**General Notes**

The ViCELL database will use multiple schemas to separate result data from instrument and analysis configuration information. The table descriptions will note the schema to which the table belongs. Currently, two schemas are planned: ViCellData and ViCellInstrument.

**Data Type Definitions**

Values listed as using the ‘large integer’ type use the SQL ‘bigint’ type in the field definition in the table schema (8-bytes).

Values listed as using the ‘integer’ type use the SQL ‘integer’ type in the field definition in the table schema (4-bytes).

Values listed as using the ‘small integer’ type use the SQL ‘smallint’ type in the field definition in the table schema (2-bytes).

Values listed as using the ‘dynamic character array’ type or the ‘character array’ type use the SQL ‘character varying’ type in the field definition in the table schema. Fixed length character arrays also use the SQL ‘character varying’ type but are limited by the field definition to the length specified.

Values listed as using the ‘double’ type use the SQL ‘double precision’ type in the field definition in the table schema.

Values listed as using the ‘float’ type use the SQL ‘real’ type in the field definition in the table schema.

Values listed as using the ‘serialized xxxxx’ type are the same storage size as their corresponding base type. Base types are of the integer-type family. Serialized types are auto-incremented to generate unique values for a table. The values are NOT guaranteed to be unique across tables or across instrument instances.

Values listed as using the ‘UUID’ type use the SQL ‘UUID’ type globally-unique reference identifier in the field definition in the table schema. Note that the format provided on retrieval is ALWAYS the ‘classic’ format of “vvvvvvvv-wwww-xxxx-yyy-zzzzzzzzzzzz’, or 8-4-4-4-12. Input formats may omit dashes, use all-upper case or all-lower case, may be formatted to use alternate grouping schemes (e.g. 8-8-8-8, 4-4-4-4-4-4-4-4), and may be surrounded by braces ( i.e. {12345678-1234-1234-1234-123456789012 } ). NOTE: all fields naming UUID objects should use an uppercase ID in the field name.

Values listed as using the type ‘point’ use the PostgreSQL ‘point’ data type, defined as { float x, float y }.

Values listed as using the type ‘box’ use the PostgreSQL ‘box’ data type, defined as { x1, y1; x2, y2 }.

Several composite data types will be defined to handle the similar composite requirements in the instrument data structures. All composite ‘map’ types are inherently arrays. The descriptions show the content of each element in the map. For data integrity, count descriptors should be used to indicate the number of elements in a map, although the array type containing the element will provide a count of the actual number of elements in the array. Composite types are defined in the ‘public’ types section of the ViCell databases, to be applicable to all tables within those databases. Some composites are compound composites whose elements are other composite types.

ad\_settings: a composite containing five fields which describes the instrument Active Directory configuration information:

servername: a character string field representing the AD server name

server\_addr: a character string containing the server IP address formatted as in the example “127.0.0.1”

port\_number: an integer representing the listening/connection port of the AD server

base\_dn: character string representing the base domain name used for login

enabled: a boolean flag to show that the configuration is enabled.

Note in the following example that the servername and the base domain name are NOT always the same.

e.g. { “bcildapqry.global.bcecorp.net”, “ www.xxx.yyy.zzz”, 3268, “Global.BCECorp.net”, true }

af\_settings: a composite containing seven fields describing the configuration setting for the instrument auto-focus operation:

save\_image: a boolean controlling the saving of images

coarse\_start: an integer describing the start of the coarse focus search

coarse\_end: an integer describing the limit for the coarse focus search

coarse\_step: a small integer describing the step value used for each incremental move during the coarse focus search

fine\_range: the limit for the fine focus search from the starting point determined during the coarse focus search

fine\_step:: a small integer describing the step value used for each incremental move during the fine focus search

sharpness\_low\_threshold: an integer value representing the minimum sharpness value allowed

e.g. { true, 18000, 22000, 300, 2000, 15, 20 }

analysis\_input\_params: a composite containing five fields allowing flexible definition of the parameter names and values for the input analysis parameters. Not all ‘key’ elements may be used; unused elements should be set to ‘0’ when not required; ‘polarity’ condition value currently only supports the enumeration values representing ‘<’ (‘eBELOW’), ‘>=’ (‘eATABOVE’), and ‘eInvalidPolarity’, values:

key: a small integer representing the primary identifier for the parameter

skey: a small integer representing the secondary identifier for the parameter; may be blank

sskey: a small integer representing the tertiary identifier for the parameter; may be blank

value: a floating point representing the value of this parameter

polarity: a small integer representing the comparison action for this parameter as defined by an enumeration of actions

e.g. { 1, 5, 2, 1.25, 1 }

blob\_characteristics: a composite containing four fields allowing flexible definition of the characteristics parameters of a blob (potential cell/region of interest), similar to the analysis\_input\_params composite, above:

key: a small integer representing the primary identifier for the parameter

skey: a small integer representing the secondary identifier for the parameter; may be blank

sskey: a small integer representing the tertiary identifier for the parameter; may be blank

value: a floating point representing the value of this parameter

e.g. { 1, 5, 2, 1.25 }

blob\_point: a composite containing two fields representing the x-y location of a cell or blob within an image; a difference between this and the SQL ‘point’ object is that the values are stored as small integers in the blob\_point composite, rather than as ‘float’ (or the corresponding ‘real’) values in the ‘point’ object. This type is typically used in arrays containing the coordinates of all blobs in an image.

startx: a small integer representing the ‘x’ location within the image of a blob

starty: a small integer representing the ‘y’ location within the image of a blob

e.g. { 497, 150 }

blob\_data: a compound composite containing three fields representing describing the characteristics of the blob, the center point of the blob, and the outline path for the blob. The characteristic and outline are stored as arrays of the composite type used to contain the information.

blob\_info: an array of ‘blob\_characteristics’ composites containing the key descriptors of the blob

blob\_center: a ‘blob\_point’ composite representing the center of the blob

blob\_outline: an array of ‘blob\_point’ composites representing the vertices of all locations in the outline of the blob.

blob\_rect: a composite containing 4 fields: the starting x and y locations of a rectangle, and the width and height values of the rectangle; an alternate to the ‘box’ type useable ONLY for true rectangles, where the ‘box’ type defines all 4 vertices of any-shaped quadrangle.

