toolbar as mentioned above, for any entity-type, should be customizable so that the user can add or remove commands.                                                                                                                                                                                                                |
| <b><u>Sketching</u></b> |                                                                                                                                                                                                                                                                                                                                                            |
| 18.                     | Capability to create 2D sketch on a Plane, a planar face or on a Path                                                                                                                                                                                                                                                                                      |
| 19.                     | On-screen input-boxes while creating sketch-geometry for providing parameters                                                                                                                                                                                                                                                                              |
| 20.                     | Dynamic preview during creation of Sketch-curve                                                                                                                                                                                                                                                                                                            |
| 21.                     | Help-lines while creating sketch-curves for horizontal & vertical alignment with end-points and mid-points of existing entities                                                                                                                                                                                                                            |
| 22.                     | Snap to constraint with existing entities while creating sketch-curves                                                                                                                                                                                                                                                                                     |
| 23.                     | Viewing and editing multiple expressions in sketch                                                                                                                                                                                                                                                                                                         |
| 24.                     | Option to create a sketch internal to a specific modeling feature or to keep it external as child-feature                                                                                                                                                                                                                                                  |
| 25.                     | Dynamic update of color of individual sketch-entities based on their constraint-status (under-constrained, fully-constrained, over-constrained)                                                                                                                                                                                                            |
| 26.                     | Capability for Auto-constraining and auto-dimensioning while creating sketch-curves                                                                                                                                                                                                                                                                        |
| 27.                     | Capability for Auto-constraining and auto-dimensioning after sketch-curves have been created                                                                                                                                                                                                                                                               |
| 28.                     | Grouping of sketch-curves                                                                                                                                                                                                                                                                                                                                  |



| S.No                                 | Description                                                                                                                                                                                                   |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 29.                                  | Capability to Sketch in the context of an assembly                                                                                                                                                            |
| 30.                                  | Continuous on-screen display of degrees of freedom of sketch-curves                                                                                                                                           |
| 31.                                  | Capability to re-attach dimensions from one entity to another entity                                                                                                                                          |
| 32.                                  | Capability to re-attach a complete sketch from one plane to another                                                                                                                                           |
| 33.                                  | Option to delay the evaluation of the changes made in a sketch to avoid drastic & partial modifications affecting the sketch adversely                                                                        |
| 34.                                  | Ability to project existing curves and edges                                                                                                                                                                  |
| 35.                                  | Ability to convert curves to reference entities                                                                                                                                                               |
| 36.                                  | Reference curves of a sketch should remain visible so that these can be used in other sketches without any additional processing                                                                              |
| 37.                                  | Mirror, Offset, Trim & Extend sketch-curves                                                                                                                                                                   |
| 38.                                  | Manual dimensioning to support horizontal, parallel, vertical, radial, diametral, perpendicular and perimeter types                                                                                           |
| 39.                                  | Patterning of sketch curves, creating regular polygons, chamfers and fillets in sketches                                                                                                                      |
| 40.                                  | Capability to identify intersection points associatively                                                                                                                                                      |
| 41.                                  | Capability to change the dimension style of sketches                                                                                                                                                          |
| 42.                                  | Capability to create associative intersection-points between sketch-plane and existing curves & edges even if there are multiple intersections                                                                |
| 43.                                  | Capability to create polygon with a specified number of sides                                                                                                                                                 |
| 44.                                  | Capability to dynamically animate the effect of dimension change on the sketch                                                                                                                                |
| 45.                                  | Capability to convert the sketch dimensions to 3D dimensions for model-based design (MBD)                                                                                                                     |
| <b>Math-engine &amp; Expressions</b> |                                                                                                                                                                                                               |
| 46.                                  | Capability to create user-defined formulae, rules and expressions within part files to drive part-dimensions and attributes. These expressions can return numbers, strings, points, vectors, Booleans, Lists. |
| 47.                                  | Ability to link one expression with another within the same part or even between two separate parts or assemblies                                                                                             |
| 48.                                  | Provides a comprehensive set of in-built mathematical / trigonometrical functions                                                                                                                             |
| 49.                                  | Part-expressions to support nested loops and conditionals like if-then-else statements and for loops                                                                                                          |



| S.No                          | Description                                                                                                                                                                                                                                                                                                  |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 50.                           | Built-in standard mechanical engineering functions and formulae. For example, standard formulas for stresses, displacements, bending-moments for beams and plates under various loading conditions; spur-gear-calculations, material-modulus calculations, spring calculations, vibrations calculations etc. |
| 51.                           | Support for various units of measurements. For example, the bending moment formula should be able to accept values in mixed units if required and provide the output in the desired unit.                                                                                                                    |
| 52.                           | Can connect to external spreadsheets to retrieve data from specified cells.                                                                                                                                                                                                                                  |
| 53.                           | Can connect to external spreadsheets to for vertical & horizontal lookup.                                                                                                                                                                                                                                    |
| 54.                           | Ability to store geometric measurements between entities in the CAD-part (distance, area, volume, etc.) and use these to drive other features.                                                                                                                                                               |
| 55.                           | Ability to set an expression in one part so that it can drive a dimension, expression or attribute of another part.                                                                                                                                                                                          |
| <b><u>Solid Modelling</u></b> |                                                                                                                                                                                                                                                                                                              |
| 56.                           | Ability to create features from open as well as closed sketches                                                                                                                                                                                                                                              |
| 57.                           | Ability to create features from sketches irrespective of its constraint status (under-, fully- or over-constrained)                                                                                                                                                                                          |
| 58.                           | Ability to extrude & revolve open sketches to create surface features                                                                                                                                                                                                                                        |
| 59.                           | Ability to extrude & revolve solid features from open sketches using offset option                                                                                                                                                                                                                           |
| 60.                           | Ability to selectively pick wireframe geometry from self-intersecting sketches by stopping at intersections                                                                                                                                                                                                  |
| 61.                           | Ability to create conic fillets, edge-based fillets, face-blends on 3D models                                                                                                                                                                                                                                |
| 62.                           | Create curves derived from mathematical equations                                                                                                                                                                                                                                                            |
| 63.                           | Create helical curve along curved path                                                                                                                                                                                                                                                                       |
| 64.                           | Create associative copies of geometry and array these along a curved path                                                                                                                                                                                                                                    |
| 65.                           | Ability to create planes, points, datum axes associative to existing geometry as well as using absolute values                                                                                                                                                                                               |
| 66.                           | Ability to create splines with or without internal knots (single- / multi-span splines) using through-points or control-point locations                                                                                                                                                                      |
| 67.                           | Ability to modify order / degree of splines after creation                                                                                                                                                                                                                                                   |
| 68.                           | Ability to fit splines on points                                                                                                                                                                                                                                                                             |
| 69.                           | Ability to extract curves associatively or non-associatively from existing edges & other curves that may even belong to other parts in an assembly                                                                                                                                                           |



