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| Palacky UniversityTechnical Specification for Sample Management and uHTS Systems |
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**Annex No 1**

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# Formalities

## Requirements

* “must” is used to express a definite requirement. These requirements are marked with an asterix (\*) and are compulsory criteria for any bidder. Any bidder not meeting these criteria will not be considered
* “should” is used to express a recommendation
* “may” is used to express an optional requirement

## Responses

The tenderer is requested to follow the order and numbering of this specification of requirements.

The tenderer must address each individual requirement and indicate to what extent the proposed system meets that requirement and the method by which it is met. A brief description of how the requirements are to be met should be given when deemed needed.

## Quotations

Formal quotations must be supplied as an addendum to this tender document. Quotations must account for Factory Acceptance Test (FAT), DDU on site, installation, setting into operation, Site Acceptance Test (SAT), documentation, training and warranty. Quotations must be valid for a minimum period of three months and exclude VAT.

All delivered components must be supplied with a one year warranty.

## Accessory Devices – Lot B

Lot B describes accessory devices that will be provided and integrated into the Sample Reformatting Work-Cell and uHTS system. Vendors who have submitted a response to Lot A must quote for the provision and integration of all of the devices in Lot B. Vendors who have not submitted a response to Lot A may independently quote for the provision of individual devices (excluding integration). Partial responses to Lot B must be clearly labeled in the vendor’s response.

## LIMS Integration – Lot C

Vendors who have submitted a response to Lot A must quote for the provision of the LIMS in Lot C. Vendors who have not submitted a response to Lot A may independently quote for the provision of the LIMS in Lot C.

## Shipping

The delivery terms will be as follows: DELIVERED DUTY UNPAID (DDU) on site according to INCOTERMS, DDU on-site including freight, documentation, start-up, testing, transport and insurance and costs for clean up from unpacking and installation to, Palacky University, Hnevotinska 5, 779 00 Olomouc, Czech Republic.

# Lot A: Provision of Hardware and Software for Automated Long-Term Sample Storage and Reformatting and Ultra High Throughput Screening

General Requirements:

* Long term storage of dry samples in vials suitable for manual weighing.
* Long term storage of solubilised samples in tubes suitable for automated pipetting.
* Long term storage of liquid sample libraries in SBS-format microplates suitable for automated pipetting.
* A robotic system for unattended sample reformatting and replication.
* A robotic system for unattended processing of a wide variety of biological assays and applications.

## Long Term Dry Vial Sample Storage

### Dry Store Hardware Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Dry sample storage must be located in separate lab space to solubilised sample tube and plate storage due to space constraints. | Yes/No\* |  |  |
| Vendor’s proposed solution must demonstrate compatibility with a vial with the following characteristics. Vendor not required to account for cost of tubes.* Glass
* 2D barcode on base
* Screw cap
* 48mm Sample Height (including cap)
* 12.6mm Outer Diameter (including cap)
 | Yes/No\* |  |  |
| Store must hold a minimum of 270,000 individual vials containing dry samples. | Yes/No\*State Quantity of Vials |  | 3 / b |
| Store must include a temperature-controlled, manually-accessible Input/Output (I/O) zone where technicians can load empty SBS-format racks for filling by the store, load populated SBS-format racks for re-indexing by the store, unload filled SBS-format racks for manual weighing, unload empty SBS-format racks for offline storage. | Yes/No\* |  |  |
| I/O zone must have a minimum capacity as follows:* non-random access for a minimum of 60 empty, SBS-format 24 position racks
* random-access capacity for a minimum of 30 destination racks populated with previously described tubes
 | * State quantity of racks for empty SBS-format 24-way racks\*
* State quantity of racks for populated SBS-format 24-way racks\*
 |  | 1 / b1 / b |
| Internal store environmental control:* It must be possible to control temperature in a minimum range of 4’C to -20’C
* It must be possible to maintain a low humidity environment, with a minimum controlled relative humidity setting of 5%
 | * State Temperature Control Range minimum -20°C\*
* State Relative Humidity Control Capabilities\*
 |  | 1 / c3 / c |
| Store design should include redundancy mechanisms for maintaining environmental conditions in the event of failure of the primary control | Yes/No |  |  |
| Store design must be modular so that capacity can be upgraded as sample collection size increases. | Yes/No\* |  |  |
| The hardware cost per vial supplied in response to this tender should be applicable for 5 years after signing of the formal project agreement up to a maximum capacity of 500,000 vials. | Yes/No |  |  |
| The vendor must provide a cost estimate (hardware only) to perform an on-site upgrade of 50% of the original store capacity | Yes/No\*State cost estimate,  |  | 1 / c |
| The vendor must provide a duration and overall cost estimate for on-site staff-time to perform an upgrade of 50% of the original store capacity | Yes/No\*State estimated duration of work and labour cost,  |  | 1 / c |
| The on-site upgrade process should be possible with no intrusion to the existing samples (no change to temperature or relative humidity)  | Yes/No |  |  |
| The height of the installed store should be no greater than a maximum of 2.8 metres | State Height |  |  |
| The width of the installed store should be no greater than a maximum of 7 metres | State Width |  |  |
| The length of the installed store should be no greater than a maximum of 2 metres | State Length |  | 1 / c |
| In the event of a vial picking failure, it should be possible to allow unattended partial completion of the active picking job. | Yes/No |  |  |
| Store must perform 1D barcode scanning for racks to permit full audit of store operations | Yes/No\* |  |  |
| Store must perform 2D barcode scanning for individual tubes to permit full audit of store operations | Yes/No\* |  |  |
| Store must be provided with a PC and accompanying workstation with the minimum requirements:PROCESSORIntelTM Core®2 Duo E7300 (2.66GHz/1066MHz/3MB L2/375W)OPERATING SYSTEMGenuine Windows 7 Business VIDEO CARD256MB PCIe x16 nVidia NVS 290, Dual Monitor DVI CapableMEMORY4GB, 800MHz, DDR2 SDRAM Memory, ECC (4 DIMMS)OPTICAL DRIVE16X DVD‐ROM with Cyberlink Power DVDTHARD DRIVE/RAIDCONFIGURATIONC7, ALL SATA, RAID 1for 2 Hard DrivesHARD DRIVE160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst Cache2ND HARD DRIVE160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst CacheMONITORDell 22 inch UltraSharpTM 2208FPW Widescreen, Adjustable Stand, VGA/DVIFILE SYSTEMNTFS File SystemSECURITYMcAfee® Total Protection for Small Business, 15 Month or equivalentSYSTEM DOCUMENTATIONResource DVD ‐ contains Diagnostics and Drivers | Yes/No\* |  |  |

## Long Term Liquid Tube Sample Storage

### Liquid Store Hardware Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Vendor’s proposed solution must demonstrate compatibility with a tube with the following characteristics. Vendor not required to account for cost of tubes.* Glass
* 2D barcode on base
* 0.5ml working volume
* Screw cap
* 27mm Sample Height (including cap)
* 9mm Outer Diameter (including cap)
 | Yes/No\* |  |  |
| Store must hold a minimum of 340,000 individual tubes containing solubilised samples. | Yes/No\*State Quantity of Vials |  | 3 / b |
| Store design must include a temperature-controlled automated Input/Output (I/O) zone and an automated link to the Sample Reformatting Work-Cell; empty or filled SBS-format racks can be shuttled in and out of the I/O zone by the automated mechanism leading directly into the Sample Reformatting Work-Cell (SRW). The store must be able to automatically pick/place SBS-format racks within the I/O module; the automated link must also permit the SRW’s robotic arm to access the racks for further processing in the SRW. | Yes/No\* |  |  |
| Proposal for Long Term Liquid store must account for an automated link that will run into the main SRW enclosure and function as described above. | Yes/No\* |  |  |
| The automated link should include a redundancy mechanism in the event of transport failure between the store and the SRW.  | Yes/No |  |  |
| Internal store environmental control:* It must be possible to control temperature in a minimum range of 4’C to -20’C
* It must be possible to maintain a low humidity environment, with a minimum controlled relative humidity setting of 5%
 | * State Temperature Control Range below -20°C\*
* State Relative Humidity Control Capabilities\*
 |  | 1 / c3 / c |
| Store design should include redundancy mechanisms for maintaining environmental conditions in the event of failure of the primary control  | Yes/No |  |  |
| Store design must be modular so that capacity can be upgraded as sample collection size increases. | Yes/No\* |  |  |
| The hardware cost per tube supplied in response to this tender should be applicable for 5 years after signing of the formal project agreement up to a maximum capacity of 500,000 tubes. | Yes/No |  |  |
| The vendor must provide a cost estimate (hardware only) to perform an on-site upgrade of 50% of the original store capacity | Yes/No\*State cost estimate, |  | 1 / c |
| The vendor must provide a duration and overall cost estimate for on-site staff-time to perform an upgrade of 50% of the original store capacity | Yes/No\*State estimated duration of work and labour cost,  |  | 1 / c |
| The on-site upgrade process should be possible with no intrusion to the existing samples (no change to temperature or relative humidity)  | Yes/No |  |  |
| The height of the installed store should be no greater than a maximum of 2.8 metres | Yes/No |  |  |
| The Long Term Liquid Store, coupled via automatic link to the Sample Reformatting Work-Cell must fit within the laboratory space “0.06” in all dimensions. DWG file available on request. | Yes/No\* |  |  |
| The vendor must provide summary dimensions and images of the store and the coupled reformatting system placed in the lab 0.06 | Yes/No\* |  |  |
| In the event of a vial picking failure, it should be possible to allow unattended partial completion of the active picking job. | Yes/No |  |  |
| Store must perform 1D barcode scanning for racks to permit full audit of store operations | Yes/No\* |  |  |
| Store must perform 2D barcode scanning for individual vials to permit full audit of store operations | Yes/No\* |  |  |
| Store must be provided with a PC and accompanying workstation with the minimum requirements:PROCESSORIntelTM Core®2 Duo E7300 (2.66GHz/1066MHz/3MB L2/375W)OPERATING SYSTEMGenuine Windows 7 Business VIDEO CARD256MB PCIe x16 nVidia NVS 290, Dual Monitor DVI CapableMEMORY4GB, 800MHz, DDR2 SDRAM Memory, ECC (4 DIMMS)OPTICAL DRIVE16X DVD‐ROM with Cyberlink Power DVDTHARD DRIVE/RAIDCONFIGURATIONC7, ALL SATA, RAID 1for 2 Hard DrivesHARD DRIVE160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst Cache2ND HARD DRIVE160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst CacheMONITORDell 22 inch UltraSharpTM 2208FPW Widescreen, Adjustable Stand, VGA/DVIFILE SYSTEMNTFS File SystemSECURITYMcAfee® Total Protection for Small Business, 15 Month or equivalentSYSTEM DOCUMENTATIONResource DVD ‐ contains Diagnostics and Drivers | Yes/No\* |  |  |