start\_x: a small integer representing the ‘x’ value associated with the upper left corner location of the rectangle

start\_y: a small integer representing the ‘y’ value associated with the upper left corner location of the rectangle

width: the x-extent of the rectangle

height: the y-extent of the rectangle

e.g. { 475, 264, 97, 125 }

cal\_consumable: a composite containing five fields containing the identifying descriptors of a consumable used for calibration:

label: a character string containing the name or other label for the consumable

lot\_id: a character string containing the lot information for the consumable

cal\_type: a small integer representing the type of calibration used by the consumable; currently may be sizing or concentration

expiration\_date: a timestamp without timezone

assay\_value: a floating point value representing the assayed result of the calibrator

e.g. { “5M Concentration beads”, “BEC-LOT3-12345”, 1, “2020-10-20 00:00:00”, 4.975e6 }

cluster\_data: a compound composite containing six fields representing an individual cell-cluster in an image; this is a composite using other composite-types to describe the location and content of the cell cluster; note that a cluster is composed of multiple cells, thus the number and location of cell points is described within the cluster location.

cell\_count: small integer representing the number of cells determined to be in the cluster

cluster\_polygon[cell\_count]; an array of small integers of size ‘cell\_count’ representing the outline of clusters found in the image

cluster\_box\_startx: a small integer representing the ‘x’ value associated with the upper left corner location of the rectangle containing the cluster

cluster\_box\_starty: a small integer representing the ‘y’ value associated with the upper left corner location of the rectangle containing the cluster

cluster\_box\_width: the x-extent of the cluster rectangle

cluster\_box\_height: the y-extent of the cluster rectangle

cluster\_data\_map: a complex composite representing a cell-cluster in an image associated with an identifier; this composite uses other composite-types to describe the location, content, and id of a cell cluster;

{ integer <cluster\_identifier>, cluster\_data[] <cluster\_location> }

column\_display\_info: a composite containing four fields representing the type and extent of data and run-related columns presented on the GUI. This is stored as an array containing the selected elements for display. When stored in the array, the columns are shown on the GUI in the order described by the position value of the composite.

col\_type: a small integer describing the column-type to be displayed.

col\_position: a small integer describing the order of the column field in the display

col\_width: a small integer representing the user-configured (or default) width of the column

visible: a boolean noting whether the column type is visible. This considered prior to the position value

email\_settings: a composite containing five fields which contain the configuration information for an email server used by the system. May be blank.

server\_addr: a character string containing the server IP address or the email server formatted as in the example “127.0.0.1”

port\_number: an integer representing the listening/connection port of the email server

authenticate: a boolean flag indicating that authentication is required

username: a character string field representing the user account on the email server used for sending email

password: an encrypted character string field representing the password associated with the email server user account

illuminator\_info: a composite containing two fields representing the type and index (position) of the illuminators in the instrument

type: a small integer representing the defined enumeration type of an illuminator

index: a small integer representing the index of the illuminator type in the illuminator type descriptor table

input\_config\_params: a composite containing two fields representing the analysis input configuration parameter type enumeration and the value of that parameter

config\_params\_enum: a small integer representing the defined enumeration type of an analysis input parameter

config\_value: a double-precision field representing the value of the configuration parameter

int16\_map\_pair: a composite containing two fields representing the illuminator channel and the maximum number of peaks associated with that channel. Values are associated with an image. Map values are stored as an array of the elements. Typically used for fluorescence illumination channels, and thus will be empty for Vi-CELL-BLU.

channel: a small integer representing the fluorescence illumination channel defined enumeration type of an analysis input parameter

max\_num\_peaks: a small integer containing the maximum number detected peaks

language\_info: a composite containing four fields describing the languages supported by the instrument, and the currently active default language (instrument level, not user-level).

language\_id: an integer containing the standardized language identifier for the language

language\_name: a character string containing the long name/description of the language

locale\_tag: a character string containing the short tag used to deote a language (e.g. engUS)

active: a boolean noting whether the language is the active instrument application default language

rfid\_sim\_info: a composite containing five fields which contains the rfid configuration information for offline instrument application use.

set\_valid\_tag\_data: a boolean flag indicating that offline mode should force valid RFID information during operation

total\_tags: a small integer

main\_bay\_file: character string containing the file to be used to read RFID information for the main bay container

door\_left\_file: character string containing the file to be used to read RFID information for the left door container bay

door\_right\_file: character string containing the file to be used to read RFID information for the right door container bay

run\_options\_info: a composite containing fifteen fields which contains the default information for creation of worklists, sample-sets, and sample-items, and for the post-processing options.

sample\_set\_name: a character string containing the default name to be used for sample-sets

sample\_name: a character string containing the default name to be used for sample-items

save\_image\_count: a small integer noting the total images to be taken

save\_nth\_image: a small integer noting the total images to be saved as every ‘nth’ image

results\_export: a boolean noting whether the reports are to be automatically exported after processing

reports\_export\_folder: character string containing the path to be used for exported reports

append\_results\_export: a boolean noting whether the reports are to be appended to existing exported reports

append\_results\_export\_folder: character string containing the path to be used for appended export reports

results\_filename: character string containing the base filename to be used for reports

results\_folder: character string containing the base path to be used for reports

auto\_export\_pdf: a boolean noting whether the reports are to be generated as PDF fiels

csv\_folder: character string containing the base path to be used for CSV-format reports

wash\_type: a small integer noting the type of post-acquisition wash to be performed

dilution: a small integer noting the dilution factor to be used by default

bpqc\_cell\_type\_index: a small integer noting the index of the Bio-Process or QC cell-type; note that the stored value is an unsigned in stored in a signed int field, as the database does not provide unsigned equivalents.

signature\_info: a composite containing five fields which contains signature definition information

username: a character string field representing the user name to be inserted with this signature

short\_tag: a character string field representing the short text tag for the signature

long\_tag: a character string field representing the complete text for the signature

signature\_time: a timestamp without timezone value

signature\_hash: the hash value for the signature definition; to prevent unauthorized modifications to the signature definiton

Fields defined as ‘array of <field-type>’ are defined in the table schema using the SQL notation <data-type>[], where ‘data-type’ is the underlying data type for field-type (e.g. array of large integer would be defined as bigint[]; array of UUIDs would be defined as UUID[]).