| S.No                   | Description                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 70.                    | Ability to offset curves on & along faces                                                                                                                                                                                                                                                                                                                                             |
| 71.                    | Ability to simplify a spline in to a set of arcs and lines                                                                                                                                                                                                                                                                                                                            |
| 72.                    | Ability to extract virtual curves like revolve axes, blend centerlines and virtual intersections                                                                                                                                                                                                                                                                                      |
| 73.                    | Ability to create curve by combining the intersecting projections of two existing chains of curves                                                                                                                                                                                                                                                                                    |
| 74.                    | In-built functionalities to create holes, bosses, pockets, pads, slots, etc. on solid models                                                                                                                                                                                                                                                                                          |
| 75.                    | Capability to emboss sections on complex faces with multiple draft and end-cap options                                                                                                                                                                                                                                                                                                |
| 76.                    | Ability to create symbolic or actual thread-features on cylindrical faces. Multiple types of threads - Metric, UNJ, Unified, Trapezoidal, ACME, stub acme, Lowenherz, Buttress, NPT, etc.                                                                                                                                                                                             |
| 77.                    | Ability to create mirrored bodies associatively                                                                                                                                                                                                                                                                                                                                       |
| 78.                    | Ability to create mirrored features associatively. Inherent Boolean operations should also be transferred to the mirrored feature.                                                                                                                                                                                                                                                    |
| 79.                    | Ability to shell solids or regions of solids and offset surfaces with uniform or variable thicknesses. Should automatically handle minimum bend-radius violations and provide partial results if necessary.                                                                                                                                                                           |
| 80.                    | Ability to create deformable component which can assume more than one shape when it is added to assembly.                                                                                                                                                                                                                                                                             |
| 81.                    | Ability to Trim, divide and split faces and solids associatively                                                                                                                                                                                                                                                                                                                      |
| 82.                    | Allow filtering of features in the model's feature-tree based on specified criteria like name (using wildcards), attributes (based on type-value pair), feature category or type, features' state (failed, suppressed, out-of-date, warnings, etc), timestamp, model-views & alerts. Allow negative filtering of selected criteria. Allow saving of selected criteria for future use. |
| 83.                    | Ability of software to replay the features in timestamp sequence.                                                                                                                                                                                                                                                                                                                     |
| 84.                    | Ability to create logical groups of features to make the feature-list more manageable.                                                                                                                                                                                                                                                                                                |
| 85.                    | Capability to show warning message to user before a feature with dependent children is deleted                                                                                                                                                                                                                                                                                        |
| 86.                    | Undo/Redo capability.                                                                                                                                                                                                                                                                                                                                                                 |
| 87.                    | Capability to import/export 3D data to/from various standard formats like STL, GES, STEP, Para solid and JT.                                                                                                                                                                                                                                                                          |
| <b>Material Tables</b> |                                                                                                                                                                                                                                                                                                                                                                                       |



| S.No                                      | Description                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 88.                                       | Built-in property-tables of some of the most-used engineering materials including multiple types of Isotropic, Fluid and Orthotropic materials including various types of plastics, metals, etc.                                                                                                                                                                      |
| 89.                                       | Capability to build a user-defined materials library from the software's own graphical user-interface.                                                                                                                                                                                                                                                                |
| 90.                                       | Library of materials can be typified in multiple manners depending on how the physical properties are defined. Among others, the following categories of property-tables can be defined: Isotropic, Anisotropic, Orthotropic, Fluid, Hyper elastic, Mooney-Rivlin, Polynomial, Ogden, Foam, Blatz, Arruda-Boyce, Neo-Hooke, Marlow, Van der Waalz, Gent, Gasket, etc. |
| 91.                                       | Capability to export an existing materials library as an XML file                                                                                                                                                                                                                                                                                                     |
| 92.                                       | Capability to import a user-defined materials library in XML format                                                                                                                                                                                                                                                                                                   |
| <b><u>Direct editing of 3D models</u></b> |                                                                                                                                                                                                                                                                                                                                                                       |
| 93.                                       | Capability to edit parts that do not have any feature history. This should be provided in the same environment as solid modeling.                                                                                                                                                                                                                                     |
| 94.                                       | Possibility of directly editing by selecting faces or groups of faces and either by dynamically dragging these or by attaching dimensions                                                                                                                                                                                                                             |
| 95.                                       | Intelligence in the software to preserve design intent of 3D parts while such changes are made.                                                                                                                                                                                                                                                                       |
| 96.                                       | Intelligence in the software to automatically select groups of faces that appear as generic engineering features like bosses, ribs, holes, pockets, slots, etc.                                                                                                                                                                                                       |
| 97.                                       | On selection of one face, software should have built-in intelligence to automatically select all tangential, coaxial, coplanar, symmetric or offset faces so that all can be edited in unison                                                                                                                                                                         |
| 98.                                       | Ability to create geometrical constraints between faces                                                                                                                                                                                                                                                                                                               |
| 99.                                       | Provision to create driving dimensions directly on features or faces                                                                                                                                                                                                                                                                                                  |
| <b><u>Assembly Modelling</u></b>          |                                                                                                                                                                                                                                                                                                                                                                       |
| 100.                                      | Capability for creating 3D assemblies using both top-down and bottom-up approaches                                                                                                                                                                                                                                                                                    |
| 101.                                      | Capability to provide geometric constraints between components like touch & align, concentric, parallel, perpendicular and centered constraints.                                                                                                                                                                                                                      |
| 102.                                      | Capability to create the joints like hinge, slider, cylindrical and ball.                                                                                                                                                                                                                                                                                             |
| 103.                                      | Capability to partition an assembly model into regions                                                                                                                                                                                                                                                                                                                |
| 104.                                      | Capability to create the associative lightweight body of selected faces or solid bodies in assembly environment                                                                                                                                                                                                                                                       |





