BSD Instrument Database Software Specification

1. Background

The basic principle of the instrument database software is to enable detailed traceability of shipped BSD instruments and their configurations. Details for each instrument will include the factory build information and tracking of any software or hardware changes since shipment from the BSD factory.

The intended benefits and uses of the information are to reduce time for finding instrument configuration (which is the collation of significant hardware items, software and firmware) for any instrument given its serial number (SN) which is the primary key for the database. By extension, an additional benefit will be on the quality of service; indicated by our timeliness, accuracy and efficiency of customer support.

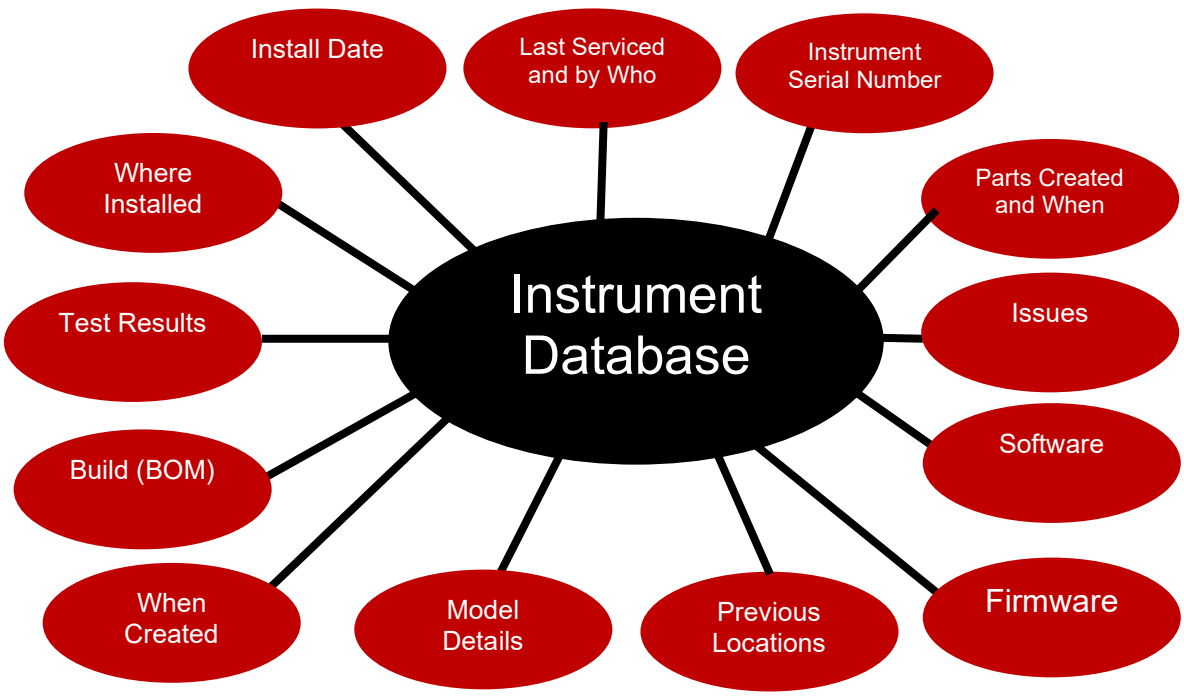
Primarily the software will provide a cloud-based secure system to facilitate data entry and advanced searches of the data, given a number of scenarios which are included in the text below.

2. Related Information

Data involved in the Instrument database will include and may draw-from existing sources:

Data	Source
Existing Excel database with basic details for each SN	Excel file on server
Customer information – address	Dear Inventory (cloud/API)
Instrument Build History	Excel file on server
Test Sheet (Pre-delivery checklist for BSD Instruments)	Excel file on server
Instrument installation or movement record	PDF Service Report
Parts and software/firmware change log	PDF Service Report
Last service information (date, details and service person)	PDF Service Report
Instrument performance report	XML Service download

3. Concept – Database



4. Concept – Data Entry

Data entry to the database is anticipated as follows:

- Upon completion of manufacture, the database will be populated with:
    - All details from Test Sheet, including
        - Serial number
        - Punch sizes
        - Date of manufacture
        - Testing completed by (name)
        - Model number
        - Build Number
        - Part numbers and Serial numbers of 'top-level items' (anticipated 20 items).
    - Sales Order (SO) number reference, eg SO-17384. This could provide a link to Dear Inventory if needed.
- Site installation details need to be recorded at a later time, including:
    - Attached or generated PDF installation report
        - Site location
        - Date of installation
    - Any issues (case number perhaps)
    - Warranty conclusion date
    - Any top-level items changed on installation (eg software was updated).
- Last service information shall be entered by the field service team, including
    - Attached or generated PDF Service report
    - Any issues (case number perhaps)
    - Any top-level items changed on installation (eg software was updated).
    - Any field-evaluation notes (eg "trialling new humidifier bottle').
- Data to be not included:
    - Names or contact details for any individual or person other than BSD Personnel.

5. Concept – Searches

Ideally the data shall be searchable using advanced options, including 'where is', by date-range, part numbers (top-level items), serial numbers, customer sites and so on. Examples of searches that are anticipated for routine usage include:

- A new top-level part was introduced and fitted to some instruments in the field. The field team updates the database when installing the items. At a later date, we need to list all the installation sites and instrument serial numbers with that new part.
- Finding all the instruments of a particular instrument build number (serial numbers, and locations).
- Finding the instruments installed or serviced within a particular date range.
- Finding the instruments manufactured within a particular date range.
- Finding instruments with a specific software or firmware version.
- Finding all the instruments last serviced by a specific person.

6. General Specifications

Function	Requirement	Note
Access	Permission-based log in must be provided for searches	
Access	Access shall be possible from any location (externally hosted data)	
Backup	Local backups of the database (storing on our server) shall be possible	
Entry	Permission-based log in must be provided for data entry/changes	
Entry	All existing fields of the Instrument Test Sheet shall be included	
Entry	All existing fields of the Service Report shall be included with the exception of the approver or personal details.	
Entry	Changes shall be possible to the instrument details (ie that which was entered from the Test Sheet at any time.	
Entry	Sales Order (SO number) shall be enterable.	
Entry	Selected details from Dear shall be linked by the SO number	To Be Decided
Tracking	On changes to any details after manufacturing, the history of changes shall be logged so that the history can be viewed.	
Search	All database fields shall be searchable – including IS, IS NOT, <, > and check box option selection, similar to Excel.	
Search	Time-based range searching shall be optional for any of the above	
Search	Sorting ascending or descending order is desirable on any field	
Content	Aside from text fields, it shall be possible to store PDF service reports and the instrument test sheet.	

7. Forms

Forms for entry, viewing and editing information are listed below. Details of each form are described later.

Form	Function
QA Sheet	Enables an instrument to be created. Selected information from the Instrument Test Sheet will be manually entered, including the serial number, sales order (SO) and instrument model. The model will be selected from a drop-down box which will then enable appropriate drop downs for that specific model. When an SO number is valid, a button click will obtain information from Dear inventory and populate appropriate fields.
History Log	This form will be used when there are changes to be made to the instrument build, such as updating software or firmware, changing parts, changing location of the instrument, dates of field services and commencement of warranty period etc. It will also allow entry of information during installation. Changes shall be saved as a timestamped history for each serial number. Potentially the QA sheet or a modified version (ie with some fields greyed as not able to be changed) could be used.
Field Service Report	This will replace the current PDF entry document and use a form to enter appropriate details during a service visit. The information will be stored historically and report PDFs generated by a button click and saved as attachments.
Search form	From this interface, a combination (AND, OR, NOT) of search phrases and with date ranges shall list all relevant information and enable a mouse click to select an appropriate record (ie either a QA sheet or a field service report ?)
Reports form	Customised report types can be run with some selection criteria, such as date range, etc (TBA). Data shall be able to export as CSV or save to a PDF. Standard reports are listed below.
Attachments form	Could be a separate form of have these functions included in the above forms. There needs to be a way to upload pdf attachments and associate with the Primary Key.