**Instrument Control Definition tables:**

WorkLists: (ViCellInstrument schema) Defines the actions and content of a worklist; will indicate run status, including errors or incomplete list processing; may be discarded on fully successful completion of processing when all information in the contained sample-sets and their contained sample items have been populated, and the resulting sample objects have been populated;

WorklistIdNum\* serialized large integer; aid for sorting that provides sequential sorting and identification

WorklistID UUID; system-unique identifier for the Worklist run; used to identify all data originated by a specific Worklist; MAY OT BE VALID if the list is a template list

WorklistStatus small integer;

WorklistName dynamic character array (unlimited);

ListComments dynamic character array (unlimited); user comments for the worklist

InstrumentSN dynamic character array (unlimited); Instrument Serial number generating and processing the worklist; may contain an indicator or the computer workstation name for worklists generated on non-instrument workstations (e.g. ‘WS-xxxxx; INST-54321’ or ‘INST-54321; INST-54321’);

CreationUserID UUID; the user originating the worklist

RunUserID UUID; the user processing the worklist (starting the list processing for carousel carrier lists allowing dynamic additions)

RunDate time stamp with time zone; ISO date format; 24-hour time format; local time; date and time of the start of the run (e.g. 2017-12-20 13:05:00); specification of the timezone is optional in time string; if not specified, it is extracted from the system settings; will be the default epoch start (typically 1970-01-01 00:00:00) for worklists not yet run;

AcquireSample boolean (default = true); indicate that the sample items in the worklist needs to be acquired and initial image-sets taken;

CarrierType small integer; designator for the sample carrier type; may be ‘No Type’ for sample reanalysis

ByColumn boolean (default = false); sampling order for plates, where false = ‘by-row’, and true = ‘by-column’;

SaveImages small integer; default criteria for saving images (every image, every ‘nth’ image, etc.); should be blank or ‘1’ for reanalysis not changing the number of saved images; used for ‘found’ or otherwise undefined sample items;

WashType small integer; default wash type for ‘found’ or otherwise undefined sample items;

Dilution small integer; default dilution factor used for ‘found’ or otherwise undefined sample items;

DefaultSetName dynamic character array (unlimited); default name for the generated sample-set for ‘found’ or otherwise undefined sample items;

DefaultItemName dynamic character array (unlimited); default name associated with ‘found’ or otherwise undefined sample items; may be modified to prevent duplicate name entries (adding a serial number and/or date stamp)

ImageAnalysisParamID◇ UUID; the default image analysis parameter set used for ‘found’ or otherwise undefined sample items;

AnalysisDefinitionID UUID; the default analysis definition used for ‘found’ or otherwise undefined sample items;

AnalysisDefinitionIndex integer; the index of the default analysis definition used for ‘found’ or otherwise undefined sample items;

AnalysisParameterID◇ UUID; the default analysis parameter set used for ‘found’ or otherwise undefined sample items;

CellTypeID◇ UUID; the default cell type reference id for ‘found’ or otherwise undefined sample items;

CellTypeIndex integer; the index of the default cell type for ‘found’ or otherwise undefined sample items;

BioProcessID◇ UUID; the default bioprocess used for ‘found’ or otherwise undefined sample items;

QcProcessID◇ UUID; identifier pointing to the QC process used for ‘found’ or otherwise undefined sample items;

WorkflowID◇ UUID; the default application science workflow process used to acquire/analyze ‘found’ or otherwise undefined sample items;

SampleSetCount small integer; the total number of sample-sets added to the worklist; dynamic value includes sample-sets added after the list run has started.

ProcessedSetCount small integer; the number of sample-sets processed by the worklist; value may be less than the number in the list if processing was terminated (or during processing)

SampleSetIDList⧺ array of UUID; list of SampleSetID values for each defined sample-set in the worklist; may be blank if an ‘empty’ default run is started;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

SampleSets: (ViCellInstrument schema) Defines groups of samples to be processed within a worklist; will indicate processing status for the entire set, and may indicate errors, non-processed sets, or sets not completely processed; may be discarded on fully successful completion of processing when all information in the contained sample items and the resulting sample objects has been populated;

SampleSetIdNum\* serialized large integer; aid for sorting that provides sequential sorting and identification

SampleSetID UUID; system-unique identifier for sets of samples to be processed; MAY OT BE VALID if the sample-set is a template;

SampleSetStatus small integer;

SampleSetName dynamic character array (unlimited); name for the individual worklist item; would equate to individual sample name

SampleSetLabel dynamic character array (unlimited); name for a group of samples

Comments dynamic character array (unlimited); user comments for the sample-set

CarrierType small integer; designator for the sample carrier type

OwnerID UUID; the user owning the sample-set (and the contained items), and the data generated from those items; MAY NOT BE VALID if the sample-set is a template or is contained in a template worklist.

CreateDate time stamp; no time zone to be included; original date the sample set was created

ModifyDate time stamp; no time zone to be included; date of last sample set modification

RunDate time stamp; no time zone to be included; date the sample set was run as part of a worklist

WorklistID◆ UUID; system-unique identifier for the worklist instance containing this sample-set; MAY NOT BE VALID if the sample-set is from a template worklist or if the sample-set is not yet assigned to a worklist (a sample-set template)

SampleItemCount small integer; the total number of sample items added to this sample-set;

ProcessedItemCount small integer; the number of sample items from the set which have been processes by the parent worklist; value may be less than the number in the sample-set if processing was terminated, or during processing.

SampleItemIDList⧺ array of UUID; list of SampleSetItemID identifiers referencing the sample item properties for each sample item in the sample-set; will be correspond to the number of added sample items, or may be the number of ‘found’ sample positions, for the generic sample-set created for ‘found’ samples;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

SampleItems: (ViCellInstrument schema) Defines the sample positions to be processed and the actions for each defined sample item entry in a sample-set; will be generated for ‘found’ samples; may be discarded on fully successful completion of a run if all items were processed properly, and the resulting sample objects have been populated; otherwise, item status will indicate those items not completing properly, not found, or never processed;

SampleItemIdNum\* serialized large integer; aid for sorting that provides sequential sorting and identification

SampleItemID UUID; system-unique identifier for the sample item; MAY NOT BE VALID if sample item is part of a template sample-set

SampleItemStatus small integer;

SampleItemName dynamic character array (unlimited); name for the individual sample item; would equate to individual sample name

Comments dynamic character array (unlimited); user comments for the sample item

RunDate time stamp; no time zone to be included; date the sample item was run as part of a worklist