| S.No | Description                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 105. | Capability to provide positional constraints between components like linear distances between faces, edges or points and & angular deviation between faces or edges.                                                                                                                                                                                                                                                                     |
| 106. | Support for handling very large assemblies by allowing the user to selectively control loading and display of components – segregation of information stored in a part-file – e.g. lightweight data, graphical data, detailed CAD-information and inter-part data – should help in optimally loading and displaying a large assembly. These data should be loaded on demand to enhance performance without compromising user-experience. |
| 107. | Capability to open only those parts in an assembly that satisfy a proximity-value with respect to a reference part, thereby helping user to conserve memory without losing details of the area of interest.                                                                                                                                                                                                                              |
| 108. | Capability to set the level of detail that gets displayed on screen, during dynamic zooming, panning & rotation, to improve graphical performance with large assemblies.                                                                                                                                                                                                                                                                 |
| 109. | Capability to define alternative positions or arrangements of parts in a sub-assembly in the context of a higher-level assembly.                                                                                                                                                                                                                                                                                                         |
| 110. | Capability to remember constraints – i.e. to save a component's constraints and its participating geometry inside its part-file so that it only asks for destination geometries whenever brought inside any assembly                                                                                                                                                                                                                     |
| 111. | Capability to define entities, like expressions or geometries in parts, that are least likely to be drastically modified or lost during part-edits and hence these product interfaces should be encouraged for assembly considerations.                                                                                                                                                                                                  |
| 112. | Capability to dynamically move a component in space, with options to honor / dishonor its constraints and with options to detect and even stop when a collision occurs.                                                                                                                                                                                                                                                                  |
| 113. | Ability to create user-defined sets of entities that can be displayed in a higher-level assembly instead of the complete part.                                                                                                                                                                                                                                                                                                           |
| 114. | Ability to allow placement of components either in selected layers or in original layers                                                                                                                                                                                                                                                                                                                                                 |
| 115. | Ability to allow creation and editing of components in the context of the assembly                                                                                                                                                                                                                                                                                                                                                       |
| 116. | Ability to optionally emphasize the work-part when working in the context of an assembly.                                                                                                                                                                                                                                                                                                                                                |
| 117. | Ability to create mirrored assemblies associatively                                                                                                                                                                                                                                                                                                                                                                                      |
| 118. | Ability to create arrays of components. The arrays should be associative if they are constrained to arrayed features                                                                                                                                                                                                                                                                                                                     |





| S.No | Description                                                                                                                                                                                                                                                                                              |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 119. | Ability to create exploded views of assemblies                                                                                                                                                                                                                                                           |
| 120. | Capability check for interference and clearance between the components. It also should allow the creation of component sets to be used for clearance analysis                                                                                                                                            |
| 121. | Capability to set minimum clearance-requirements in an assembly, set zones or pairs that are allowed to violate such requirements, validate the assembly against these rules, study the hard and soft interferences in detail, isolate the solids of hard-interference and save the results as a report. |
| 122. | Capability to check for interferences even with lightweight / facet representations of components                                                                                                                                                                                                        |
| 123. | Capability to create reports of an assembly including names of components, file-names with paths, quantities, their constraint status, etc.                                                                                                                                                              |
| 124. | Ability to perform clearance analysis of assemblies in batch-mode. Option in software to send mail when the desired checks are complete.                                                                                                                                                                 |
| 125. | Capability to report the complete assembly structure in an HTML or Microsoft Excel format.                                                                                                                                                                                                               |
| 126. | Capability for associative inter-part modelling so that geometric entities of one part can be linked to another part. Geometric entities may include composite curves, points, datums, sketches, faces, region of faces, bodies, mirror bodies and routing objects.                                      |
| 127. | Option to link geometries from one part to another at specified timestamp in the featuretree so that the shape of the object at that timestamp is correctly captured.                                                                                                                                    |
| 128. | Option to break inter-part link and re-create the same later with original parent or with a new parent.                                                                                                                                                                                                  |
| 129. | Status of inter-part link (whether broken or intact) and the type of resulting geometry should be distinctly discernible from the icon representing the feature in the model's feature tree.                                                                                                             |
| 130. | Ability to create company-standard rules for part-name versioning while working in an unmanaged environment (without any PDM system). Such versioning rule may include alphanumeric characters (barring certain specific characters prohibited by file-system) in a pre-defined sequence.                |
| 131. | Provision of building an assembly in batch-mode from an external text-file containing the names of the parts, their transformation matrices, color, etc.                                                                                                                                                 |
| 132. | Capability to save the way an assembly is viewed as a an external "snapshot" or "bookmark" file so that such view can be restored anytime later.                                                                                                                                                         |