## Long Term Sample Storage Software

The long term sample storage systems (both dry and liquid) must have multi-user friendly operating software that is capable of performing the following functions.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| The software must maintain a full inventory of vials present in the store by barcode | Yes/No\* |  |  |
| The software must permit the registration of new samples in vials and tubes | Yes/No\* |  |  |
| The software must permit weighing technicians to place orders to retrieve specific lists of vials | Yes/No\* |  |  |
| The software must provide reports on the success or otherwise of specified orders | Yes/No\* |  |  |
| The software must provide notifications to operators of any errors (either in picking or in environmental conditions) by email and audible alarm | Yes/No\* |  |  |
| The software should utilize a persistent data storage mechanism such as Oracle database | Yes/No |  |  |
| All data outputs from the software should be in an open (non-proprietary) format that can be read/exported in a standard database format | Yes/No |  |  |

## Sample Reformatting Work-Cell (SRW)

A robotic system designed to allow the unattended reformatting of samples in tube and plate format. Tasks include, but are not limited to:

* Solubilisation of dry samples in 96-way tube format
* Compression of 96-way tube racks into 384-well plates
* Compression of 384-well plates into 1536-well plates
* Creation of intra- and inter-plate dilution series
* Straight replication in 96/384/1536 format

Samples to be processed on the system may come from the previously-described automated link to the liquid tube store, or may be manually loaded into one of the labware storage devices on the work-cell.

Samples will primarily be dissolved in 100% DMSO, but may also be in aqueous format.

### SRW Robotics/Integration Requirements

#### Robot

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Automatic labware movement must be provided by high-speed robotic arm – plate movement from one device to another (in same orientation) must take no longer than 10 seconds. | Yes/No\* |  |  |
| Sufficient number of robotic arms must be proposed to integrate the required peripherals.  | Yes/No\* |  |  |
| If multiple robots are proposed, the vendor must include and describe a mechanism for automatically transporting labware between those robots without operator intervention. | Yes/No\* |  |  |
| Robot must be able to pick/place SBS-format racks from the automated link that runs into the system from the Long Term Liquid Tube Store. | Yes/No\* |  |  |
| Robot must include collision detection to prevent damage to instrumentation or robot in the event of error. | Yes/No\* |  |  |
| Robot must include a plate gripper that is compatible with all common SBS-format labware. | Yes/No\* |  |  |
| The gripper must incorporate plate/part presence sensing. | Yes/No\* |  |  |
| Robot must have ability to regrip from portrait to landscape grip as necessary to reach the various lab devices to be integrated in the work-cell. | Yes/No\* |  |  |
| Robot should perform 1D barcode scanning as part of moves. | Yes/No |  |  |
| Robot should have “auto-teach” function with ability to sequentially teach multiple robot points with no operator intervention. | Yes/No |  |  |
| On the system images submitted for this proposal, the vendor must summarise the robot access limits in their work-cell design to indicate the future expansion capability of the system design. | Yes/No\* |  |  |

#### Peripheral Device Access

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| It must be possible to rotate or slide devices that are integrated to the SRW into a position for ergonomic manual use, while the rest of the system is in use for automation | Yes/No\* |  |  |
| The access mechanism must ensure positional accuracy upon re-positioning of the device to automation position (operator not required to reteach robot), and also prevent the robot from accessing any instrument when it is rotated to the offline/manual position | Yes/No\* |  |  |
| On the system images submitted for this proposal, the vendor must individually label devices if this option is available. The summary table in the “SRW System Layout Summary” section must also be completed. | Yes/No\* |  |  |

#### Device Exchange Mechanism

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Robot system must have a flexible design to allow the following:* Day to day exchange of devices to permit different processes to be run on the system. Devices not on the integrated system can be used in offline mode.
* Exchange of failed devices (“hot swap”) to permit processing to continue with minimum down-time in the middle of a run.
* Adjustment of device location to optimize system throughput.
* Incorporation of additional devices in the future to match expanded processing requirements or new screening formats.
* Incorporation of new devices in the future to integrate novel technologies.
 | Yes/No\* |  |  |
| It must be possible to perform the exchange mechanism without requiring the system operator to perform a robot re-teaching function. | Yes/No\* |  |  |
| The exchange mechanism must allow for facile connect and disconnect of services to the device (power, gases, data) | Yes/No\* |  |  |
| The exchange mechanism must be compatible with devices that weigh up to a minimum of 900 kilograms. | State weight capacity\* |  | **1 / b** |
| The device exchange process (remove one device, add another) should take a maximum of sixty seconds. | State timing |  | **1 / c** |
| The exchange mechanism must require a maximum of one system operator to perform (no vendors employees required) | State number of operators required\* |  | **1 / c** |
| The exchange mechanism should integrate with the scheduling software to allow automatic identification of devices that have been swapped (initialize new device, and confirm physical location on system). | Yes/No |  |  |
| The SRW system must have a minimum of two device exchange positions to permit parallel operation of varying technologies to support multiple replication campaigns | State quantity\* |  | 1 / b |
| On the system images submitted for this proposal, the vendor must individually label devices if this option is available. The summary table in the “SRW System Layout Summary” section must also be completed. | Yes/No\* |  |  |

#### Enclosure

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| The SRW must be housed within a dry-air enclosure. The dry air source for the enclosure will be provided by the University’s facilities team. | Yes/No\* |  |  |
| The enclosure must permit full unhindered movement of the robotic arm to access the various integrated devices. | Yes/No\* |  |  |
| The enclosure must be designed to accommodate the automated link that runs into the SRW from the Long Term Liquid Tube Store. System robot must be able to pick/place SBS-format racks from the automated link. | Yes/No\* |  |  |
| The enclosure must be designed to enable applicable devices to be swapped via the device exchange mechanism so that common lab devices can be transported in and out of the enclosure by a system operator (no vendor employees required). | Yes/No\* |  |  |
| The enclosure must utilise a safety-interlock system (or equivalent) to prevent operator access to the work-cell when the robot is in high power/remote mode. | Yes/No\* |  |  |
| The Sample Reformatting Work-Cell, coupled via automatic link to the Long Term Liquid Store must fit within the laboratory space “0.06” in all dimensions. DWG file available on request. | Yes/No\* |  |  |
| The vendor must provide summary dimensions and images of the store and the coupled reformatting system placed in the lab 0.06 | Yes/No\* |  |  |

#### Workstation

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| SRW must be provided with a PC and accompanying workstation with the minimum requirements:PROCESSORIntelTM Core®2 Duo E7300 (2.66GHz/1066MHz/3MB L2/375W)OPERATING SYSTEMGenuine Windows 7 Business VIDEO CARD256MB PCIe x16 nVidia NVS 290, Dual Monitor DVI CapableMEMORY4GB, 800MHz, DDR2 SDRAM Memory, ECC (4 DIMMS)OPTICAL DRIVE16X DVD‐ROM with Cyberlink Power DVDTHARD DRIVE/RAIDCONFIGURATIONC7, ALL SATA, RAID 1for 2 Hard DrivesHARD DRIVE160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst Cache2ND HARD DRIVE160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst CacheMONITORDell 22 inch UltraSharpTM 2208FPW Widescreen, Adjustable Stand, VGA/DVIFILE SYSTEMNTFS File SystemSECURITYMcAfee® Total Protection for Small Business, 15 Month or equivalentSYSTEM DOCUMENTATIONResource DVD ‐ contains Diagnostics and Drivers | Yes/No\* |  |  |

### SRW Labware Storage and Handling Requirements

#### Ambient, non-random access stackers for simple loading/unloading of SBS-format labware

* The vendor must propose device(s) to provide the following features and account for the hardware and software integration to the overall system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 1 / b |
| It must be possible to store a minimum of 700 384-well plates (Sample Height 14.4mm) in non-random access stackers | Yes/No\*State plate capacity |  | 3 / b |
| Must have automatic plate handling system (lift system and plate-handler or comparable system). | Yes/No\* |  |  |
| Plate storage/retrieval time should be a maximum of 15 seconds. | State retrieval time |  | 1 / c |
| Rapid, self-inventorying barcode feature to integrate with scheduling software ordering process. The time taken to inventory 700 384 well plates (Sample Height 14.4mm) should be no greater than 4 minutes. | State time to scan 700 384-well plates |  | 1 / c |
| Removable stackers to permit swift exchange of processed labware with fresh labware | Yes/No\* |  |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |

#### Ambient, random access stackers for loading/unloading of SBS-format labware

* The vendor must propose device(s) to provide the following features and account for the hardware and software integration to the overall system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 1 / b |
| It must be possible to store a minimum of 900 1536-well plates, sample height 11mm in random access stackers | Yes/No\*State plate capacity |  | 3 / b |
| Must have automatic plate handling system (lift system and plate-handler or comparable system). | Yes/No\* |  |  |
| Plate storage/retrieval time should be a maximum of 18 seconds. | State storage/retrieval time. |  | 1 / c |
| Rapid, self-inventorying barcode feature to integrate with scheduling software ordering process. The time taken to inventory 900 1536 well plates (Sample Height 11mm) should be no greater than 8 minutes. | State time to scan 900 1536-well plates |  | 1 / c |
| Removable stackers to permit swift exchange of processed labware with fresh labware. | Yes/No\* |  |  |
| Barcoded stackers to allow automatic identification of stacker pitch | Yes/No |  |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Environmentally, controlled random access stackers for storage of liquid libraries in 384-well plate format

* The vendor must propose device(s) to provide the following features and account for the hardware and software integration to the overall system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 1 / b |
| Internal storage conditions:* It must be possible to control temperature in a minimum range of 4’C to -20’C
* It must be possible to maintain a low humidity environment, with a minimum controlled relative humidity setting of 10%
 | * State Temperature Control Range\*
* State Relative Humidity Control Capabilities\*
 |  | 1 / c2 / c |
| It must be possible to store a minimum of 1500 heat sealed 384-well plates, sample height 14.4mm in random access stackers | Yes/No\*State plate capacity |  | 4 / b |
| Must have automatic plate handling system (lift system and plate-handler or comparable system). | Yes/No\* |  |  |
| Plate storage/retrieval time should be a maximum of 18 seconds. | State storage/retrieval time. |  | 1 / c |
| Rapid, self-inventorying barcode feature to integrate with scheduling software ordering process. The time taken to inventory 1500 384-well plates (Sample Height 14.4mm) should be no greater than 8 minutes. | State time to scan 1500 384-well plates |  | 1 / c |
| Removable stackers to permit swift exchange of processed labware with fresh labware. | Yes/No\* |  |  |
| Barcoded stackers to allow automatic identification of stacker pitch | Yes/No |  |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

### SRW Accessory Devices Integration

Lot B describes accessory devices that will be provided and integrated into the Sample Reformatting Work-Cell and uHTS system. Vendors who have submitted a response to Lot A must quote for the provision and integration of all of the devices in Lot B. This section covers the integration component of the requirements for the SRW system. All device technical specifications can be cross-referenced to Lot B.