SampleSetID◆ UUID; system-unique identifier for the SampleSet containing this item; MAY NOT BE VALID if the containing sample-set is a template

SampleID◆ UUID; ID for the sample data and its characteristics and description generated from this sample item; if not initially blank, indicates re-analysis for a sample

SaveImages small integer; criteria for saving images (every image, every ‘nth’ image, etc.); should be blank or ‘1’ for reanalysis not changing the number of saved images; may be different for each sample item if per-sample image-save configuration is supported

WashType small integer; wash-type indicator for the original sample acquisition; per-sample sample wash definition

Dilution small integer; dilution factor used for the original sample acquisition; per sample dilution factor

ItemLabel dynamic character array (unlimited); tag or label for the sample item;

ImageAnalysisParamID◆ UUID; the image analysis parameter set used to perform the analysis of this sample; may be blank for ‘Acquire only’ items;

AnalysisDefinitionID UUID; the analysis parameter set used to perform the analysis of this sample; may be blank for ‘Acquire only’ items;

AnalysisDefinitionIndex integer; the index of the default analysis definition to be used for this sample during acquisition and analysis

AnalysisParameterID◇ UUID; the analysis parameter set used to perform the analysis of this sample; may be blank for ‘Acquire only’ items;

CellTypeID◇ UUID; cell type reference id for the original cell type used for this sample; per-sample cell type definition

CellTypeIndex integer; the index of the cell type to be used for this sample during acquisition and analysis

BioProcessID◇ UUID; identifier pointing to the bioprocess used

QcProcessID◇ UUID; identifier pointing to the QC process used

WorkflowID◇ UUID; identifier pointing to the application science workflow process used to acquire/analyze this sample;

SamplePosition character array (limited to 8 characters); row-column-rotation values (e.g. Z-1-1, A-1-0); positional information for each sample discreetly added to the worklist;

NOTE: the row value will be ‘Z’ for all carousel-originated samples, and rotation values will be 0 for all plate-originated samples; positions may point at invalid locations for re-analysis;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

**Instrument Data Definition tables:**

SampleProperties: (ViCellData schema) sample characteristics; identification, descriptive information, origination reference information, acquisition characteristics

SampleIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

SampleID\* UUID; ID for this sample and its characteristics and description

SampleStatus small integer;

SampleName dynamic character array (unlimited); name label for this sample (taken from the originating worklist item name)

CellTypeID◇ UUID; cell type reference id for the original cell type used for this sample

CellTypeIndex integer; the index of the cell type used for this sample during acquisition and analysis

AnalysisDefinitionID UUID; the analysis parameter set used to perform the analysis of this sample

AnalysisDefinitionIndex integer; the index of the default analysis definition used for this sample during acquisition and analysis

Label dynamic character array (unlimited); name label for the originating VAT or other text identifier or this sample

BioProcessID◇ UUID; identifier pointing to the bioprocess process used

QcProcessID◇ UUID; identifier pointing to the QC process used

WorkflowID◇ UUID; identifier pointing to the application science workflow process used to acquire/analyze this sample;

Comments dynamic character array (unlimited); user comments for the sample

WashType small integer; wash-type indicator for the original sample acquisition

Dilution small integer; dilution factor used for the original sample acquisition

OwnerUserID UUID; the user defining the sample and it’s characteristics (taken from the originating worklist item)

RunUserID UUID; the user processing the worklist (starting the queue processing for carousel carrier queues allowing dynamic additions) containing this sample

AcquisitionDate time stamp; no time zone to be included; original date of sample acquisition

ImageSetID◆ UUID; identifier for the sets of images for this sample

DustRefImageSetID◆ UUID; identifier for the sets of dust reference images used

InstrumentSN dynamic character array (unlimited); Instrument Serial number processing the sample;

ImageAnalysisParamID◇ UUID; the image analysis parameter set used to perform the initial analysis

NumReagents small integer; number of reagents used, representing individually replaceable reagents

ReagentTypeNameList dynamic character array (unlimited); an array of description strings formatted as “type-id, type-name”

ReagentPackNumList dynamic character array (unlimited); an array of reagent pack numbers as strings

PackLotNumList dynamic character array (unlimited); an array of lot numbers as strings

PackLotExpirationList array of large integers representing the day offset from the start of the time epoch for the pack expiration; no time component to avoid timezone adjustment

PackInServiceList array of large integers representing the day offset from the start of the time epoch when the pack was put into service; no time component to avoid timezone adjustment

PackServiceExpirationList array of large integers representing the number of days the pack may be used once put into service

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

Analyses: (ViCellData schema) The table of analysis results generated by the worklists per sample; may have multiple analyses on a sample after reanalysis

AnalysisIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

AnalysisID\* UUID; reference id for this analysis set

SampleID◇ UUID; reference ID of the sample used to generate this analysis

ImageSetID◇ UUID; the image set from which the images used by this analysis originated

SummaryResultID◆ UUID; the SummaryResultID value of the image result generated by this analysis

SResultID◆ UUID; the SResultID value of the SResult generated by this analysis

RunUserID UUID; the user processing the worklist (starting the queue processing for carousel carrier queues allowing dynamic additions) containing this sample

AnalysisDate time stamp with time zone; ISO date format; 24-hour time format; local time; date and time of the start of the run (e.g. 2017-12-20 13:05:00); specification of the time zone is optional in time string; if not specified, it is extracted from the system settings

InstrumentSN dynamic character array (unlimited); Instrument Serial number or workstation identifier performing the analysis;

BioProcessID◆ UUID; identifier pointing to the bioprocess process used

QcProcessID◆ UUID; identifier pointing to the QC process used

WorkflowID◆ UUID; identifier pointing to the application science workflow process used to acquire/analyze this sample;

ImageSequenceCount small integer; the number of image records were used in the analysis (NOTE: not all image sequences in an image set may be used in an analysis)

ImageSequenceIDList⧺ array of UUID; the ImageSequenceID values of the images used in this analysis (NOTE: not all image sequences in an image set may be used in an analysis)

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

ImageSets: (ViCellData schema) describes the set of images generated for a single sample; may be up to 100 image records per sample

ImageSetIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

ImageSetID\* UUID; the identifier for the set of image records for a sample

SampleID◇ UUID; reference ID of the sample used to generate this image set

CreationDate time stamp with time zone; ISO date format; 24-hour time format; local time; date and time of the start of the run (e.g. 2017-12-20 13:05:00); specification of the time zone is optional in time string; if not specified, it is extracted from the system settings