| S.No                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 133.                            | Capability to replace a component with another by maintaining all relationships that are logically possible. Should provide the option of replacing all the occurrences of the selected component.                                                                                                                                                                                                                                                                                                                                                                          |
| 134.                            | Capability to define assembly/disassembly or motion sequences by defining components' start and end positions. Should be capable of reporting any collision with other bodies during such motion.                                                                                                                                                                                                                                                                                                                                                                           |
| 135.                            | Capability to warn user if measurement requirements are violated during assembly motion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <u>Freeform modeling, basic</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 136.                            | All surfacing commands must be history-supported and should not result in any deletion of the model's history.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 137.                            | Capability to create lofted surface through non-intersecting sections, each section containing contiguous curves with option to preserve. Option to control position-, tangent- or curvature-continuity at end-sections with adjoining surfaces. Option to re-parametrize the lofted surface to enhance smoothness. Provision to select the iso-lines of the lofted surface based on arc-length of the sections, connecting points, by distance along a vector, by a template curve or by segments. Capability to create either single-patch or multi-patch lofted surface. |
| 138.                            | Capability to create a body through a mesh of sections in one direction, and guides in another direction. Option to define continuity with adjacent surfaces.                                                                                                                                                                                                                                                                                                                                                                                                               |
| 139.                            | Capability to create a multi-sided surface by defining the boundaries of the patch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 140.                            | Capability to sweep an open or a closed section along guide curves with option for lateral or uniform scaling when there are only two guides.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 141.                            | Capability to create variationally swept surface with a parametric section along a guide path where the parameters can be controlled progressively based on user-inputs.                                                                                                                                                                                                                                                                                                                                                                                                    |
| 142.                            | Capability to create tubes by selecting the path and by keying-in the outer and inner diameters. Option to create solid tube by providing zero inner diameter                                                                                                                                                                                                                                                                                                                                                                                                               |
| 143.                            | Capability to thicken a sheet or surface to create a solid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 144.                            | Capability to trim or extend a surface either by a specified distance, by percentage, until a selected entity or to make a corner with another surface.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 145.                            | Capability to trim a surface by a curve, another surface or a plane with the intention of discarding one of the regions.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



| S.No        | Description                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 146.        | Capability to split or divide a surface by a curve, another surface or a plane with the intention of keeping both the regions.                                                                                                                                                                                                                                                                                                            |
| 147.        | Capability to create blends, between two sets of surfaces, with circular or conic cross sections either with rolling-ball method or with swept-section method.                                                                                                                                                                                                                                                                            |
| 148.        | <u>Drafting</u>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 149.        | Capability to create 2D engineering-drawings completely associative to a 3D model with options for view-selection and placement (both first-angle and third-angle projections), hidden-line processing, section-views, inheritance of feature-dimensions and 3D annotations, creation of part-lists / BOM of assemblies with associative ballooning, creation of additional dimensions and annotations and company-standard title-blocks. |
| 150.        | Capability to add multiple sheets of different sizes to a drawing                                                                                                                                                                                                                                                                                                                                                                         |
| 151.        | Capability to select from a list of metric and English standard sheet-sizes while creating sheets or later                                                                                                                                                                                                                                                                                                                                |
| 152.        | Capability to bring views from the model in either shaded or wireframe modes.                                                                                                                                                                                                                                                                                                                                                             |
| 153.        | Annotations and dimensions should include horizontal, vertical, parallel and perpendicular dimensions between entities, radial, diametral and cylindrical dimensions, chain dimensions, ordinate dimensions, base-dimensions, notes and symbols including custom symbols, weld-symbols, datum symbols, datum targets and feature control frames.                                                                                          |
| 154.        | Dimensions can use various types of arrow-heads including open, closed, solid-filled, topleft, bottom-left and double arrows. Support for dot, circle, integral, square and filled square arrow heads as required.                                                                                                                                                                                                                        |
| 155.        | Arrow-head types and sizes can be defined during creation by user or later during editing.                                                                                                                                                                                                                                                                                                                                                |
| 156.        | Capability to create dual dimensions, tolerances, reference and inspection dimensions.                                                                                                                                                                                                                                                                                                                                                    |
| 157.        | Capability to add annotations on any of the 4 sides of a dimension and associatively link their positions to the parent dimension.                                                                                                                                                                                                                                                                                                        |
| 158.        | Capability to re-associate any dimension with alternate modeling entities.                                                                                                                                                                                                                                                                                                                                                                |
| 159.        | Support of a library of industry standard drafting and GD&T symbols                                                                                                                                                                                                                                                                                                                                                                       |
| 160.        | Capability of software to automatically update view-border based on view-scale and model                                                                                                                                                                                                                                                                                                                                                  |
| <b>SIZE</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                           |