#### Automated Liquid Handler Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |

#### Automated Heat Sealer Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Plate De-Sealer Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Benchtop Centrifuge Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Low Volume Bulk-Reagent Dispenser Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Screw-Cap Decapper/Recapper Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** |  |
| Integration (hardware and software) for minimum two device instances. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |

#### 2D Barcode Reader Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |

### SRW System Layout Summary

Vendors submitting responses to Lot A must fill out this table to summarise their proposal.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Requirement** | **Proposed Device** | **Quantity** | **Peripheral Device Access Option** | **Device Exchange Mechanism Option** | **Comments** |
| Robot |  |  | n/a | n/a |  |
| Compatible with Direct Automated Link to Liquid Tube Store |  |  | n/a | n/a |  |
| Dry Air Enclosure |  |  | n/a | n/a |  |
| Barcode Scanning |  |  | n/a | n/a |  |
| Regripping |  |  | n/a | n/a |  |
| Ambient, non-random access stackers for simple loading/unloading of SBS-Format labware |  |  | n/a | n/a |  |
| Ambient, random access stackers for loading/unloading of SBS-Format labware |  |  | n/a | Yes/No |  |
| Environmentally, controlled random access stackers for storage of liquid libraries in 384-well plate format |  |  | n/a | Yes/No |  |
| Automated Liquid Handler |  |  | n/a | n/a |  |
| Automated Heat Sealer |  |  | Yes/No | Yes/No |  |
| Automated Plate De-Sealer |  |  | Yes/No | Yes/No |  |
| Automated Benchtop Centrifuge |  |  | Yes/No | Yes/No |  |
| Automated Low Volume Bulk-Reagent Dispenser |  |  | Yes/No | Yes/No |  |
| Automated Screw-Cap Decapper/Recapper |  |  | Yes/No | n/a |  |
| 2D Barcode Reader |  |  | n/a | n/a |  |

### SRW System Layout Images

Vendors submitting responses to Lot A must include 3D images of the SRW system design in their proposal\*

### SRW System Throughput

Referencing attached spreadsheet “Palacky University Protocol Throughput Analysis.xls”.

The first tab in the attachment describes an example protocol to be run on the SRW system. Vendors must perform simulations in the proposed scheduling software, using the selected device configuration to provide throughput estimations for this protocol.

Vendors must complete the tables in the spreadsheet to display all composite timing data (including robot moves and storage device operations).

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| The vendor must fill out Tab 1 of the “University Protocol Throughput Analysis.xls” to completion | Yes/No\* |  |  |
| A batch of 200 source plates in the example replication protocol must be run to completion in a maximum of 8 hours. | Yes/No\*State simulated completion time |  | **1 / c** |
| The vendor must state any assumptions or optimisations used to generate this predicted processing time | Yes/No\* |  |  |
| The vendor must include in the spreadsheet summary images of the protocol design used to predict the processing schedule for the batch | Yes/No\* |  |  |
| The vendor must include in the spreadsheet summary images of the predicted processing schedule for the batch | Yes/No\* |  |  |

## Ultra-High Throughput Screening (uHTS) System

A robotic system designed to allow the unattended processing of a wide variety of biological assays and applications. Tasks include, but are not limited to:

* Biochemical screening in 96/384/1536 plate format
* Cell-based screening in 96/384/1536 plate format
* High content biology assays in 96/384/1536 plate format
* siRNA inhibition assays, sample extraction and PCR analysis in 96/384/1536 plate format

### uHTS Robotics/Integration Requirements

#### Robot

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Automatic labware movement must be provided by high-speed robotic arm – plate movement from one device to another (in same orientation) must take no longer than 10 seconds. | Yes/No\* |  |  |
| Sufficient number of robotic arms must be proposed to integrate the required peripherals.  | Yes/No\* |  |  |
| If multiple robots are proposed, the vendor must include and describe a mechanism for automatically transporting labware between those robots without operator intervention. | Yes/No\* |  |  |
| Robot must include collision detection to prevent damage to instrumentation or robot in the event of error. | Yes/No\* |  |  |
| Robot must include a plate gripper that is compatible with all common SBS-format labware.\  | Yes/No\* |  |  |
| The gripper must incorporate plate/part presence sensing. | Yes/No\* |  |  |
| Robot must have ability to regrip from portrait to landscape grip as necessary to reach the various lab devices to be integrated in the work-cell. | Yes/No\* |  |  |
| Robot should perform 1D barcode scanning as part of moves. | Yes/No |  |  |
| Robot must perform high-speed automated lidding/delidding.  | Yes/No\* |  |  |
| Robot should be able to regrip plate at the same time as lidding/delidding to adjust plate orientation if required. | Yes/No |  |  |
| Vendor must propose an automated lidding/delidding function to hold a minimum of 12 lids in parallel across the system | State lid capacity of system\* |  | **1 / b** |
| Robot should have “auto-teach” function with ability to sequentially teach multiple robot points with no operator intervention. | Yes/No |  |  |
| On the system images submitted for this proposal, the vendor must summarise the robot access limits in their work-cell design to indicate the future expansion capability of the system design. | Yes/No\* |  |  |

#### Peripheral Device Access

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| It must be possible to rotate or slide devices that are integrated to the SRW into a position for ergonomic manual use, while the rest of the system is in use for automation | Yes/No\* |  |  |
| The access mechanism must ensure positional accuracy upon re-positioning of the device to automation position (operator not required to reteach robot), and also prevent the robot from accessing any instrument when it is rotated to the offline/manual position | Yes/No\* |  |  |
| On the system images submitted for this proposal, the vendor must individually label devices if this option is available. The summary table in the “uHTS System Layout Summary” section must also be completed. | Yes/No\* |  |  |

#### Device Exchange Mechanism

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Robot system must have a flexible design to allow the following:* Day to day exchange of devices to permit different processes to be run on the system. Devices not on the integrated system can be used in offline mode.
* Exchange of failed devices (“hot swap”) to permit processing to continue with minimum down-time in the middle of a run.
* Adjustment of device location to optimize system throughput.
* Incorporation of additional devices in the future to match expanded processing requirements or new screening formats.
* Incorporation of new devices in the future to integrate novel technologies.
 | Yes/No\* |  |  |
| It must be possible to perform the exchange mechanism without requiring the system operator to perform a robot re-teaching function. | Yes/No\* |  |  |
| The exchange mechanism must allow for facile connect and disconnect of services to the device (power, gases, data) | Yes/No\* |  |  |
| The exchange mechanism must be compatible with devices that weigh up to a minimum of 900 kilograms. | State weight capacity\* |  | **1 / b** |
| The device exchange process (remove one device, add another) should take a maximum of sixty seconds. | State timing |  | **1 / c** |
| The exchange mechanism must require a maximum of one system operator to perform (no vendors employees required) | State number of operators required\* |  | **1 / c** |
| The exchange mechanism should integrate with the scheduling software to allow automatic identification of devices that have been swapped (initialize new device, and confirm physical location on system). | Yes/No |  |  |
| The uHTS system must have a minimum of ten device exchange positions to permit parallel operation of varying technologies to support multiple screening campaigns | State quantity\* |  | 1 / b |
| On the system images submitted for this proposal, the vendor must individually label devices if this option is available. The summary table in the “uHTS System Layout Summary” section must also be completed. | Yes/No\* |  |  |

#### Enclosure

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| A section of the uHTS system must be housed within a Biosafety Level 2+ (BSL2+) enclosure to integrate the applicable accessory devices. The vendor must account for the provision of all associated fan boxes and filters. | Yes/No\* |  |  |
| The BSL2+ enclosed section of the uHTS system must be linked via automation to an unenclosed section that will process lower-containment level biochemical/cell-based assays | Yes/No\* |  |  |
| The enclosure must permit full unhindered movement of the robotic arm to access the various integrated devices. | Yes/No\* |  |  |
| The enclosure must be designed to enable applicable devices to be swapped via the device exchange mechanism so that common lab devices can be transported in and out of the enclosure by a system operator (no vendor employees required). | Yes/No\* |  |  |
| The enclosure must utilise a safety-interlock system (or equivalent) to prevent operator access to the work-cell when the robot is in high power/remote mode. | Yes/No\* |  |  |
| It should be possible to modify the enclosure in the future to run with a hypoxic environment (0.1% to 5% atmospheric oxygen).  | Yes/No |  |  |
| The installed uHTS system must fit within the laboratory space “2.29” in all dimensions. DWG file available on request. | Yes/No\* |  |  |
| The width of the installed uHTS system (including enclosure and fans) should be no greater than a maximum of 11 metres. | State Width |  | 1 / c |
| The length of the installed uHTS system (including enclosure and fans) should be no greater than a maximum of 4.5 metres. | State Length |  | **1 / c** |

#### Workstation

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| uHTS system must be provided with a PC and accompanying workstation with the minimum requirements:PROCESSORIntelTM Core®2 Duo E7300 (2.66GHz/1066MHz/3MB L2/375W)OPERATING SYSTEMGenuine Windows 7 Business VIDEO CARD256MB PCIe x16 nVidia NVS 290, Dual Monitor DVI CapableMEMORY4GB, 800MHz, DDR2 SDRAM Memory, ECC (4 DIMMS)OPTICAL DRIVE16X DVD‐ROM with Cyberlink Power DVDTHARD DRIVE/RAIDCONFIGURATIONC7, ALL SATA, RAID 1for 2 Hard DrivesHARD DRIVE160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst Cache2ND HARD DRIVE160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst CacheMONITORDell 22 inch UltraSharpTM 2208FPW Widescreen, Adjustable Stand, VGA/DVIFILE SYSTEMNTFS File SystemSECURITYMcAfee® Total Protection for Small Business, 15 Month or equivalentSYSTEM DOCUMENTATIONResource DVD ‐ contains Diagnostics and Drivers | Yes/No\* |  |  |