ImageSetFolder dynamic character array (unlimited); folder container path for all the image files in the set; may be blank for images no longer stored in the system

ImageSequenceCount small integer; the number of image sequence records in the set

ImageSequenceIDList⧺ UUID array; the IDs of all image sequence records in this image set

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

ImageSequences: (ViCellData schema) Information pertaining to each image record taken per sample; image records may contain up to 5 individual images for fluorescence

ImageSequenceIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

ImageSequenceID\* UUID; unique identifier for this image sequence record

ImageSetID◇ UUID; identifier pointing to the sets of images to which this image belongs; each image set represents a ‘sample’

SequenceNum small integer; the order the image was taken in the entire set

ImageCount small integer; the number of images in the record; will be the number of total channels used; may be up to 5 channels with fluorescence, or up to 5 images

FlChannels small integer; the number of fluorescence images in the record; may be up to 4 for fluorescence; number does not include brightfield channel

ImageIDList⧺ array of UUID; the IDs of all images generated for this image record; number of Ids should match FlChannels + 1 (for brightfield);

ImageSequenceFolder dynamic character array (unlimited); folder container name for the image sequence; requires image set folder for complete path

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

ImageReferences: (ViCellData schema) Information pertaining to individual images

ImageIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

ImageID\* UUID; unique identifier for the single image reference by this object

ImageSequenceID◇ UUID; globally-unique reference identifiers pointing to the images representing a single sample image capture sequence

ImageChannel small integer; image channel/illuminator for the image (BF or FL image type/channel);

ImageFileName dynamic character array (max length: 50 characters); the name of the image (default is the image ID converted to text string); may be blank if the image is no longer available;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

SummaryResults: (ViCellData schema)

SummaryResultIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

SummaryResultID\* UUID; reference id for this image analysis summary result set

SampleID◇ UUID; identifier for the sample originating the image record used to generate this result

ImageSetID◇ UUID; identifier for the image set used for this sample result

AnalysisID◇ UUID; reference id for the analysis generating this result

ResultDate time stamp with time zone; ISO date format; 24-hour time format; local time; date and time of the start of the experiment (e.g. 2015-04-23 13:05:00); specification of the time zone is optional in time string; if not specified, it is extracted from the system settings

SignatureList array of ‘signature\_info’ composite data types;

ImageAnalysisParamID◇ UUID; identifier for the image analysis parameters used to generate these results;

AnalysisDefID◇ UUID; identifier for the analysis definition used to generate these results;

AnalysisParamID◇ UUID; identifier for the parameters used to generate these results;

CellTypeID◇ UUID; identifier for the CellType used to generate these results;

CellTypeIndex integer; the index of the cell type used for the analysis generating this Summary result

ProcessingStatus small integer;

TotCumulativeImages small integer;

TotalCellsGP integer; total potential cells blobs found

TotalCellsPOI integer; total cells found representing points of interest (meeting cell type parameters)

POIPopulationPercent float; calculation of the percentage of total cell blobs which are ROI cells

CellConcGP float; concentration of potential cells blobs

CellConcPOI float; concentration of cells found representing points of interest (meeting cell type parameters)

AvgDiamGP float; avg diameter of potential cells blobs

AvgDiamPOI float; avg diameter of cells found representing points of interest (meeting cell type parameters)

AvgCircularityGP float; avg circularity of potential cells blobs

AvgCircularityPOI float; avg circularity of cells found representing points of interest (meeting cell type parameters)

CoefficientOfVariance float;

AvgCellsPerImage small integer;

AvgBkgndIntensity small integer;

TotalBubbleCount small integer; total bubbles detected by the analysis

LargeClusterCount small integer; number of large clusters detected by the analysis

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

DetailedImageResults: (ViCellData schema)

DetailedResultIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

DetailedResultID\* UUID; reference id for this image analysis result set

SampleID◇ UUID; identifier for the sample originating the image record used to generate this result

ImageID◇ UUID; identifier for the image used for this image result

AnalysisID◇ UUID; reference id for the analysis generating this result

OwnerID◇ UUID; identifier for the object owning this image result

ResultDate time stamp with time zone; ISO date format; 24-hour time format; local time; date and time of the start of the experiment (e.g. 2015-04-23 13:05:00); specification of the time zone is optional in time string; if not specified, it is extracted from the system settings

ProcessingStatus small integer;

TotCumulativeImages small integer;

TotalCellsGP integer; total potential cells blobs found

TotalCellsPOI integer; total cells found representing points of interest (meeting cell type parameters)

POIPopulationPercent double; calculation of the percentage of total cell blobs which are ROI cells

CellConcGP double; concentration of potential cells blobs

CellConcPOI double; concentration of cells found representing points of interest (meeting cell type parameters)

AvgDiamGP double; avg diameter of potential cells blobs

AvgDiamPOI double; avg diameter of cells found representing points of interest (meeting cell type parameters)

AvgCircularityGP double; avg circularity of potential cells blobs

AvgCircularityPOI double; avg circularity of cells found representing points of interest (meeting cell type parameters)

AvgSharpnessGP double; avg sharpness of potential cells blobs

AvgSharpnessPOI double; avg sharpness of cells found representing points of interest (meeting cell type parameters)

AvgEccentricityGP double; avg eccentricity of potential cells blobs

AvgEccentricityPOI double; avg eccentricity of cells found representing points of interest (meeting cell type parameters)

AvgAspectRatioGP double; avg aspect ratio of potential cells blobs

AvgAspectRatioPOI double; avg aspect ratio of cells found representing points of interest (meeting cell type parameters)

AvgRoundnessGP double; avg roundness of potential cells blobs

AvgRoundnessPOI double; avg roundness of cells found representing points of interest (meeting cell type parameters)

AvgRawCellSpotBrightnessGP double; avg spot brightness of potential cells blobs

AvgRawCellSpotBrightnessPOI double; avg spot brightness of cells found representing points of interest (meeting cell type parameters)

AvgCellSpotBrightnessGP double; avg spot brightness of potential cells blobs

AvgCellSpotBrightnessPOI double; avg spot brightness of cells found representing points of interest (meeting cell type parameters)

AvgBackgroundIntensity double; avg background intensity for the image

TotalBubbleCount integer; total bubbles detected by the analysis

LargeClusterCount integer; number of large clusters detected by the analysis

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

ImageResults: (ViCellData schema)

ResultIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

ResultID\* UUID; reference id for this image analysis result set

SampleID◇ UUID; identifier for the sample originating the image record used to generate this result

ImageID◇ UUID; identifier for the image record used in this image result

AnalysisID◇ UUID; identifier for the analysis for which these results were generated

ImageSeqNum small integer; the order number for the image in the entire set

DetailedResultID UUID; the ID of the Detailed result for this image result

MaxNumOfPeaksFlChanMap array of ‘int16\_map\_pair’ composite data types; array with each element containing the map identifier, and the sub-map-pair elements {id, first, second}, {id, first, second}, …

NumBlobs small integer;

BlobDataList array of ‘blob\_data’ composite data types; the list of blob data records for the image

NumClusters small integer;

ClusterDataList array of ‘cluster\_data’ composite data types;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

SResults: (ViCellData schema)

SResultIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

SResultID\* UUID; reference id for this image analysis result set

CumulativeDetailedResultID UUID; the ID of the cumulative Detailed result for this image result (represents ALL images in the analysis image set)

ImageResultIdList array of UUIDs; list of ID references for the image result records belonging to this SResult

AnalysisID◇ UUID; identifier for the analysis for which these results were generated

SampleID◇ UUID; identifier for the sample originating the image record used to generate this result

ProcessingSettingsID UUID; the ID of the settings used to generate this SResult

CumulativeMaxNumOfPeaksFlChan array of ‘int16\_map\_pair’ composite data types; array with each element containing the map identifier, and the sub-map-pair elements {id, first, second}, {id, first, second}, …

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

**Parameter Definition tables:**

ImageAnalysisParams: (ViCellInstrument schema)

ImageAnalysisParamIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

ImageAnalysisParamID\* UUID; the image analysis parameter set used to perform this analysis

AlgorithmMode integer;

BubbleMode boolean;

DeclusterMode boolean;

SubPeakAnalysisMode boolean;

DilutionFactor integer;

SizingSlope double;

SizingIntercept double;

ROIXcoords integer;

ROIYcoords integer;

DeclusterAccumulatorThresh integer;

DeclusterMinDistanceThresh integer;

ConcSlope double;

ConcIntercept double;

ConcImageControlCnt integer;

BubbleMinSpotAreaPrcnt integer;

BubbleMinSpotAvgBrightness integer;

BubbleRejectImgAreaPrcnt integer;

VisibleCellSpotArea double;

FlScalableROI double;

FlPeakPercent double;

NominalBkgdLevel double;

BkgdIntensityTolerance double;

CenterSpotMinIntensityLimit double;

PeakIntensitySelectionAreaLimit double;

CellSpotBrightnessExclusionThreshold double;

HotPixelEliminationMode double;

ImgBotAndRightBoundaryAnnotationMode double;

SmallParticleSizingCorrection double;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

AnalysisInputSettings: (ViCellInstrument schema)

SettingsIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

SettingsID\* UUID; the image analysis cell identification input parameter ID for this parameter set

InputConfigParamMap array of input\_config\_params composite data types;

CellIdentParamList array of ‘analysis\_input\_params’ composite data types;

POIIdentParamList array of ‘analysis\_input\_params’ composite data types;

ImageAnalysisCellIdentParams: (ViCellInstrument schema)

IdentParamIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

IdentParamID\* UUID; the image analysis cell identification parameter ID for this tuple set

CharacteristicKey small integer; the identification parameter characteristic key

CharacteristicSubKey small integer; the identification parameter characteristic sub-key

CharacteristicSubSubKey small integer; the identification parameter characteristic sub-sub-key

ParamValue float; the parameter value associated with this configuration characteristic

ValueTest small integer; the logic comparison action used with this characteristic; [ currently only ‘< (‘eBELOW’) and ‘>= (‘eATABOVE’), and eInvalidPolarity are supported ]

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

AnalysisDefinitions: (ViCellInstrument schema)

AnalysisDefinitionIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

AnalysisDefinitionID UUID;

AnalysisDefinitionIndex small integer; BCI-supplied or user-created analysis definition index value; BCI supplied should be the same across all instruments; user-created may have duplicated indices for dissimilar definitions

AnalysisDefinitionName dynamic character array (unlimited); name associated with this definition

NumReagents small integer;

ReagentTypeIndexList array of integers; BCI-defined reagent indices;

MixingCycles small integer;

NumIlluminators small integer;

IlluminatorsIndexList array of small integers; BCI-defined illuminator type indices

NumAnalysisParams small integer;

AnalysisParamIDList array of UUID;

PopulationParamExists boolean; indicator that the optional parameter set is present

PopulationParamID UUID; ID of optional analysis parameters; may be empty;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

AnalysisParams: (ViCellInstrument schema) equivalent to the threshold\_key\_map composite for permanent single data objects

AnalysisParamIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

AnalysisParamID UUID;

IsInitialized boolean;

AnalysisParamLabel dynamic character array (unlimited); name associated with this parameter set

CharacteristicKey small integer;

CharacteristicSubKey small integer;

CharacteristicSubSubKey small integer;

ThresholdValue float;

AboveThreshold boolean;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

**Cell Type tables:**

CellTypes: (ViCellInstrument schema)

CellTypeIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

CellTypeID\* UUID; the ID of this cell type

CellTypeIndex integer; BCI-supplied or user-created cell type index value; BCI supplied should be the same across all instruments; user-created may have duplicated indices for dissimilar cell types

CellTypeName dynamic character array (unlimited); name associated with this cell type

Retired boolean;

MaxImages small integer; maximum number of images acquired for this cell type

AspirationCycles small integer; resuspend/mixing cycles

MinDiamMicron float;

MaxDiamMicron float;

MinCircularity float;

SharpnessLimit float;

NumCellIdentParams small integer;

CellIdentParamIDList array of UUID; list of AnalysisParameter object IDs

DeclusterSetting small integer

RoiExtent float;

RoiXPixels small integer; UI value for exclusion zone at edge of image

RoiYPixels small integer; UI value for exclusion zone at edge of image

NumAnalysisSpecializations small integer;

AnalysisSpecializationsIDList array of UUID; list of AnalysisDefinition object Ids for definitions used by this cell type

CalculationAdjustmentFactor float; calculation adjustment factor for external sample cup (currently not used)