| S.No | Description                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 161. | Capability to driving view-scale through expressions so that model can always be inside the drawing sheet using step-wise changes in scale.                                                                                                                                                                                                                                                                                                           |
| 162. | Capability to anchor views based on specific model-entity and sheet location                                                                                                                                                                                                                                                                                                                                                                          |
| 163. | Capability to hide or change font / width of hidden lines                                                                                                                                                                                                                                                                                                                                                                                             |
| 164. | Option to automatically or manually update a drafting view whenever the drawing is opened.                                                                                                                                                                                                                                                                                                                                                            |
| 165. | Option to change view orientation during creation or later                                                                                                                                                                                                                                                                                                                                                                                            |
| 166. | Capability to align views in a drawing sheet                                                                                                                                                                                                                                                                                                                                                                                                          |
| 167. | Capability to adjust the representation of smooth edges in a view.                                                                                                                                                                                                                                                                                                                                                                                    |
| 168. | Capability to adjust perspective and clipping thickness of a view                                                                                                                                                                                                                                                                                                                                                                                     |
| 169. | Capability to create projected views, detail views, section views including straight sections, stepped sections, half-cut sections, revolved section sections, break-out sections, folded & unfolded sections and pictorial section views.                                                                                                                                                                                                            |
| 170. | Capability to define non-sectioned components of an assembly.                                                                                                                                                                                                                                                                                                                                                                                         |
| 171. | Capability to define hidden components in specific views.                                                                                                                                                                                                                                                                                                                                                                                             |
| 172. | Capability to define cross-hatch styles for different materials                                                                                                                                                                                                                                                                                                                                                                                       |
| 173. | Capability to add cross-hatch by selecting a point in a closed area or a set of curves that define a boundary.                                                                                                                                                                                                                                                                                                                                        |
| 174. | Capability to create broken views with simple, saw-tooth, tubular, rod and solid tubular break-ends.                                                                                                                                                                                                                                                                                                                                                  |
| 175. | Capability of defining the position of break-ends or break-out section view associatively linked to model entities                                                                                                                                                                                                                                                                                                                                    |
| 176. | Capability to create hole tables, tabular labels and tabular notes from spreadsheet data                                                                                                                                                                                                                                                                                                                                                              |
| 177. | Standard symbols library to be supplied and should include fasteners symbols like cap screw, counter-bore, dowel, counter-bore dowel It should also include standard ID symbols like circle, hexagon, divided circle, divided hexagon, square, triangle and rounded box. Additional standard symbols like datum-origin (circle with diagonal quadrants solidfilled), centerline (CL), parting-line (PL) and industry-standard surface finish symbols. |
| 178. | Capability to import raster images (JPEG, PNG, TIFF) in to drawing.                                                                                                                                                                                                                                                                                                                                                                                   |
| 179. | Capability to associatively add existing expressions or attributes in the part to an annotation.                                                                                                                                                                                                                                                                                                                                                      |
| 180. | Capability to create standalone drawings with no relationship to 3D models                                                                                                                                                                                                                                                                                                                                                                            |



| S.No                                                 | Description                                                                                                                                                                                                                                       |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 181.                                                 | Capability to import standalone drafting views to modelling environment                                                                                                                                                                           |
| 182.                                                 | Capability to project entities from stand-alone drawing-views to other orthogonal views for quick creation of view-entities.                                                                                                                      |
| 183.                                                 | Capability to save a "snapshot" of a drawing in the file itself and to compare this snapshot after modifications. Capability of software to present a report of the modifications and allow the user to zoom in on each of the modified entities. |
| 184.                                                 | Option to automatically add modification-symbols (triangular, circular, hexagonal, etc) with sequential numbering during comparison.                                                                                                              |
| 185.                                                 | Capability to overlay an earlier snapshot on the current drawing for visual comparison.                                                                                                                                                           |
| 186.                                                 | Capability to export/import 2D drawing in /from various standard formats like IGES, DXF and DWG                                                                                                                                                   |
| 187.                                                 | Capability to create user-defined character and line fonts                                                                                                                                                                                        |
| 188.                                                 | Capability to use layers for hiding and showing entities in drafting views                                                                                                                                                                        |
| <b><u>UDF (User-defined features)</u></b>            |                                                                                                                                                                                                                                                   |
| 189.                                                 | Capability to define a library of re-usable groups of modeling features                                                                                                                                                                           |
| 190.                                                 | Capability to define the driving dimensions while creating the feature group.                                                                                                                                                                     |
| 191.                                                 | No need to define the driven dimensions and the hard-coded ones while defining the reusable feature-group.                                                                                                                                        |
| 192.                                                 | Software allows user to modify only the driving dimensions when the feature group is called from the library.                                                                                                                                     |
| 193.                                                 | Capability to re-define geometrical dependencies, if any, when the feature-group is called by user from library.                                                                                                                                  |
| 194.                                                 | Capability to make the reusable library of feature-groups available in the enterprise network.                                                                                                                                                    |
| <b><u>Dynamic &amp; Photorealistic Rendering</u></b> |                                                                                                                                                                                                                                                   |
| 195.                                                 | Make realistic product visualization and display of 3D environment using background images, shadows and lightings, floor reflections and a library of materials having different reflective & glossiness properties.                              |
| 196.                                                 | Capability of showroom environment with option to automatically turn and observe the object from various directions.                                                                                                                              |
| 197.                                                 | Options to setup foreground and background images and image-based lighting.                                                                                                                                                                       |
| 198.                                                 | Ability to import raster images (in TIFF format) into modelling environment.                                                                                                                                                                      |
| 199.                                                 | Support for Photo-realistic, Raytracing & Radiosity shading                                                                                                                                                                                       |





| S.No                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 200.                                          | Supports non-photorealistic rendering by displaying the on-screen entities like a pencil sketch, ink drawing, or painting.                                                                                                                                                                                                                                                                                                                                                                                            |
| 201.                                          | Capability to produce High Quality Image rendered MPEG movies to record on-screen activity.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b><u>Product Validation</u></b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 202.                                          | Provide a set of standard tools to check compliance of modeling, drafting and assembly against well-known industry CAD-practices.                                                                                                                                                                                                                                                                                                                                                                                     |
| 203.                                          | Capability of software to run a selected set of model-checks in either batch or interactive mode and recurse through a complete folder.                                                                                                                                                                                                                                                                                                                                                                               |
| 204.                                          | Capability of software to save the results of the checks in the part-files                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 205.                                          | Among others, checks should include consistency of assembly inter-part links, whether clearance analysis has been run or not, consistency of model geometry, feature positioning and tolerances, chamfer and blend feature too early in the model history, sheet body offset thickness, unparametrized features, whether all sketches are fully constrained, drafting with false dimensions, drawings with overlapping views, whether all drawings are up-to-date, spell-check on drawing notes, VDA 4955 compliance. |
| 206.                                          | Capability to measure distances and angles between objects, radii of circular or cylindrical entities, face & body properties, minimum radius of curvature of faces, minimum distance between objects and section inertia.                                                                                                                                                                                                                                                                                            |
| 207.                                          | Capability to validate 3D model for tiny or misaligned edges, faces with spikes or self intersections or smoothness violations.                                                                                                                                                                                                                                                                                                                                                                                       |
| 208.                                          | Capability to analyze curves using curvature combs, curvature variation graphs, peaks, inflections and continuities.                                                                                                                                                                                                                                                                                                                                                                                                  |
| 209.                                          | Capability to analyze surfaces for poles, knots, curvature color-plots, environment maps & reflection, zebra-plots and slope.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b><u>3D Annotation (GD &amp; T, PMI)</u></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 210.                                          | Capability to create 3D annotation PMI (Product Manufacturing Information) directly over a model. Annotations include various types of dimensions on model entities, surface finish symbols, locator and weld symbols, datum symbols, feature-control frames, notes, geometric-tolerancing (GD&T) symbols, pre-set company-proprietary or governmentsecurity symbols, etc.                                                                                                                                            |
| 211.                                          | Capability to select and associate auxiliary objects for a PMI to communicate multiple entities in the model that have to be considered during manufacturing for that PMI.                                                                                                                                                                                                                                                                                                                                            |
| 212.                                          | Provision to create a report of all the PMIs in a model                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 213.                                          | Capability to define different views in the model and associate and display of various PMIs in such views to reduce clutter and to segregate PMIs according to interest-areas.                                                                                                                                                                                                                                                                                                                                        |