### uHTS Labware Storage and Handling Requirements

#### Ambient, random access stackers for loading/unloading of SBS-format labware

* The vendor must propose device(s) to provide the following features and account for the hardware and software integration to the overall system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 1 / b |
| It must be possible to store a minimum of 400 1536-well plates, sample height 11mm in random access stackers | Yes/No\*State plate capacity |  | 3 / b |
| Must have automatic plate handling system (lift system and plate-handler or comparable system). | Yes/No\* |  |  |
| Plate storage/retrieval time should be a maximum of 18 seconds. | State storage/retrieval time. |  | 1 / c |
| Rapid, self-inventorying barcode feature to integrate with scheduling software ordering process. The time taken to inventory 400 1536 well plates (Sample Height 11mm) should be no greater than 4 minutes. | State time to scan 400 1536-well plates |  | 1 / c |
| Removable stackers to permit swift exchange of processed labware with fresh labware. | Yes/No\* |  |  |
| Barcoded stackers to allow automatic identification of stacker pitch | Yes/No |  |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Environmentally controlled random access stackers for storage of source sample plates in 1536 well format

* The vendor must propose device(s) to provide the following features and account for the hardware and software integration to the overall system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 1 / b |
| Internal storage conditions:* Temperature control must be internal ambient
* It must be possible to maintain a low humidity environment, with a minimum controlled relative humidity setting of 10%
 | * State Temperature Control\*
* State Relative Humidity Control Capabilities\*
 |  | 1 / c1 / c |
| It must be possible to store a minimum of 900 heat sealed 1536-well plates, sample height 11mm in random access stackers | Yes/No\*State plate capacity |  | 1 / b |
| Must have automatic plate handling system (lift system and plate-handler or comparable system). | Yes/No\* |  |  |
| Plate storage/retrieval time should be a maximum of 18 seconds. | State storage/retrieval time. |  | 1 / c |
| Rapid, self-inventorying barcode feature to integrate with scheduling software ordering process. The time taken to inventory 900 1536 well plates (Sample Height 11mm) should be no greater than 8 minutes. | State time to scan 900 1536-well plates |  | 1 / c |
| Removable stackers to permit swift exchange of processed labware with fresh labware. | Yes/No\* |  |  |
| Barcoded stackers to allow automatic identification of stacker pitch | Yes/No |  |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must include a dedicated instrument UPS to allow environmental storage conditions to be maintained during device exchange | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Environmentally controlled random access stackers for assay plate incubations

* The vendor must propose device(s) to provide the following features and account for the hardware and software integration to the overall system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 1 / b |
| Internal storage conditions:* It should be possible to control temperature in a minimum range of 4’C to 100’C
* It must be possible to establish a high relative humidity environment, with a minimum setting of 98%
* CO2 must be controllable in a minimum range of 0 to 20% volume
* O2 should be a controllable in a minimum range of 1 to 21% volume by supplying N2.
 | * State Temperature Control Range
* State Relative Humidity Control\*
* State CO2 control range\*
* State O2 control range
 |  | 1 / b1 / b1 / b3 / b |
| It should be possible to run an unattended dry heat sterilization program, with a minimum soak temperature of 180’C. | Yes/NoState soak temperature |  | 1 / b |
| It must be possible to store a minimum of 400 lidded 1536-well plates, sample height 11mm in random access stackers | Yes/No\*State plate capacity |  | 3 / b |
| Must have automatic plate handling system (lift system and plate-handler or comparable system). | Yes/No\* |  |  |
| Plate storage/retrieval time should be a maximum of 18 seconds. | State storage/retrieval time. |  | 1 / c |
| Rapid, self-inventorying barcode feature to integrate with scheduling software ordering process. The time taken to inventory 400 1536 well plates (Sample Height 11mm) should be no greater than 4 minutes. | State time to scan 400 plates  |  | 1 / c |
| Removable stackers to permit swift exchange of processed labware with fresh labware. | Yes/No\* |  |  |
| Barcoded stackers to allow automatic identification of stacker pitch | Yes/No |  |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### BSL2+, Ambient, non-random access stackers for simple loading/unloading of SBS-Format labware

* The vendor must propose device(s) to provide the following features and account for the hardware and software integration to the overall system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 1 / b |
| It must be possible to store a minimum of 700 384-well plates (Sample Height 14.4mm) in non-random access stackers | Yes/No\*State plate capacity |  | 1 / b |
| Must have automatic plate handling system (lift system and plate-handler or comparable system). | Yes/No\* |  |  |
| Plate storage/retrieval time should be a maximum of 15 seconds. | State retrieval time |  | 1 / c |
| Rapid, self-inventorying barcode feature to integrate with scheduling software ordering process. The time taken to inventory 700 384 well plates (Sample Height 14.4mm) should be no greater than 4 minutes. | State time to scan 700 384-well plates |  | 1 / c |
| Removable stackers to permit swift exchange of processed labware with fresh labware | Yes/No\* |  |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. To be positioned in BSL2+ enclosure. | Yes/No\* |  |  |

#### BSL2+, Environmentally controlled random access stackers for assay plate incubations

* The vendor must propose device(s) to provide the following features and account for the hardware and software integration to the overall system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 1 / b |
| Internal storage conditions:* It should be possible to control temperature in a minimum range of 4’C to 100’C
* It must be possible to establish a high relative humidity environment, with a minimum setting of 98%
* CO2 must be controllable in a minimum range of 0 to 20% volume
* O2 should be a controllable in a minimum range of 1 to 21% volume by supplying N2.
 | * State Temperature Control Range
* State Relative Humidity Control\*
* State CO2 control range\*
* State O2 control range
 |  | 1 / b1 / b1 / b4 / b |
| It should be possible to run an unattended dry heat sterilization program, with a minimum soak temperature of 180’C. | Yes/NoState soak temperature |  | 1 / b |
| It must be possible to store a minimum of 400 lidded 1536-well plates, sample height 11mm in random access stackers | Yes/No\*State plate capacity |  | 1 / b |
| Must have automatic plate handling system (lift system and plate-handler or comparable system). | Yes/No\* |  |  |
| Plate storage/retrieval time should be a maximum of 18 seconds. | State storage/retrieval time. |  | 1 / c |
| Rapid, self-inventorying barcode feature to integrate with scheduling software ordering process. The time taken to inventory 400 1536 well plates (Sample Height 11mm) should be no greater than 4 minutes. | State time to scan 400 plates  |  | 1 / c |
| Removable stackers to permit swift exchange of processed labware with fresh labware. | Yes/No\* |  |  |
| Barcoded stackers to allow automatic identification of stacker pitch | Yes/No |  |  |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. To be initially positioned in BSL2+ enclosure. | Yes/No\* |  |  |
| It must be possible, given appropriate decontamination, to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

### uHTS Accessory Devices Integration

Lot B describes accessory devices that will be provided and integrated into the Sample Reformatting Work-Cell and uHTS system. Vendors who have submitted a response to Lot A must quote for the provision and integration of all of the devices in Lot B. This section covers the integration component of the requirements for the uHTS system. All device technical specifications can be cross-referenced to Lot B.

#### Pin Tool Instrument Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Low Volume Non-Contact Liquid Transfer Instrument Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must include a dedicated instrument UPS to allow a started method to complete in the event of power failure | Yes/No\* |  |  |
| Vendor must account for integration costs to enable cherry picking and dose response applications on the device(s) using a CSV-file based input mechanism | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Heat Sealer Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Plate De-Sealer Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Benchtop Centrifuge Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Bulk-Reagent Dispenser Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum two device instances. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Automated Low Volume Bulk-Reagent Dispenser Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

### Combination Washer/Dispenser Instrument Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum two device instances. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. | Yes/No\* |  |  |
| It must be possible to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### BSL2+ Automated Liquid Handler Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. To be positioned in BSL2+ enclosure. | Yes/No\* |  |  |

#### BSL2+ Combination Washer/Dispenser Instrument Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. To be initially positioned in BSL2+ enclosure. | Yes/No\* |  |  |
| It must be possible, given appropriate decontamination, to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### BSL2+ Automated Heat Sealer Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. To be initially positioned in BSL2+ enclosure. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible, given appropriate decontamination, to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### BSL2+ Automated Plate De-Sealer Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Integration (hardware and software) for minimum one device instance. The bidder must account for the number of devices consistent with overall throughput and capacity requirements. To be initially positioned in BSL2+ enclosure. | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible, given appropriate decontamination, to swap the device(s) on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

### uHTS Reader Integration

On the uHTS system the University plans to integrate several reader instruments that will be purchased in a separate tendering process. There is no advantage or disadvantage for bidding on either the reader tender(s) or this tender.

The vendor must account for the integration of the following devices into the overall uHTS system. The vendor’s proposed solution should indicate how these readers will be integrated considering the previously described requirements for peripheral device access and device-exchange mechanism.