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

**Configuration Information tables:**

InstrumentConfig: (ViCellInstrument schema)

InstrumentIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

InstrumentSN\* dynamic character array (unlimited);

InstrumentType small integer; designator for the instrument type

DeviceName dynamic character array (unlimited);

UIVersion dynamic character array (unlimited);

SoftwareVersion dynamic character array (unlimited);

AnalysisSWVersion dynamic character array (unlimited);

FirmwareVersion dynamic character array (unlimited);

CameraType small integer; designator for the camera type (for model changes or performance differences)

CameraFWVersion dynamic character array (unlimited);

CameraConfig dynamic character array (unlimited);

PumpType small integer; designator for the syringe pump type in the system (for model, performance, and command/control differences)

PumpFWVersion dynamic character array (unlimited);

PumpConfig dynamic character array (unlimited);

IlluminatorsInfoList array of ‘illuminator\_info’ composite data types;

IlluminatorConfig dynamic character array (unlimited); for laser wavelength and layout configuration changes

ConfigType small integer;

LogName dynamic character array (unlimited);

LogMaxSize integer;

LogSensitivity dynamic character array (unlimited);

MaxLogs small integer;

AlwaysFlush boolean;

CameraErrorLogName dynamic character array (unlimited);

CameraErrorLogMaxSize integer;

StorageErrorLogName dynamic character array (unlimited);

StorageErrorLogMaxSize integer;

CarouselThetaHomeOffset integer;

CarouselRadiusOffset integer;

PlateThetaHomePosOffset integer;

PlateThetaCalPos integer;

PlateRadiusCenterPos integer;

SaveImage small integer;

FocusPosition integer;

AutoFocus ‘af\_settings’ composite data type;

AbiMaxImageCount small integer;

SampleNudgeVolume small integer;

SampleNudgeSpeed small integer;

FlowCellDepth float;

FlowCellDepthConstant float;

RfidSim ‘rfid\_sim\_info’ composite data type;

LegacyData boolean;

CarouselSimulator boolean;

NightlyCleanOffset small integer;

LastNightlyClean timestamp without time zone;

SecurityMode small integer;

InactivityTimeout small integer;

PasswordExpiration small integer;

NormalShutdown boolean;

NextAnalysisDefIndex integer;

NextFactoryCellTypeIndex integer;

NextUserCellTypeIndex large integer

SamplesProcessed integer;

DiscardCapacity small integer;

EmailServer ‘email\_settings composite data type;

ADSettings ‘ad\_settings’ composite data type;

LanguageList array of ‘language\_info’ composite data types;

RunOptionDefaults ‘run\_options\_info’ composite data type,

AutomationInstalled boolean;

AutomationEnabled boolean;

AutomationPort integer;

AcupEnabled boolean;

Protected boolean (default = true); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

IlluminatorTypes: (ViCellInstrument schema)

IlluminatorIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

IlluminatorIndex\* small integer; BCI-defined illuminator index value

IlluminatorType small integer; BCI-defined illuminator type value

IlluminatorName dynamic character array (unlimited); name associated with this illuminator

PositionNum small integer; assigned position value in the internal rack

Tolerance float;

MaxVoltage integer;

IlluminatorWavelength small integer; wavelength in nanometers

EmissionWavelength small integer; wavelength of the fluorescence emission for this illuminator

ExposureTimeMs small integer; exposure time is milliseconds

PercentPower small integer;

SimmerVoltage integer;

Ltcd small integer;

Ctld small integer;

FeedbackPhotoDiode small integer;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

Users: (ViCellInstrument schema)

UserIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

UserID\* UUID; ID for this user

Retired boolean; preserve previous user entries to prevent duplicate / reused usernames

ADUser boolean;

RoleID⧺ UUID; ID of the role for this user

UserName dynamic character array (unlimited); name associated with this user; should not allow duplicate names;

Pre-populated names will ONLY include the factory\_admin administrative-level user;

DisplayName dynamic character array (unlimited); display name associated with this user; should not allow duplicate names;

Comments dynamic character array (unlimited);

UserEmail dynamic character array (unlimited);

AuthenticatorList array of character arrays; contains the hashed passwords for the user; maximum number of entries is 11 (current + 10 history), but is not enforced by the database;

AuthenticatorDate timestamp without timezone; date of last password change for password aging

LastLogin timestamp without timezone; date of last login attempt for failed login limiting

AttemptCount small integer;

LanguageCode dynamic character array (unlimited); language indicator for per-user UI screen text customization

DefaultSampleName dynamic character array (unlimited); for per-user analysis configuration defaults

SaveNthImage small integer; default image decimation value for image saving

DisplayColumns array of ‘column\_display\_info’ composite data types; for per-user screen configuration

DecimalPrecision small integer;

ExportFolder dynamic character array (unlimited);

DefaultResultFileName dynamic character array (unlimited);

CSVFolder dynamic character array (unlimited),

PdfExport boolean; controls automatic PDF export for per-user configuration

AllowFastMode boolean; controls use of fast mode

WashType small integer; default per-user configuration

Dilution small integer; default per-user configuration

DefaultCellTypeIndex small integer; default per-user configuration

NumUserCellTypes small integer; default per-user configuration

UserCellTypeIndexList array of integer; default per-user configuration;

UserAnalysisDefIndexList array of integer; default per-user configuration

NumUserProperties small integer; default per-user configuration

UserPropertiesIndexList array of small integers; currently not used

AppPermissions large integer; bit-field for allowed actions;

AppPermissionsHash dynamic character array (unlimited); hash of the user application permissions

InstrumentPermissions large integer; bit-field for allowed actions;

InstrumentPermissionsHash dynamic character array (unlimited); hash of the user instrument permissions

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

UserProperties: (ViCellInstrument schema) (currently not used)

PropertyIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

PropertyIndex\* integer; BCI defined protected property index values; also allow user properties to be added (BCI = 0x1-0x1fffffff; customer = 0x20000000 – 0xffffffff)

PropertyName dynamic character array (unlimited); name associated with this property; (e.g. UserType, Analysis, CellType)

PropertyType small integer; BCI defined property values; generic groupings (e.g. for UserType: normal user, elevated, admin, service)

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

Roles: (ViCellInstrument schema)

RoleIdNum serialized large integer; aid for sorting that provides sequential sorting and identification