8. API Data

Data fields to import by web APIs are listed below.

API	Field
DEAR	*Data is linked using the instrument sale - sales order (SO) number*
	Customer
	Reference
	Shipping (dispatch) date
	Ship to company
	Carrier/service
	Tracking number
	Comments
	Required by (date)
DEAR	*Data is linked using 1 or more service contract sales order (SO) numbers*
	Service contract line item
	Quote Memo

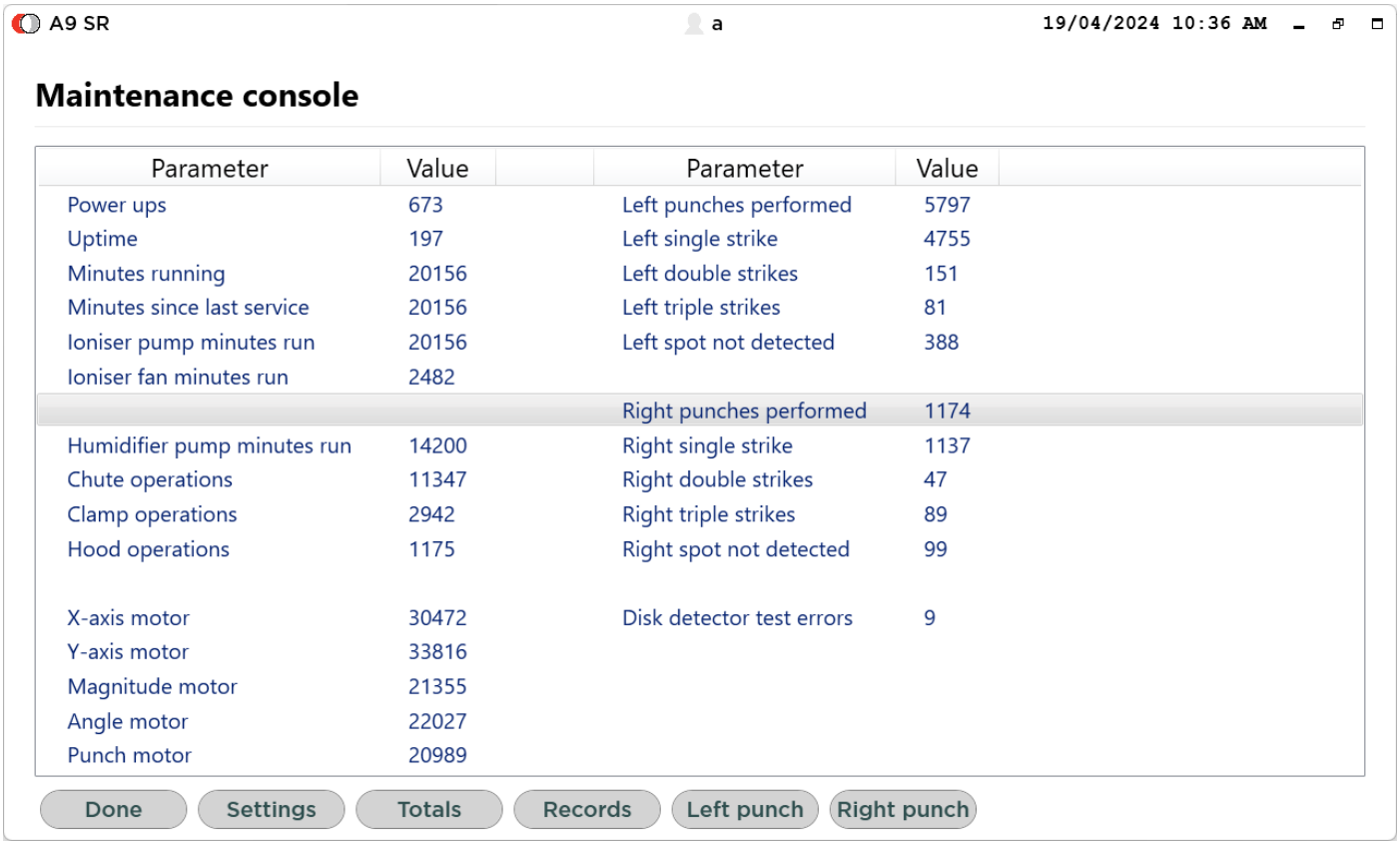
9. Manual Entry Data

Unless noted, all data is entered as a text string

Field	Details	Note
SERIAL NUMBER	PRIMARY KEY	
SO Number	*Allows data linking to Dear (CIN7)*	
Approved by	Person approving the production	
Approval date	Date of manufacturing completion	
Model type	Dropdown box selection	Approx 10 items
Model No		
Instrument Build No		
Firmware version		
Software version		
License Key[3]	Array or record of strings	
License key name[3]		
Part description[]	Array/record	Can these be dynamically sized ?
Part number & rev []		
Part serial number[]		
History description[]	Array/record	Can these be dynamically sized ?
History date[]		
History technician name[]		
History notes[]		
Date of visit		
Service technician		
Service report no		
Service Type	Dropdown box selection	Approx 8 types
Service duration (hours)		
Date of service		
Service description		
Service follow up notes		
Service contract SO	*Allows data linking to Dear (CIN7)*	There can be multiple per serial no
Contract start date		
Contract end date		
Contract status		
Comments	Any notes associated with this serial no.	

10. Import Data Entry

During an instrument service it will be possible to obtain an XML file that contains the following information from an instrument:



The xml data relevant to the Instrument Database are listed below:

```
<powerups>
<minutesRun>
<minutesSinceLastService>
<minutesUpTime>
<ioniserPumpMinutesRun>
<humidifierPumpMinutesRun>
<ioniserFanMinutesRun>
<chuteOperations>
<clampOperations>
<hoodOperations>
<leftPunchesPerformed>
<leftSinglePunches>
<leftDoublePunches>
<leftTriplePunches>
<rightPunchesPerformed>
<rightSinglePunches>
<rightDoublePunches>
<rightTriplePunches>
<diskDetectorFails>
<leftSpotDetectFails>