| S.No                                       | Description                                                                                                                                                                                                                  |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 214.                                       | Capability to make PMIs visible through shaded models                                                                                                                                                                        |
| 215.                                       | Capability to define and import custom-symbols in to model.                                                                                                                                                                  |
| 216.                                       | Capability to define the component-level PMIs that are to be visible in an assembly.                                                                                                                                         |
| 217.                                       | Capability to inherit 3D PMIs to 2D drafting views and edit the annotations from either environment                                                                                                                          |
| 218.                                       | Capability to create the automatic PMIs from the drafting views with dimensions and annotations                                                                                                                              |
| <b><u>Advanced Assemblies</u></b>          |                                                                                                                                                                                                                              |
| 219.                                       | Capability to analyze weights data of a complete assembly by simple click of a button and report it in textual format or in a spreadsheet.                                                                                   |
| 220.                                       | Capability to store the weight data of all components as a default and automatic operation during file-save                                                                                                                  |
| 221.                                       | Capability to simplify a large assembly for easier visualization – using either wrapping techniques, selective display of faces, defining zones of interest or faceted representations,                                      |
| 222.                                       | Capability to create component-groups based on interest areas (for example, those related to manufacturing teams, design teams, reviewers, etc.).                                                                            |
| 223.                                       | Tools to facilitates a high level, systems oriented, design process that enables concurrent engineering and promotes design re-use and standardization of the design process.                                                |
| 224.                                       | Capabilities to identify critical design variables that drive product design, and then capture them in an associative control structure.                                                                                     |
| <b><u>Freeform Modelling, advanced</u></b> |                                                                                                                                                                                                                              |
| 225.                                       | Capability to enlarge or contract a surface by using drag-handles and keep the edit as a feature (history-supported)                                                                                                         |
| 226.                                       | Capability to edit a surface by changing either its degree/order, or its number of segments/knots, or its stiffness and keep the edit as a feature (history-supported)                                                       |
| 227.                                       | Capability to edit a surface by fitting it to a target geometry or faceted point data by providing a user-controlled checking distance and an optional direction for fitting. Keep the edit as a feature (history-supported) |
| 228.                                       | Capability to edit a surface by modifying the locations of its defining points and keep the edit as a feature (history-supported)                                                                                            |
| 229.                                       | Capability to edit a surface by modifying the locations of its control points and keep the edit as a feature (history-supported)                                                                                             |



| S.No                                        | Description                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 230.                                        | Capability to smoothen the distribution of pole / control-points of a surface with respect to its surrounding data and keep the edit as a feature (history-supported)                                                                                                                                                                                              |
| 231.                                        | Trim or divide a surface based on its iso-lines and keep the edit as a feature (history supported)                                                                                                                                                                                                                                                                 |
| 232.                                        | Capability to create a surface from point-clouds that can be selected from screen or from an external file.                                                                                                                                                                                                                                                        |
| 233.                                        | Capability to create a rough offset of surface where the offset-distance is greater than the minimum radius of curvature.                                                                                                                                                                                                                                          |
| 234.                                        | Capability to create flange surface on a set of contiguous edges by law-controlled expressions to define the vector and distance at multiple points on the edges.                                                                                                                                                                                                  |
| 235.                                        | Capability for creating advanced 3D forms using digital sculpting tools.                                                                                                                                                                                                                                                                                           |
| 236.                                        | Capability for advanced subdivision shape creation allows for rapid conceptualization of ideas without the need for expert knowledge.                                                                                                                                                                                                                              |
| <b><u>Optimization &amp; Validation</u></b> |                                                                                                                                                                                                                                                                                                                                                                    |
| 237.                                        | Capability to perform optimization studies on a model by defining an objective, independent variables, constraints and a limiting factor for the iterations. Objectives can be to maximize, minimize or to seek a particular value of a dependent parameter of the model by varying the independent variables and adhering to the constraints set by the designer. |
| 238.                                        | Support for multiple algorithms of optimizations including Powell, Simulated Annealing, Global Simplex, Conjugate Gradient, Lexicographic or Pattern Swarm.                                                                                                                                                                                                        |
| 239.                                        | Capability to limit the iterations of an optimization-study by specifying the maximum timelimit, number of iterations and absolute & relative convergence criteria.                                                                                                                                                                                                |
| 240.                                        | Capability to report the results of the optimization iterations in a spreadsheet.                                                                                                                                                                                                                                                                                  |
| 241.                                        | Capability to perform sensitivity of dependent model attributes on selected design-variables and thereby to estimate the biggest contributor(s) to the variation of the dependent attribute.                                                                                                                                                                       |
| 242.                                        | Capability to report the results of a sensitivity-analysis in a spreadsheet.                                                                                                                                                                                                                                                                                       |
| 243.                                        | Capability of software to check if minimum wall-thickness requirements are being met in a part.                                                                                                                                                                                                                                                                    |
| <b><u>Freeform Shape</u></b>                |                                                                                                                                                                                                                                                                                                                                                                    |
| 244.                                        | Capability to create curves to remain exactly on surfaces and to constrain these with adjoining geometries using G0, G1 or G2 continuity                                                                                                                                                                                                                           |