#### Reader 1 Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Integration (hardware and software) for one device to perform multimode microplate reader function. Example devices include but are not limited to BMG PheraStar, PerkinElmer Envision, Biotek Synergy. To be positioned in BSL2+ enclosure. | Yes/No\* |  |  |
| Hardware integration must include a dedicated instrument UPS to allow a started method to complete in the event of power failure | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |

#### Reader 2 Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Integration (hardware and software) for one device to perform high content microplate microscopy function. Example devices include but are not limited to PerkinElmer Opera, and Yokogowa CV6000. | Yes/No\* |  |  |

#### Reader 3 Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Integration (hardware and software) for one device to perform high content microplate microscopy function. Example devices include but are not limited to PerkinElmer Operetta, and Thermo ArrayScan | Yes/No\* |  |  |
| Hardware integration must include a dedicated instrument UPS to allow a started method to complete in the event of power failure | Yes/No\* |  |  |
| It must be possible to swap the device on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Reader 4 Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Integration (hardware and software) for one device to perform high throughput CCD-detection of light. Example devices include but are not limited to PerkinElmer Viewlux and GE LeadSeeker | Yes/No\* |  |  |
| Hardware integration must include a dedicated instrument UPS to allow a started method to complete in the event of power failure | Yes/No\* |  |  |
| It must be possible to swap the device on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Reader 5 Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Integration (hardware and software) for one device to perform real-time PCR detection. Example devices include but are not limited to Roche LightCycler and Applied Biosystems ViiA 7. | Yes/No\* |  |  |
| Hardware integration must include a dedicated instrument UPS to allow a started method to complete in the event of power failure | Yes/No\* |  |  |
| Hardware integration must be compatible with previously described peripheral device access requirement. | Yes/No\* |  |  |
| It must be possible to swap the device on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Reader 6 Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Integration (hardware and software) for one device to perform high throughput microplate-based mass spectrometry. Example devices include but are not limited to Agilent RapidFire 300 / MS System. | Yes/No\* |  |  |
| It must be possible to swap the device on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Reader 7 Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Integration (hardware and software) for one luminescence and radioactivity detector (beta/gamma isotopes). Example devices include but are not limited to PerkinElmer MicroBeta2 LumiJET. | Yes/No\* |  |  |
| It must be possible to swap the device on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

#### Reader 8 Integration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Integration (hardware and software) for custom/University made device for the automated irradiation of microplates. Vendors may assume microplate presentation for robotic access will be via automated door, communication via TCP/IP or RS-232, similar to standard multimode plate reader | Yes/No\* |  |  |
| It must be possible to swap the device on and off the robot system using the previously described device-exchange mechanism. | Yes/No\* |  |  |

### uHTS System Layout Summary

Vendors submitting responses to Lot A must fill out this table to summarise their proposal.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Requirement** | **Proposed Device** | **Quantity** | **Peripheral Device Access Option** | **Device Exchange Mechanism Option** | **Comments** |
| Robot |  |  | n/a | n/a |  |
| Automated Link Between Robots |  |  | n/a | n/a |  |
| BSL2+ Enclosure |  |  | n/a | n/a |  |
| Barcode Scanning |  |  | n/a | n/a |  |
| Lid Handling |  |  | n/a | n/a |  |
| Regripping |  |  | n/a | n/a |  |
| Ambient, random access stackers for loading/unloading of SBS-format labware |  |  | n/a | Yes/No |  |
| Environmentally controlled random access stackers for storage of source sample plates in 1536 well format |  |  | n/a | Yes/No |  |
| Environmentally controlled random access stackers for assay plate incubations |  |  | n/a | Yes/No |  |
| BSL2+, Ambient, non-random access stackers for simple loading/unloading of SBS-Format labware |  |  | n/a | n/a |  |
| BSL2+, Environmentally controlled random access stackers for assay plate incubations |  |  | n/a | Yes/No |  |
| Reader 1 | n/a | 1 | Yes/No | n/a |  |
| Reader 2 | n/a | 1 | n/a | n/a |  |
| Reader 3 | n/a | 1 | n/a | Yes/No |  |
| Reader 4 | n/a | 1 | n/a | Yes/No |  |
| Reader 5 | n/a | 1 | Yes/No | Yes/No |  |
| Reader 6 | n/a | 1 | n/a | Yes/No |  |
| Reader 7 | n/a | 1 | n/a | Yes/No |  |
| Reader 8 | n/a | 1 | n/a | Yes/No |  |
| Pin Tool Instrument |  |  | Yes/No | Yes/No |  |
| Low Volume Non-Contact Transfer Instrument |  |  | Yes/No | Yes/No |  |
| Automated Heat Sealer |  |  | Yes/No | Yes/No |  |
| Automated Plate De-Sealer |  |  | Yes/No | Yes/No |  |
| Automated Benchtop Centrifuge |  |  | Yes/No | Yes/No |  |
| Automated Bulk-Reagent Dispenser |  |  | Yes/No | Yes/No |  |
| Automated Low Volume Bulk-Reagent Dispenser |  |  | Yes/No | Yes/No |  |
| Combination Washer/Dispenser Instrument |  |  | n/a | Yes/No |  |
| BSL2+ Automated Liquid Handler |  |  | n/a | n/a |  |
| BSL2+ Combination Washer/Dispenser Instrument |  |  | n/a | Yes/No |  |
| BSL2+ Automated Heat Sealer |  |  | Yes/No | Yes/No |  |
| BSL2+ Automated Plate De-Sealer |  |  | Yes/No | Yes/No |  |

### uHTS System Layout Images

Vendors submitting responses to Lot A must provide 3D images of the uHTS system design in their proposal\*

### uHTS System Throughput

See attached spreadsheet “Palacky University Protocol Throughput Analysis.xls”.

The second tab in the attachment describes an example protocol to be run on the uHTS system. Vendors must perform simulations in the proposed scheduling software, using the selected device configuration to provide throughput estimations for this protocol.

Vendors must complete the tables in the spreadsheet to display all composite timing data (including robot moves and storage device operations).

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| The vendor must fill out Tab 2 of the “University Protocol Throughput Analysis.xls” to completion | Yes/No\* |  |  |
| A batch of 250 assay plates in the example screening protocol must be run to completion in a maximum of 14 hours. | Yes/No\*State simulated completion time |  | **1 / c** |
| The vendor must state any assumptions or optimisations used to generate this predicted processing time | Yes/No\* |  |  |
| The processing schedule must be designed to ensure consistent processing of assay plates. The vendor should provide a statistical summary of assay plate variation across the batch | Yes/No\*State statistical summary of assay plate variation |  | **1 / c** |
| The vendor must include in the spreadsheet summary images of the protocol design used to predict the processing schedule for the batch | Yes/No\* |  |  |
| The vendor must include in the spreadsheet summary images of the predicted processing schedule for the batch | Yes/No\* |  |  |

## Scheduling Software

### Overview

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| The Sample Reformatting Work-Cell and uHTS system must be under the control of a scheduling software package, to control the flow of labware through the system and also initiate and log all operations performed on the peripheral devices. | Yes/No\* |  |  |

* The University has identified key areas of the scheduling software that must be described by the vendor. These have been split out into functional areas of the software.

#### Protocols

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Software must include simple to use GUI for building and annotating plate workflows, and assigning parameters for device operations.  | Yes/No\* |  |  |
| Must be possible to organise protocols into groups based on operator-scheme. Password protection of protocols to prevent un-authorised editing. | Yes/No\* |  |  |
| Must include sample input control mechanisms (e.g. pacing time) to ensure uniform processing of plates across large batches | Yes/No\* |  |  |
| Must be possible to prioritise steps within protocols to ensure processing is as required, and instrument use is optimised. | Yes/No\* |  |  |
| Must include pooling options for efficient use of multiple instances of the same device type | Yes/No\* |  |  |
| Should be possible to incorporate scripting components to protocol workflows, to allow the use of contextual information (e.g. plate barcode) mid-run | Yes/No |  |  |
| Scripts should be able to be run in either synchronous or asynchronous fashion | Yes/No |  |  |
| Should be possible for non-vendor employees to write and add new scripts to protocols without vendor assistance | Yes/No |  |  |
| Should be possible to build decision points into protocols based on the outcome of a script; for example, interpret analysed data from a LIMS system and branch a plate to waste if the pre-read signal is not within range | Yes/No |  |  |

#### Ordering

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| Software must include a simple to use GUI for assigning input and output storage positions for labware to be processed against the selected protocol. | Yes/No\* |  |  |
| Must include back-end ordering option to allow direct creation of orders in the work-cell’s database (bypass operator ordering GUI) preferably via Web Services. | Yes/No\* |  |  |
| Should be possible to perform “pre-run inventory” of barcoded plates that have been manually loaded to input storage locations. The scheduling software should utilise internal barcode scanners on peripheral storage devices to scan and then update the records for the order before it starts on the system.  | Yes/No |  |  |
| It should be possible to request labware from long term storage devices by barcode from a persistent inventory. | Yes/No |  |  |

#### Simulation Tools

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Software must include the ability to perform simulations on orders prior to running them on the work-cell.  | Yes/No\* |  |  |
| It should take a maximum of 30 seconds to generate a simulation for an order that will take 8 hours to run in real time | State time |  | 1 / c |
| Simulation data must be presented in a user-friendly Gantt-Chart style format | Yes/No\* |  |  |
| Gantt chart must allow detailed inspection of predicted total run time, and sample treatment/resource utilisation statistics to determine opportunities to optimise the processing. It must be possible to zoom into areas of interest to enable effective analysis. | Yes/No\* |  |  |
| The simulations must use real timing data derived from the protocol design. The software must make it simple for any level of operator to access historical run and operation timings to update simulations with the latest data. | Yes/No\* |  |  |
| It should be possible to use the simulation tool to visualise data from orders that have already been completed on the system. | Yes/No |  |  |
| Should allow for direct visual comparison of multiple simulations (including planned versus completed). | Yes/No |  |  |
| Software must be able to run multiple orders in parallel, and to control the release of secondary orders, either in time-based or event-based manner.  | Yes/No\* |  |  |
| The simulation tool should allow the operator to test these scenarios to ensure that multiple orders run as planned on the live system. | Yes/No |  |  |

#### Runs

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Software must include a simple to use interface that allows the operators to initialise the required devices on the system and then launch live orders for processing.  | Yes/No\* |  |  |
| Must allow the operator to set/determine the status of instruments prior to system utilisation, to ensure that devices in off-line use are not initialised for automated use. | Yes/No\* |  |  |
| Must be possible to launch a single order or multiple orders in parallel. Multiple orders to be run on the system must be able to be launched in either a time/date dependent mode, or an event-driven mode. | Yes/No\* |  |  |
| Must allow active orders to be paused, to allow operator intervention. Orders that are paused must then resume from the next step in the processing chain with no operator input. | Yes/No\* |  |  |
| Should allow operators to modify an instrument’s status on the fly; for example to retire a device from a pooled set of devices for consumable exchange. It should then be possible to re-insert the device to the active pool once the operator has completed the intervention. | Yes/No |  |  |
| The software must include intuitive error recovery procedures that allow for advanced error recovery options. | Yes/No\* |  |  |
| The system should be able to recover from a power failure to either the main PC or entire system without re-building a process or generating a new method. | Yes/No |  |  |
| The system should be able to recover from closing the main operating software without re-building a process or generating a new method. | Yes/No |  |  |
| The system should be able to recover from an emergency stop activation or device operation failure without re-building a process or generating a new method. | Yes/No |  |  |
| For simple device errors (for example heat sealer failed to apply seal)* The software must clearly display the step that has failed, and the associated error message from the instrument in failure
* The operator must be able to recover from simple errors by choosing how to recover that individual step.
* The active order should resume from the point of failure with no further intervention.
* It should be possible to recover from simple errors while the rest of the order is still processing
 | * Yes/No\*
* Yes/No\*
* Yes/No
* Yes/No
 |  |  |
| For complex error scenarios (e.g. one reader in a pool of two has failed)* It should be possible to pause an active order, and make detailed adjustments to the parameters of that order
* For example, it should be possible to adjust the sample input pacing for unstarted samples to account for the reduced number of plate readers, without re-building a process or generating a new method.
* It should be possible to simulate the effect of any mid-run changes prior to resuming processing of the order.
 | * Yes/No
* Yes/No
* Yes/No
 |  |  |
| The scheduling software must send detailed warning/error messages to allow remote monitoring of the system by email | Yes/No\* |  |  |
| The scheduling software should include a Gantt-Chart style mechanism to allow the operator to track the progress of the active order(s) and predict the finishing time of the current processing. | Yes/No |  |  |
| The scheduling software should be regularly updated, i.e. not an obsolete product. The vendor should describe their update approach, and how this would be managed alongside warranty/service contract periods. | Yes/No |  |  |
| The scheduling software must have device drivers available for each of the instruments that are listed in the accessories section. It must be possible to operate all devices independently through the scheduling software. | Yes/No\* |  |  |
| Must be able to use all other functions within the scheduling software while orders are running on system. | Yes/No\* |  |  |