RoleID\* UUID; ID for this user role

RoleName dynamic character array (unlimited); name associated with this role

Pre-configured role-names will be:

‘DefaultAdmin’, ‘DefaultElevated’, ‘DefaultUser’

RoleType small integer; BCI defined bit-field values; generic groupings (e.g. for normal user role, elevated user role, admin user role)

GroupMapList array of dynamic character array (unlimited); mapping list to map Active Directory roles to instrument roles (currently only one AD role per instrument role)

CellTypeIndexList array of integersl; the default cell types allowed for this role type;

ValueIDList array of UUID; list of the IDs of the listed values, where necessary; may be empty

InstrumentPermissions integer; BCI defined permissions; instrument-related permission value bitfield (currently not used)

ApplicationPermissions integer; BCI defined permissions; application-related permission value bitfield (currently not used)

Protected boolean (default = true); roles must be present for the user records that reference them; the BCI supplied default roles correspond to the current instrument permission levels and must not be deleted;

UserAuthentication: (ViCellInstrument schema)

AuthenticatorID\* UUID; ID for this user role

UserID UUID; ID for the user owning this authenticator

AuthenticationValue dynamic character array (unlimited); encrypted authentication value

CreationDate timestamp without timezone; creation date of this authenticator

ExpirationDays small integer; for password aging policy

Retired boolean; preserve history of authentication values to enforce reuse policies

SignatureDefinitions: (ViCellInstrument schema)

SignatureDefIdNum

SignatureDefID\* UUID;

ShortSignature dynamic character array (unlimited); short encrypted signature for the user

ShortSignatureHash dynamic character array (unlimited); the hashed value of the short signature to prevent tampering

LongSignature dynamic character array (unlimited); long encrypted signature for the user

LongSignature Hash dynamic character array (unlimited); the hashed value of the long signature to prevent tampering

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

ReagentInfo: (ViCellInstrument schema)

ReagentIdNum serialized large integer; aid for sorting that provides sequential sorting and identification and organization of BCI-provided default reagent type descriptions

ReagentTypeNum small integer; BCI-defined reagent type

Current boolean; designator for the currently installed reagent pack

ContainerTagSN dynamic character array (unlimited); represents the unique serial number of the RFID tag in the reagent pack

ReagentIndexList array of small integers; list of the indices of the individual reagents in the pack; should correspond to the bottle locations within the pack (or the door positions for future use)

ReagentNameList array of dynamic character array (unlimited); list of the names of the reagents in a reagent pack

MixingCycles array of small integers; indicates the specified number of mixing cycles required to perform the intended chemistry using the reagent

PackPartNum dynamic character array (unlimited); the part number of the pack (may be blank for pre-defined reagent descriptions)

LotNum dynamic character array (unlimited); (may be blank for pre-defined reagent descriptions)

LotExpiration large integer; represents the whole day value of the expiration date, to avoid timezone shifiting

InService large integer; represents the whole day value of the date the pack was placed in service, to avoid timezone shifiting

ServiceLife small integer; maximum number of days for in-service use; effective use may be limited by the pack expiration date

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

Calibrations: (ViCellInstrument schema)

CalibrationIdNum serialized large integer; aid for sorting that provides sequential sorting and identification and organization of BCI-provided default reagent type descriptions

CalibrationID UUID

InstrumentSN dynamic character array (unlimited); Instrument Serial number processing the calibration;

CalibrationDate timestamp without time zone;

CalibrationUserID UUID;

CalibrationType small integer;

Slope double;

Intercept double;

ImageCount small integer;

CalQueueID UUID; the worklist used to process this calibration

ConsumablesList array of ‘cal\_consumable’ composite data types;

Protected boolean (default = true);

SystemLogs: (ViCellInstrument schema)

EntryIdNum serialized large integer; aid for sorting that provides sequential sorting and identification and organization of BCI-provided default reagent type descriptions

EntryType small integer; designates the type of entry from Audit log entry, Error log entry, and Sample log entry

EntryDate timestamp without timezone;

EntryText dynamic character array (unlimited); log entry text; may be encoded

Protected boolean (default depends on the log-type);

**Workflow Sequence tables:**

Workflows: (ViCellInstrument schema) Defines the processing steps for a particular type of science to be performed on a sample

WorkflowIdNum serialized large integer; aid for sorting that provides sequential sorting and identification and organization of BCI-provided workflow types

WorkflowID\* UUID; the ID of this workflow sequence

WorkflowName dynamic character array (unlimited); name associated with this workflow

ReagentTypeList array of integers;

WorkflowSequenceControl dynamic character array (unlimited); operational sequence instructions carriage-return/line-feed delimited text format

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

**Process Information tables:**

BioProcesses: (ViCellInstrument schema) Defines the processing steps for a particular type of bioprocess science to be performed on a sample or set of samples

BioProcessIdNum serialized large integer; aid for sorting that provides sequential sorting and identification and organization of bio-process types

BioProcessID\* UUID; the ID of this bioprocess

BioProcessName dynamic character array (unlimited); name associated with this bioprocess

BioProcessSequence dynamic character array (unlimited); operational sequence instructions carriage-return/line-feed delimited text format

ReactorName dynamic character array (unlimited); name associated with this process reactor (may be equivalent to the VatID)

CellTypeID◇ UUID; cell type reference id for this process

CellTypeIndex integer; BCI-supplied or user-created cell type index value;

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;

QcProcesses: (ViCellInstrument schema) Defines the processing steps for a particular type of QC process on a sample or set of samples

QcIdNum serialized large integer; aid for sorting that provides sequential sorting and identification and organization

QcID\* UUID; the ID of this QC process

QcName dynamic character array (unlimited); name associated with this QC process

QcType small integer; the designation for QC type (concentration, population, size);

CellTypeID◇ UUID; cell type reference id for this process

LotInfo dynamic character array (unlimited); description of the lot associated with this QC process

LotExpiration time stamp with time zone; ISO date format; 24-hour time format; local time; date and time of the start of the run (e.g. 2017-12-20 13:05:00); No the time zone specification included;

AssayValue double;

AllowablePercentage double;

QcSequence dynamic character array (unlimited); operational sequence instructions carriage-return/line-feed delimited text format

Comments dynamic character array (unlimited);

Protected boolean (default = false); part of the default table-set provided and should not be deleted; not user settable; used for the default values row in a table; may also be used for a set of entries provided by BEC which define required default conditions and must not be deleted;