| S.No                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 245.                                    | Single command to reform / deform a styled surface by stretching it, changing its bend properties in either or both parametric directions, changing the skew of its bends in either or both parametric directions and by changing the twist of the surface.                                                                                                                                                                                                                                                                 |
| 246.                                    | Capability to match edges of a surface to corresponding edges of a target-surface with G0, G1, G2 or G3 continuity and at the same time keeping control of the former's order / patches, direction of movement of control points, region of influence and parametrization.                                                                                                                                                                                                                                                  |
| 247.                                    | Option to match to a selected portion of the target-edge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 248.                                    | Single command to make an edge planar and curvature-symmetric so that a subsequent mirror would be curvature-continuous.                                                                                                                                                                                                                                                                                                                                                                                                    |
| 249.                                    | Option to create a styled-blend between two surfaces by controlling the depth of the blend, its skew and the chordal distances                                                                                                                                                                                                                                                                                                                                                                                              |
| 250.                                    | Capability to snip-back surfaces based on a curve and re-parameterize these so that the trim-edge is converted to a natural edge.                                                                                                                                                                                                                                                                                                                                                                                           |
| 251.                                    | Single command to build surfaces by lofting or sweeping, depending on the selection of any number of section curves and guide curves. Option to preserve up to curvature continuity with adjoining surfaces, if any.                                                                                                                                                                                                                                                                                                        |
| 252.                                    | Single command to edit b-surfaces or spline curves by dynamically manipulating the locations of control-points by selecting these individually or in groups and at the same time increase/decrease the number of control points by changing the order or number of patches of the free-form entity. Command should also provide options to maintain up to G3 continuity at selected ends, and/or lock selected control-points and/or to move adjacent control points proportionally.                                        |
| 253.                                    | Capability to create surfaces on facet-bodies by defining patch-boundaries                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 254.                                    | Capability to fit existing surfaces by wrapping them on facets.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 255.                                    | Tools and capabilities for creating High quality (Class-A) surface/solid sculpting, facet modeling and reverse engineering                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b><u>Advanced Surface Analysis</u></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 256.                                    | Capability to provide a framework of analysis results that must be dynamic, i.e. should update immediately when the underlying objects are modified                                                                                                                                                                                                                                                                                                                                                                         |
| 257.                                    | Capability to display deviation data between target objects and one or more reference objects. Target and reference objects may include any of the various types like Curves, faces, edges, and facet bodies. Labels, needles, color mapping, and a color legend should identify maximum and minimum deviation, and where deviation exceeds inner and outer tolerances. Option to provide feedback of deviation in 3D space, along a vector or by projecting objects onto the work view plane or any other reference plane. |



| S.No                             | Description                                                                                                                                                                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 258.                             | Capability to analyze the shape and quality of surfaces or facet bodies using section cuts and display curvature combs, inflection points, peak points, and labels on each section. The sections can be defined by the user as parallel planes, isoparametric, radial or perpendicular to a curve. |
| 259.                             | Command to project a grid onto selected surfaces and visually check the quality of their shape and curvature flow                                                                                                                                                                                  |
| 260.                             | Command to evaluate the quality of a surface by generating a set of highlight lines from a specified number of light sources. Highlight lines should update when during dynamic rotation and translation                                                                                           |
| 261.                             | Command to analyze deviations between surfaces at their junctions to display the results as a combination of "comb and markers" – combs to identify the general flows of the surfaces and the markers to identify the numeric value of G0, G1, G2 or G3 discontinuities.                           |
| 262.                             | Command to verify the gap and flushness distance between two surface panels and                                                                                                                                                                                                                    |
| 263.                             | compare them to nominal values and tolerances. Also, must evaluate how large the distance will appear from a specified viewing direction to report the aesthetic gap and flushness.                                                                                                                |
| 264.                             | Capability to create a color map that differentiates areas of high and low curvature in one or more facet bodies. Capability to extract new facet bodies based on such color map on one or more input facet bodies.                                                                                |
| 265.                             | Tools enabling real-time rendered effects of materials, lighting and environments.                                                                                                                                                                                                                 |
| <b><u>Sheet Metal Design</u></b> |                                                                                                                                                                                                                                                                                                    |
| 266.                             | Capability to create basic sheet-metal features like tabs, flanges, lofted flanges, contour flanges, hem flanges, jogs, bends.                                                                                                                                                                     |
| 267.                             | In-built functions to create form-features like beads, louvers, dimples, gussets and drawn cutouts that can run across folds of a sheet-metal feature.                                                                                                                                             |
| 268.                             | Capability to define a solid body as a punch to create sheet-metal feature.                                                                                                                                                                                                                        |
| 269.                             | Capability to treat sheet-metal corners using in-built features like closed-corners, open corners, circular / U-shaped / V-shaped cutouts and three-bend corners.                                                                                                                                  |
| 270.                             | Capability to rip the corner edge of a solid to convert it into sheet metal body                                                                                                                                                                                                                   |
| 271.                             | Workflow to simulate the bending at non-linear cut-out areas on a flat to show post-bend deformation                                                                                                                                                                                               |
| 272.                             | Software should support creation of flanges on non-linear edges                                                                                                                                                                                                                                    |