#### Custom Integration to LIMS

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| The supplier of the Dry Store, Liquid Store, Sample Reformatting Work-Cell and uHTS system will be given the overall responsibility for the implementation, testing and final delivery of an integration solution between the platforms of Lot A and the planned LIMS functionality that is specified in Lot C.Vendors must provide a quotation for services (project management, software development and testing and on-site implementation) that will provide a seamless integration layer between the hardware/software of Lot A and the LIMS of Lot C. | Yes/No\*State figure and include in overall quotation. |  | 1 / c |
| Integration layer must automatically translate LIMS requests to build orders to be run on the relevant system’s controlling software package | Yes/No\* |  |  |
| Integration layer must provide dynamic barcode validation against all LIMS orders | Yes/No\* |  |  |
| Integration layer must allow event/message publication to the LIMS to allow tracking of system behavior (e.g. system error, system paused, job complete, file created) | Yes/No\* |  |  |
| Integration layer inputs and outputs should be via Web Services | Yes/No |  |  |
| Integration layer must specifically translate LIMS sample management jobs (examples include, but are not limited to, tube requests, tube returns, plate replication, cherry picking, dose response) to allow orders to be generated against the against the required system software protocol | Yes/No\* |  |  |
| Integration layer must track replication jobs back into LIMS – including active publication of job results back to LIMS (e.g. registration of newly created labware, sample volume tracking) | Yes/No\* |  |  |
| Integration layer must specifically translate LIMS screening jobs to allow orders to be generated against the required scheduling software protocol | Yes/No\* |  |  |
| On creation of reader output files, the integration layer must raise an event and copy the file to a server location | Yes/No\* |  |  |
| The integration layer should have the capability to parse the reader output file to a generic format for consumption by the LIMS given appropriate API on the LIMS end. | Yes/No |  |  |
| The integration layer should support the automatic publishing of data to the LIMS for analysis given appropriate API on the LIMS end.  | Yes/No |  |  |
| Given appropriate LIMS APIs, the integration layer should have the capability to automatically read analysed data from the LIMS system and adapt the flow control for the active order in the scheduling software. See Tender Section “Scheduling Software Requirements - Protocols” for further requirements on Flow Control options via scripting . | Yes/No |   |  |

## Lot A Tendering Approach

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| All vendors who respond to Lot A must provide references (contact details and descriptions) for at least three installations in the past three years that cover the following attributes:* An overall project budget larger than 4 million USD
* Implementation of large-scale (>25 instruments on a system) robotic integrations
* Implementation of robotic systems in Biosafety Level 2 enclosures
* Direct integration of robotic systems with large sample tube stores
* Robotic systems for high throughput sample reformatting with integrated automated liquid handlers
* Robotic systems for ultra high throughput screening with four or more plate readers integrated on a system
 | Yes/No\* |  |  |
| The tendered solution to Lot A should be provided by a sole source vendor  | Yes/No |  |  |
| Responses to Lot A that consist of products and services from more than one vendor (a syndicate of vendors or sub-contracted works) must provide references of at least three reference installations where the joint approach has been validated within the past three years. | Yes/No\*Provide details of three reference sites |  |  |

# Lot B –Accessory Devices

## Formalities

Lot B describes accessory devices that will be provided and integrated into the Sample Reformatting Work-Cell and uHTS system. Vendors who have submitted a response to Lot A must quote for the provision and integration of all of the devices in Lot B. Vendors who have not submitted a response to Lot A may independently quote for the provision of individual devices (excluding integration). Partial responses to Lot B must be clearly labeled in the vendor’s response.

## Accessory Devices for SRW

### Automated Liquid Handler

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 10 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Multi-channel tip-based pipetting (96 full head and 384 full head) into/out of 96/384/1536-way SBS-format labware.  | Yes/No\* |  |  |
| Ability to use multi-channel heads to pick tips in rows and columns | Yes/No\* |  |  |
| The minimum volume range must be 0.5ul to 500ul | State volume range\* |  | 50 / b |
| “Span-8” channel disposable tip liquid handling head for cherry picking and serial dilution tasks. | Yes/No\* |  |  |
| Ability to automatically swap pipetting format (e.g. multi-channel 96, multi-channel 384, disposable tips or solid) on-the-fly, without user intervention to support a wide range of plate formats in parallel | Yes/No |  |  |
| The system should notuse patented/contractual disposable pipetting tips | Yes/No |  |  |
| Automated tip-washing for disposable tips. | Yes/No\* |  |  |
| Internal gripper option to facilitate hand-off with main system robotics and for moving plates and tip-boxes around the deck. | Yes/No\* |  |  |
| Minimum six deck positions available for standard microplates and tip boxes | State quantity\* |  | 20 / b |
| Minimum one position available for active positioning of 1536-well microplates | State quantity\* |  | 20 / b |
| All software for full functionality/applications and prices must be included so that the instrument can perform cherry picking applications, plate reformatting applications or serial dilution applications. | Yes/No\* |  |  |

### Automated Heat Sealer

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 60 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Thermal sealing of SBS format microplates | Yes/No\* |  |  |
| Seal plate height with no adjustment from 9 to 48mm high | Yes/No |  |  |
| Minimum seal temperature range from ambient to 200 degrees Celsius | State Range\* |  | 10 / b |
| Minimum seal time from 0.1 to 9.9 seconds | State Range |  | 30 / b |
| Automatic plate presence sensing | Yes/No |  |  |
| Foil present sensing | Yes/No |  |  |
| Low air sensing | Yes/No |  |  |
| Touch Panel Display | Yes/No\* |  |  |

### Automated Plate De-Sealer

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 100 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Automated removal of a wide variety of seals from SBS-format microplates | Yes/No\* |  |  |
| Configurable seal removal parameters | Yes/No\* |  |  |

### Automated Benchtop Centrifuge

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 60 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| 3000 RPM/1000G minimum | State Range\* |  | 20 / b |
| Minimum two SBS-format microplate capacity. | State Range\* |  | 20 / b |

### Automated Low Volume Bulk-Reagent Dispenser

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 30 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Dispense into 96/384/1536-way SBS-format microplates | Yes/No\* |  |  |
| Minimum volume range 50nl-50ul | State Range\* |  | 30 / b |
| Dispensing precision minimum <5% at 0.5ul | State Precision |  | 20 / c |
| Dispensing accuracy minimum +/- 5% at <1ul | State Accuracy |  | 20 / c |
| Any-well, any volume backfill capability | Yes/No\* |  |  |
| DMSO compatibility should be proven | Yes/No\* |  |  |

### Automated Screw-Cap Decapper/Recapper

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum two device instances. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 60 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Prepare 96-way screw-cap tube racks for pipetting | Yes/No\* |  |  |
| Must be compatible with tubes described in Section “Long Term Liquid Tube Sample Storage” | Yes/No\* |  |  |
| Whole rack at a time | Yes/No\* |  |  |
| Option to dispose of caps, or hold and re-cap | Yes/No\* |  |  |
| Cycle time a maximum of 15 seconds | State cycle time |  | 40 / c |

### 2D Barcode Reader

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 60 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Must be compatible with 96-format racked 2d-coded tubes as described in Section “Long Term Liquid Tube Sample Storage” | Yes/No\* |  |  |
| Decode whole 96-format tube rack at a time | Yes/No\* |  |  |
| Cycle time a maximum of 5 seconds | State cycle time |  | 40 / c |
| Able to discriminate between a tube with a barcode that cannot be decoded and a rack position with no tube | Yes/No |  |  |

### NMR Instrument

#### Device Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. | State number of devices\* |  |  |
| Highly stable and advanced spectrometer with the following hardware:* RF transmitter
* Receivers for observation
* Transmitter and receiver for 2H-lock
* RF power amplifier
* Head amplifier chassis (RF power monitor, preamplifier)
* Intelligent controller
* Variable temperature controller
* Spectrometer controller system
1. Processor for controlling spectrometer
2. Spectrometer controller
3. Acquisition processor
4. AD converter
5. Sequencer
 | Yes/No\* |  |  |
| 500 MHz self-shielded Super Conducting Magnet with 11.74 Tesla magnetic field and nominal value of 54mm bore diameter | Yes/No\* |  |  |
| Highly sensitive 5mm autotunable probe for liquid samples equipped with a coil generating z-gradients and operating at sample temperature from -100 to 150 °C or wider | Yes/No\* |  |  |
| Dual Frequency Synthesizer | Yes/No\* |  |  |
| 10A Field Gradient System | Yes/No\* |  |  |
| Lagrange Shimming System, including shim controller, shim driver and shim coil | Yes/No\* |  |  |
| Auto Tuning Unit for HF and LF channels | Yes/No\* |  |  |
| Air Compressor with Air Dryer | Yes/No\* |  |  |
| Standard NMR Sample Kits | Yes/No\* |  |  |
| Low temperature equipment to run experiments below room temperature to -100 °C | Yes/No\* |  |  |
| The spectrometer control unit will have a built-in 250GB HDD and 2GB memory to ensure independent operation and safe data acquisition | Yes/No\* |  |  |
| Multiple sequencers for carrying out synchronous and asynchronous control of each RF channel must able to be included. | Yes/No\* |  |  |
| 2 RF channels must be available as standard. | Yes/No\* |  |  |
| 3 MHz offset band range with the minimum phase step of 0.01° and minimum amplitude step of 0.01dB must be available. The shaped pulse accuracy should be at least 15 bits or better. | Yes/No\* |  |  |
| Lagrange shimming for at least 44 channels must be provided. | Yes/No\* |  |  |
| Software for No-D (No-Deuterium) NMR measurement and processing | Yes/No\* |  |  |
| Data processing system including DOSY (Diffusion Ordered Spectroscopy). | Yes/No\* |  |  |