<rightSpotDetectFails>
```

11. Standard Reports

Several reports will be generated by a single button click (ie not a customised report).

Document	Notes
Field service report	Created from the current (most recent) data fields
Change report	Created from a selectable History record for the primary key (ie serial number)
QC Sheet	Created from production information

12. Attachments

The database shall allow for PDF documents to be attached and associated with the primary key. The method of accessing the attachments is open to discussion. These could be accessed through the search form.

Document	Notes
Instrument Test Sheet	Current PDF document will normally be uploaded when production is complete.
Certificate of Manufacture	Current PDF document will normally be uploaded when production is complete.
Service Reports (old format)	Any historical service reports could be uploaded for an Instrument

13. Dropdown Selections

Instrument Type
Nano M1
Nova M4
Ascent JR
Ascent M2
Ascent A2
Ascent Plus
Ascent X2
Ascent L2
Galaxy JR
Galaxy A9
Other

Service Type
PM
Repair
Emergency
Warranty
Non-contract PM
Return visit
Relocation
Installation
Remote connection
Courtesy call
Other

14. Database Size Estimate

a. How many instruments manufactured in a month: 6
b. How many field service jobs are done in a month: 35
c. How many revisions in BOM made per month per instrument 0.2
d. How many people will need to login to the platform: 15, max 5 concurrent.
e. How much retrospective data is needed to be uploaded? 1400 entries* In years -19

- Data is limited for the historical entries:
    - Dispatch date
    - Serial number
    - Model number
    - Build number
    - Software version
    - License key
    - Serviced by ^
    - Sales order
    - Customer organization
    - Lab name
    - Site Address
    - Address State
    - Address zip code
    - Address region ^
    - Contact person ^
    - Contact position ^
    - Contact email ^
    - Contact phone no ^
    - Service contract type
    - Service contract start date
    - Service contract end date
    - Service contract status
    - Comments

    ^ This data is not planned for the new Instrument Database