| S.No | Description                                                                                                                                                                                                                                             |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 273. | Software should support creation of complex and nested joggles on a web face of a flange or a tab                                                                                                                                                       |
| 274. | Software should support creation of flanged cutouts                                                                                                                                                                                                     |
| 275. | Capability to resize the bend radius and bend-angle at a particular bend-line                                                                                                                                                                           |
| 276. | Inherent options to create rectangular and round reliefs and corner reliefs for various bend features.                                                                                                                                                  |
| 277. | Capability to define company-standard sheet-metal properties including neutral factor value, bend tables and bend allowance formula to control bend-deformation.                                                                                        |
| 278. | Capability to define material thickness, relief dimensions, default methodology for flat pattern treatment                                                                                                                                              |
| 279. | Ability to convert a thin-walled part, which may have been imported from another CAD system, to a workable sheet-metal part, for subsequent sheet-metal specific operations.                                                                            |
| 280. | Ability to create flat-pattern drawings with annotations for bending, punching or cutting manufacturing instructions in automated or semi-automated fashion. Ability to create formed and unformed (flattened) views of the part in the same 2D drawing |
| 281. | Ability to incorporate annotations / callouts for Tool ID information in manufacturing or process planning drawings                                                                                                                                     |



**Price Bid**

| <b><u>SI No</u></b> | <b><u>Description</u></b>        | <b><u>Cost (in Rs)</u></b> |
|---------------------|----------------------------------|----------------------------|
| I                   | Cost of Software as per clause-B |                            |
| II                  | Cost of demonstration            |                            |
| III                 | Cost of Training                 |                            |
| IV                  | Cost of Warranty                 |                            |
| V                   | Total Basic Cost (I+ II+III+IV)  |                            |
|                     | GST (As Applicable)              |                            |



**PERFORMANCE BANK GUARANTEE (PBG) FORMAT**

This deed of guarantee executed on ..... day of ..... by ..... Bank, Branch ..... hereinafter called the 'Bank' (which term shall mean and include its successors and assigns wherever the context so admits) in favour of BrahMos Aerospace Pvt. Ltd., a Company incorporated and registered under the Companies Act, 1956, having its registered Office at 16, Kirby Place, Cariappa Marg, Delhi Cantt-110010, INDIA (hereinafter referred to as 'BrahMos', which term shall include its successors and assigns.)

2. In consideration of BrahMos Aerospace Pvt. Ltd. (BrahMos) having placed the: Purchase Order No. \_\_\_\_\_ dated \_\_\_\_\_ (hereinafter called the Agreement) on M/s \_\_\_\_\_ (here in after called the said "Contractor/SELLER") (which term shall mean and include its successors assigns and legal representatives) and whereas the Contractor/SELLER has undertaken to provide a Bank Guarantee for an amount of Rs. .... (RUPEES. .... ONLY) (Being the amount equivalent to ( )% of the total value of Agreement), to secure its obligation to you for warranty of the material as mentioned in para \_\_\_\_\_ of the Agreement, we ..... (name of the bank, address) hereinafter referred to as "the Bank") at the request of Contractors do hereby undertake to pay BrahMos an amount not exceeding Rs. .... against any loss or damage caused to or suffered or would be caused to or suffered by BrahMos by reason of any breach by the said agreement.

3. We ..... (Bank) do hereby unconditionally and irrevocably agree and undertake to pay to BrahMos the amounts due and payable under this guarantee without any demur merely on a demand from BrahMos stating that the amount claimed is due by the way of loss or damage caused to or would be caused to or suffered by BrahMos by reason of breach by the said "Contractors" / "SELLER" of any of the terms and conditions contained in the said agreement or by reason of the contractor's failure to perform the said agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ....

4. We undertake to pay BrahMos any money so demanded notwithstanding any dispute or disputes by the "Contractors" / "SELLER" in any suit or proceedings pending before any court or tribunal relating thereto, our liability under this guarantee being absolute and unequivocal. The payment so made by us under this guarantee shall be valid discharge of our liability for payment there under and the "Contractors" / "SELLER" shall have no claim against us for making such payment.

5. We ..... (Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that, would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of BrahMos under or by virtue of the said Agreement have been fully paid and its claims satisfied or, discharged or till BrahMos certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said "Contractors" / "SELLER" and accordingly discharges this guarantee. Provided that if BrahMos together with the Contractor / SELLER seeks an extension of term of the guarantee, such extension shall be guaranteed by the Bank and the guarantee shall be in full force till the expiry of such extended period.



6. We .....(Bank) further agree with BrahMos that BrahMos shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) / SELLER from time to time or to postpone for any time or from time to time any of the powers exercisable by BrahMos against the said Contractors / SELLER and to forebear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor(s) / SELLER or for any forbearance, act or omission on the part of BrahMos or any indulgence by BrahMos to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have effect of so relieving us.

7. It shall not be necessary for BrahMos to proceed against the Contractor / SELLER before proceeding against the Bank and the guarantee herein contained shall be enforceable against the bank notwithstanding any security, which BrahMos may have obtained or obtains from the Contractor / SELLER.

8. This guarantee shall not be discharged due to the change in the constitution of the Bank or the Contractor(s) / SELLER.

9. We.....(Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of BrahMos in writing.

10. Our liability is limited to a sum not exceeding Rs..... Unless a claim is made on us in writing on or before 3 months beyond the date of completion of delivery period as specified in the contract, we shall be discharged from liability under this guarantee.

In witness whereof these presents are executed at ..... on the date, month and year first herein above written.

Notwithstanding anything contained herein

- I. Our liability under this Bank Guarantee shall not exceed Rs.....
- II. This bank Guarantee will be valid up to.....(Date) (Inclusive of claim period)
- III. We are liable to pay the guarantee amount or any part thereof under this Bank Guarantee only and if you serve upon us a written claim or demand on or before .....(Date) (Inclusive of claim period)

FOR AND ON BEHALF OF THE BANK

Date:

Place:

Witness

(With full name & Address)

1.

2.