#### Technical Specifications – Spectrometer

|  |  |  |  |
| --- | --- | --- | --- |
| **Weight / type of parameter** | **Vendor Response** | **Vendor Description** |  |
| The standard frequency for the 1H must be 500 MHz with the stability of at least 0.1 Hz/h or better when the 2H internal lock is used. | Yes/No\* |  |  |
| The High Frequency Transmission Control1. Frequency Range: 10 to 535 MHz
2. Offset Frequency
3. Minimum Step : 0.05 Hz
4. Switching Time : ≤ 200 ns
5. Phase Shift Range : 0° to 360°
6. Full range of amplitude: 139 dB (0.01 dB steps)
7. Attenuation
8. Range : 0 to 79 dB (1 dB steps)
9. Switching time : ≤ 200 ns
10. Phase and amplitude
11. 16 bit quadruple phase and amplitude control
* Minimum Phase Step ≤ 0.01°
* Minimum Amplitude Step ≤ 0.1%
1. Switching time : ≤ 100 ns
 | State technical capabilities\* |  |  |
| High-Frequency Power Amplifier1. High-Band Power Amplifier (HF)
2. Frequency Range: 470~535MHz
3. Maximum Output: 100 W (Pulse), 10 W (CW)
4. Pulse Rise/Fall Time: 175 ns
5. Low-Band Power Amplifier (LF)
6. Frequency Range: 10~230MHz
7. Maximum Output: 300 W (Pulse), 20 W (CW)
8. Pulse Rise/Fall Time: 150 ns
9. Pulse Controller
10. Time Resolution: 20 ns
11. Pulse Timer Control: By Multiple Pulse Controller
 | State technical capabilities\* |  |  |
| Heteronuclear Spin Decoupling: Programmable Wide-Band Noise Decoupling1. X-{1H}, X-{19F}, 1H-{X}, 19F-{X}
2. Various types of gated decouplings
 | State technical capabilities\* |  |  |
| Matrix Shim: Consists of at least 44 shims as below:Z0, Z1, Z2, Z3, Z4, Z5, Z6, Z7, X, Y, XZ, YZ, X2, Y2, XZ2, YZ2, X2Z, Y2Z, X3, Y3, XZ3, YZ3,X2Z2, Y2Z2, X3Z, Y3Z, X4, Y4, XZ4, YZ4, X2Z3, Y2Z3, X3Z2, Y3Z2, X4Z, Y4Z,XZ5, YZ5, X2Z4, Y2Z4, X3Z3, Y3Z3, X4Z2, Y4Z2 | Yes/No\* |  |  |
| The variable temperature should be in the range of -140 to +180°C by computer control with the setting step of 0.1°C or better. | State temperature control range |  |  |
| The spectrometer must have an independent built-in spectrometer-control computer which communicates with a client computer (workstation) through network protocol and supports multiple-multiple platform communication with exclusive control, combining multiple spectrometers and multiple client computers.  | Yes/No\* |  |  |
| Secure data collection and storage. | Yes/No\* |  |  |

#### Technical Specifications - Self-Shielded Super-Conducting Magnet (SCM)

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Standard magnetic field: 11.74 T with the nominal value of 54mm bore diameter | Yes/No\* |  |  |
| The holding time of liquid He must be at least 110 days or longer. | Yes/No\* |  |  |
| The holding time for liquid N2 must be at least 17 days or longer. | Yes/No\* |  |  |
| Low drift field rate | Yes/No\* |  |  |
| Liquid He and liquid N2 level probes, liquid He transfer line and vibration proof base must be provided. | Yes/No\* |  |  |

#### Technical Specifications - NMR Probe

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| 500 MHz Auto-tunable 5mm probe with Z-axis Gradients | Yes/No\* |  |  |
| The probe must be able to observe any nucleus in the frequency range from 50 MHz (15N) to 200 MHz (31P) in the low frequency channel, and 1H and 19F in the high frequency channel. Automatic change of both observation and irradiation nuclei must be under full computer control for tuning and matching. The probe must be suitable for both direct and indirect detection experiments with optimum sensitivity. The probe must be fitted with shielded Z-axis pulse field gradient coil and must allow variable temperature experiments in the range of -100 to 150 °C. The probe uses a deuterium internal lock system. | Yes/No\* |  |  |
| Tube size: 5mm OD | Yes/No\* |  |  |
| Resolution: 1H Line width < 0.5 Hz, (Chloroform in Acetone-d6) | Yes/No\* |  |  |
| Line shape: < 6/12 Hz (Chloroform in Acetone-d6 at 0.55% and 0.11%) | Yes/No\* |  |  |
| Side bands: < 1% (4 scans, 1H) | Yes/No\* |  |  |
| Sensitivity: all measurements are single scan using Wilmad standard samples (Nucleus, S/N, Sample)1H, 700:1, 0.1% Ethyl benzene in CDCl313C, 300:1, 10% Ethyl benzene | Yes/No\* |  |  |
| Variable temperature range: -100 to +150 °C | Yes/No\* |  |  |
| Output of magnetic-field gradient: Approximately 0.3 T/m at 10 A setting. Maximum field gradient intensity 0.9 T/m.  | Yes/No\* |  |  |

#### Technical Specifications – Data System

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Workstation: Intel processor with 2GB Memoryor better* 1. Hard disk drive: 250 GB at 7.2 KRPM or better
	2. Optical drive
	3. Graphics: at least 24 bits full colour with resolution of 1280 × 1024 pixels
 | Yes/No\* |  |  |
| Acquisition processor: 32 bits word length with 64 MB Memory | Yes/No\* |  |  |
| AD converter: 1. 16 bits resolution
2. Sampling rate of 2 MHz
3. Number of channels: 2
 | Yes/No\* |  |  |
| Operating System 1. OS: Windows 7 (English or Czech version)
2. Graphics system: Windows GDI/OpenGL
 | Yes/No\* |  |  |
| Standard program for spectrometer and data processing must include:* Variable Temperature Control
* Acquisition Control
* Data processing and Data printout
* Autotune control
* Network support
* Digital filter function
* Shaped pulse function
* Automatic phase correction for 1D and 2D
* PDF output
* DOSY-related programmes including 3D-DOSY should be included as standard
* Automatic measurement and processing software for Non-Deuterium solvents
* Unlimited download of the data processing software with license key should be available from the website free of charge.
 | Yes/No\* |  |  |

#### Installation and Training

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| The supplier must install and commission the system immediately after the system delivery. System installation must be carried out by factory trained engineers.  | Yes/No\* |  |  |
| Comprehensive training on the operation and maintenance of the system must be provided on-site by experienced and qualified experts from the principal. | Yes/No\* |  |  |
| A full set of operator instruction manuals in English or Czech must be included. | Yes/No\* |  |  |
| The cryogenic supplies such as the liquid He, liquid Nitrogen, gas He and gas Nitrogen will be supplied by the customer for installation. Regulation valves, capillaries and connection to central or local gas sources will be supplied by vendor. | n/a |  |  |

## Accessory Devices for uHTS System

### Pin Tool Instrument

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 100 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Compatible with 96/384/1536 SBS-format microplates | Yes/No\* |  |  |
| User-exchangeable pin tool heads | Yes/No\* |  |  |
| Supplied with heads, pins and spares for 384 transfers at 200nl and 1536 transfers at 50nl | Yes/No\* |  |  |
| Blot station option to dry pins | Yes/No\* |  |  |
| Up to five-step wash program with sonication and vacuum drying options | Yes/No\* |  |  |
| Ability to have parallel activity on the instrument; i.e. external robot can assemble one set of transfer plates while another set is being processed | Yes/No |  |  |

### Low Volume Non-Contact Liquid Transfer Instrument

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 20 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Compatible with source 384/1536 SBS-format microplates | Yes/No\* |  |  |
| Compatible with destination 96/384/1536/3456 SBS-format microplates | Yes/No\* |  |  |
| Must use “non-contact” liquid handling to transfer liquid from any source well to any destination well | Yes/No\* |  |  |
| Individual transfer volumes no greater than 5nl. | State lowest transfer volume\* |  | 80 / c |
| Ability to survey volume of DMSO in source plate | Yes/No |  |  |
| Ability to survey hydration percentage of DMSO in source plate | Yes/No |  |  |
| Must be configured to dispense DMSO and aqueous fluids, compatible with nucleic acid transfer | Yes/No\* |  |  |
| Internal barcode reader | Yes/No |  |  |

### Automated Heat Sealer

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 40 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Thermal sealing of SBS format microplates | Yes/No\* |  |  |
| Seal plate height with no adjustment from 9 to 48mm high | Yes/No |  |  |
| Minimum seal temperature range from ambient to 200 degrees Celsius | State Range\* |  | 30 / b |
| Minimum seal time from 0.1 to 9.9 seconds | State Range |  | 30 / b |
| Automatic plate presence sensing | Yes/No |  |  |
| Foil present sensing | Yes/No |  |  |
| Low air sensing | Yes/No |  |  |
| Touch Panel Display | Yes/No\* |  |  |

### Automated Plate De-Sealer

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 100 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Automated removal of a wide variety of seals from SBS-format microplates | Yes/No\* |  |  |
| Configurable seal removal parameters | Yes/No\* |  |  |

### Automated Benchtop Centrifuge

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 40 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| 3000 RPM/1000G minimum | State Range\* |  | 30 / b |
| Minimum two SBS-format microplate capacity. | State Range\* |  | 30 / b |

### Automated Bulk-Reagent Dispenser

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum two device instances. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 25 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Dispense into 96/384/1536-way SBS-format microplates | Yes/No\* |  |  |
| Autoclavable dispensing cassettes | Yes/No\* |  |  |
| Minimum volume range 0.5ul-2500ul | State Range\* |  | 25 / b |
| Dispensing precision minimum <5% at 0.5ul | State Precision |  | 25 / c |
| Dispensing accuracy minimum +/- 5% at <1ul | State Accuracy |  | 25 / c |
| Any-well, any volume backfill capability | Yes/No\* |  |  |
| Proven cell dispensing ability | Yes/No\* |  |  |

### Automated Low Volume Bulk-Reagent Dispenser

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 25 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Dispense into 96/384/1536-way SBS-format microplates | Yes/No\* |  |  |
| Minimum volume range 50nl-50ul | State Range\* |  | 25 / b |
| Dispensing precision minimum <5% at 0.5ul | State Precision |  | 25 / c |
| Dispensing accuracy minimum +/- 5% at <1ul | State Accuracy |  | 25 / c |
| Any-well, any volume backfill capability | Yes/No\* |  |  |
| DMSO compatibility should be proven | Yes/No\* |  |  |

### Combination Washer/Dispenser Instrument

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum two device instances. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 30 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Wash SBS-format microplates in 96/384 microplates | Yes/No\* |  |  |
| Built in ultrasonic cleaner | Yes/No |  |  |
| Automatic switching of a minimum of 4 wash buffers | State number of wash buffers\* |  | 35 / b |
| Minimum three reagent dispensing options integrated to device | State number and type of reagent dispensing options\* |  | 35 / b |

### BSL2+ Automated Liquid Handler

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 30 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Multi-channel tip-based pipetting (96 full head and 384 full head) into/out of 96/384/1536-way SBS-format labware. | Yes/No\* |  |  |
| Ability to use multi-channel heads to pick tips in rows and columns | Yes/No\* |  |  |
| The minimum volume range should be 0.5ul to 500ul | State volume range\* |  | 20 / b |
| 8 channel disposable tip liquid handling headfor cherry picking and serial dilution tasks. | Yes/No\* |  |  |
| Ability to automatically swap pipetting format (e.g. multi-channel 96, multi-channel 384, disposable tips or solid) on-the-fly, without user intervention to support a wide range of plate formats in parallel. | Yes/No |  |  |
| The system should notuse patented/contractual disposable pipetting tips | Yes/No |  |  |
| Automated tip-washing for disposable tips. | Yes/No\* |  |  |
| Internal gripper option to facilitate hand-off with main system robotics and for moving plates and tip-boxes around the deck. | Yes/No\* |  |  |
| Should use a system of flexible deck accessories to accommodate various sample extraction technologies | Yes/No |  |  |
| Minimum ten deck positions available for standard microplates, reservoirs and tip boxes | State quantity\* |  | 20 / b |
| Minimum one position available for active positioning of 1536-well microplates | State quantity\* |  | 10 / b |
| Minimum two heating/cooling positions | State Quantity\* |  | 10 / b  |
| Minimum two orbital shaking positions | State Quantity\* |  | 10 / b |
| May include capability for magnetic-bead based separation techniques | Yes/No – quote as option in price proposal |  |  |
| May include capability for vacuum-based separation techniques | Yes/No – quote as option in price proposal |  |  |
| All software for full functionality/applications and prices must be included so that the instrument can perform cherry picking applications, plate reformatting applications or serial dilution applications. | Yes/No\* |  |  |

### BSL2+ Combination Washer/Dispenser Instrument

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 40 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Wash SBS-format microplates in 96/384 microplates | Yes/No\* |  |  |
| Built in ultrasonic cleaner | Yes/No |  |  |
| Automatic switching of a minimum of 4 wash buffers | State number of wash buffers\* |  | 30 / b |
| Minimum three reagent dispensing options integrated to device | State number and type of reagent dispensing options\* |  | 30 / b |

### BSL2+ Automated Heat Sealer

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 40 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Thermal sealing of SBS format microplates | Yes/No\* |  |  |
| Seal plate height with no adjustment from 9 to 48mm high | Yes/No |  |  |
| Minimum seal temperature range from ambient to 200 degrees Celsius | State Range\* |  | 30 / b |
| Minimum seal time from 0.1 to 9.9 seconds | State Range |  | 30 / b |
| Automatic plate presence sensing | Yes/No |  |  |
| Foil present sensing | Yes/No |  |  |
| Low air sensing | Yes/No |  |  |
| Touch Panel Display | Yes/No\* |  |  |

### BSL2+ Automated Plate De-Sealer

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Minimum one device instance. The bidder must propose the number of devices consistent with overall throughput and capacity requirements. | State number of devices\* |  | 100 / b |
| Device is “robot integration-ready” in terms of hardware and software | Yes/No\* |  |  |
| Automated removal of a wide variety of seals from SBS-format microplates | Yes/No\* |  |  |
| Configurable seal removal parameters | Yes/No\* |  |  |

#

# Lot C: Laboratory Information Management System (LIMS)

## Introduction

This section of the tender is for the provision of a LIMS to be fully integrated with the hardware and software requirements listed in Lot A and B.

Vendors who have submitted a response to Lot A must quote for the provision of the LIMS in Lot C. Vendors who have not submitted a response to Lot A may independently quote for the provision of the LIMS in Lot C.

## Overview

The University has identified key areas of the LIMS that must be described by the vendor. These have been split out into functional areas.

## LIMS Requirements – Sample Management

### Sample Registration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Should support compounds and biological molecules (e.g. siRNA) | Yes/No |  |  |
| Should support single and batch sample registration | Yes/No |  |  |
| Should generate unique sample IDs. Should support numeric only as well as human readable. Should allow differentiation of entity (e.g. siRNA vs chemical) and type (e.g. source vs destination) | Yes/No |  |  |
| Should allow association of chemical structure information with sample ID | Yes/No |  |  |
| Should allow association of calculated physical properties information with sample ID (e.g. molecular weight) | Yes/No |  |  |
| Should allow association of measured physical properties information with sample ID (e.g. NMR, LC/MS data) | Yes/No |  |  |
| Should support multiple batches of the same sample, based on synthetic/production iterations | Yes/No |  |  |
| Should allow normalization of compound structure information | Yes/No |  |  |

### Sample Inventory Tracking

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Should allow registration of new containers | Yes/No |  |  |
| Should account for hierarchy of container types | Yes/No |  |  |
| Must track containers by 1D and 2D barcode | Yes/No\* |  |  |
| Should be compatible with manual and automated storage mechanisms or systems | Yes/No |  |  |
| Should be able to hide/lock/remove containers | Yes/No |  |  |
| Should allow for volume and mass tracking | Yes/No |  |  |
| Should be able to track sample heritage | Yes/No |  |  |
| Should provide an overview of storage hardware (e.g dry vial store) – to include % capacity, general view of occupied locations, or distribution of selected sub-set of samples | Yes/No |  |  |
| Should allow for library/set management to group samples or labware based on a property | Yes/No |  |  |
| Should provide an audit trail for sample or labware history | Yes/No |  |  |

### Ordering

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Should provide a simple to use interface for consumers to order samples (compounds, biologics) from the sample management team | Yes/No |  |  |
| Should allow for order tracking (e.g. progress with expected completion data), including remote tracking | Yes/No |  |  |
| Should allow for creation of, and ordering by templates | Yes/No |  |  |
| Should provide automated order validation (based on sample/volume/mass availability). Partial ordering possible based on validation | Yes/No |  |  |
| Should allow for ordering of samples from screening analytics output, or user generated file import | Yes/No |  |  |

### Replication Planning and Execution

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Should allow sample management team to manage execution of orders across various platforms | Yes/No |  |  |
| Should allow large orders to be broken up into smaller units of work | Yes/No |  |  |
| Should allow for association of replication workflows with specific scheduling software protocols | Yes/No |  |  |
| Should provide APIs to receive outputs from solid and liquid transfers and update sample inventory and order completion status | Yes/No |  |  |

## LIMS Requirements – Assay Management

### Assay Registration

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Should allow for creation of new assays | Yes/No |  |  |
| Should allow for definition of the type of screen (e.g. primary, secondary) | Yes/No |  |  |
| Should allow for the definition of result types associated with the assay (e.g. single point % inhibition, dose response, kinetic, raw data) | Yes/No |  |  |
| Should be able to create assay relationships | Yes/No |  |  |
| Should be able to associate biological targets with new assays | Yes/No |  |  |
| Should be able to define result calculations associated with an assay | Yes/No |  |  |
| Should be able to define plate map templates (e.g. usage by well – control, sample, blank) | Yes/No |  |  |

### Ordering

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Should provide a simple to use interface for end users to order samples to be testing by the screening team | Yes/No |  |  |
| Should allow for order tracking (e.g. progress with expected completion data), including remote tracking | Yes/No |  |  |
| Should allow for ordering against pre-registered assays | Yes/No |  |  |
| Should provide automated order validation (based on sample availability). Partial ordering possible based on validation | Yes/No |  |  |
| Should allow for ordering of tests from user generated file import | Yes/No |  |  |

### Screening Planning and Execution

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Should allow screening team to manage execution of orders across various platforms | Yes/No |  |  |
| Should allow large orders to be broken up into smaller units of work | Yes/No |  |  |
| Should allow for association of assays with specific scheduling software protocols | Yes/No |  |  |

### Screening Data Analysis

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Description** | **Weight / type of parameter** |
| Should be able to import and perform calculations on raw data based on assay registration. Should include data capture and analysis tracking. Should also capture operator, system and user information. | Yes/No |  |  |
| Should allow for IC50/EC50 curve viewing and modification and saving | Yes/No |  |  |
| Should allow for summary or detailed views of plate data (e.g. Z’, heat maps) | Yes/No |  |  |
| Should allow for analysis and storage of data from automated and benchtop testing | Yes/No |  |  |
| Should store all raw, calculated and annotated results | Yes/No |  |  |
| Should associate results with assays and samples | Yes/No |  |  |
| Should allow for masking bad results or measurements, with feedback reschedule ordering of tests | Yes/No |  |  |
| Should allow publication of results and annotations | Yes/No |  |  |
| Should enable generation of hit lists | Yes/No |  |  |
| Should allow for report generation | Yes/No |  |  |
| Should allow the combination of multiple assay results with sample information for sample profiling | Yes/No |  |  |
| Should provide APIs for automated importing and analysis and reporting of screening data generated on the uHTS system (See Lot A, Scheduling Software LIMS Integration) | Yes/No |  |  |
| All results information should be stored in a query-able database | Yes/No |  |  |

## Lot C Tendering Approach

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Vendor Response** | **Vendor Additional Comments** | **Weight / type of parameter** |
| The tendered solution to Lot C may be from a single source vendor, or may be a joint approach from multiple vendors.  | State chosen approach |  |  |
| The selected vendor(s) for Lot C must state they are willing to expose relevant APIs to ensure a seamless integration with the hardware/software described in Lot A | Yes/No\* |  |  |
| The selected vendor(s) for Lot C must allow for making relevant technical staff available to enable the selected vendor for Lot A to deliver a custom integration layer. | Yes/No\* |  |  |