BRAINLAB

Technical Publication

DICOM Conformance Statement

ExacTrac Vero 3.5

Document Revision 1

December 18, 2013

1 Conformance Statement Overview

This is a conformance statement for the Brainlab ExacTrac Vero software.

The DICOM import part of the application is:
- Query remote Brainlab DICOM Proxy (see [2]) archives.
- Retrieve DICOM data from DICOM Proxy archives.

What is not part of ExacTrac Vero:

- There is no direct way e.g. to read DICOM files and send them to a remote system.
- ExacTrac Vero itself has no permanent DICOM Storage SCP to receive data at any time. This feature is provided by the Brainlab DICOM Proxy (see [2]).

SOP Classes	User Of Service (SCU)	Provider Of Service (SCP)
Transfer		
CT Image Storage	No	Yes
RT Structure Set Storage	No	Yes
RT Plan Storage	No	Yes

Table 1-1: Network services supported by ExacTrac Vero

ExacTrac Vero is embedded into the Brainlab Workflow Services:

Brainlab Workflow Service	User Of Service (SCU)	Provider Of Service (SCP)
Request Instances	Yes	No
Task Notification	Yes	No

Table 1-2: Brainlab Workflow Services supported by Quentry

The Brainlab Workflow services are described in the Conformance Statements of DICOM Proxy (see [2]) and are not part of this Conformance Statement.

2 Table of Contents

3 Introduction

3.1 Revision History

Document Version	Date of Issue	Author	Description
1	December 1, 2014		Initial release for ExacTrac Vero 3.5

3.2 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3.3 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between Brainlab and non–Brainlab equipment.
- This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended. An acceptance protocol is available to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements. Brainlab reserves the right to make changes to its products or to discontinue its delivery.

3.4 Abbreviations

There are a variety of terms and abbreviations used in the document that are defined in the DICOM Standard. Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
IOD	(DICOM) Information Object Definition
ISO	International Standard Organization
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
TPS	Treatment Planning System

3.5 References

[1] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.1-3.18 – 2009
[2] DICOM Conformance Statement DICOM Proxy, Brainlab AG

4 Networking

4.1 Implementation Model

The ExacTrac Vero application is embedded in the Brainlab workflow infrastructure. This infrastructure is provided and maintained by the DICOM Proxy. It provides the DICOM Storage and Query/Retrieve to communicate with the world outside and the Brainlab Workflow services to communicate with the ExacTrac Vero application.

The ExacTrac Vero application communicates only with the DICOM Proxy and uses the following activities to interact with the DICOM Proxy:

- *Notify*
  The DICOM Proxy notifies registered applications about received DICOM instances.
- *Request Instances*
  The DICOM Proxy provides the DICOM Query/Retrieve C-GET service as SCP.
- *Read Task*
  The DICOM Proxy maintains Unified Procedure Step Tasks which an application may read.

Please refer to the Conformance Statements of DICOM Proxy (see [2]) for a detailed description of these activities. This DICOM Conformance Statement concentrates on the ExacTrac Vero application and data it reads.

4.1.1 Application Data Flow Diagram

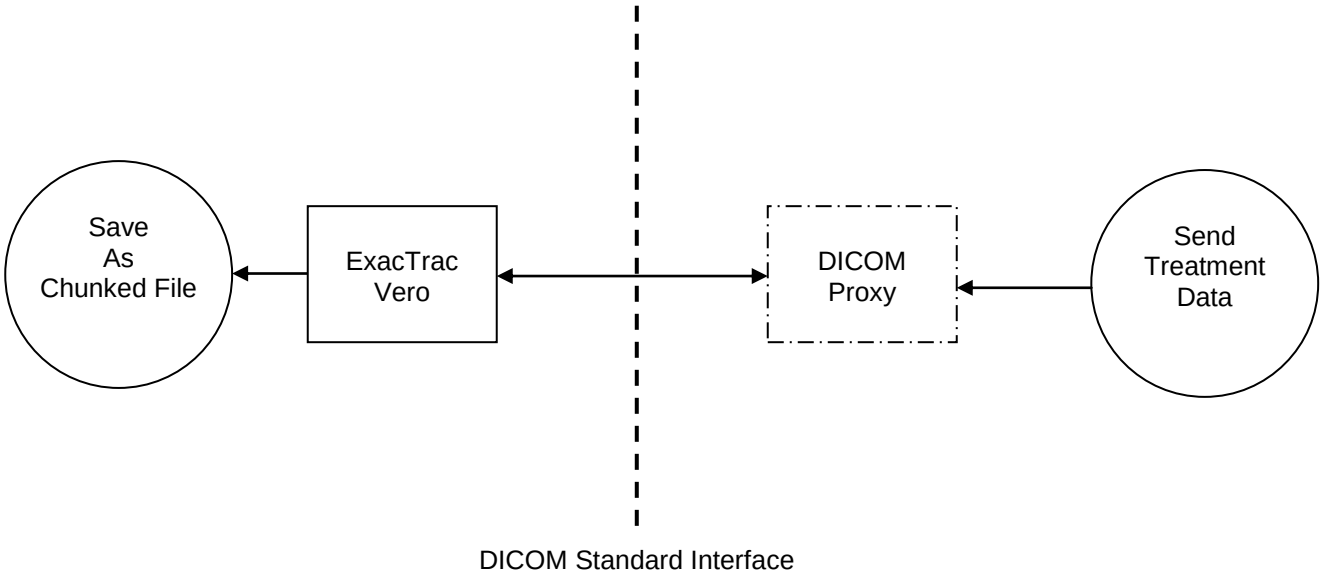

Figure 4-1: The ExacTrac Vero flow diagram

4.1.2 Functional Definition of Application Entity (AE)

Some communications and data transfer with remote AEs are accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack.

- **ExacTrac Vero**:
  The ExacTrac Vero is automatically notified by the DICOM Proxy about available treatment data. It starts retrieving the corresponding data sets (CT, RT Plan and RT Structure Set) and converts them to the Brainlab Chunked File Format (chunked).

Additional application entities that are not part of this Conformance Statement:

- **DICOM Proxy**:
  A service which acts as proxy between the ExacTrac Vero application and the DICOM world outside of Brainlab.

4.1.3 Sequencing Of Real World Activities

The ExacTrac Vero application depends on the Brainlab workflow services. These services are not part of this Conformance Statement and are described in the DICOM Proxy (see [2]). But to understand the basic workflow this section shortly announces some of the aspects.

The ExacTrac Vero application is embedded in a sequencing of real-world activities as follows:

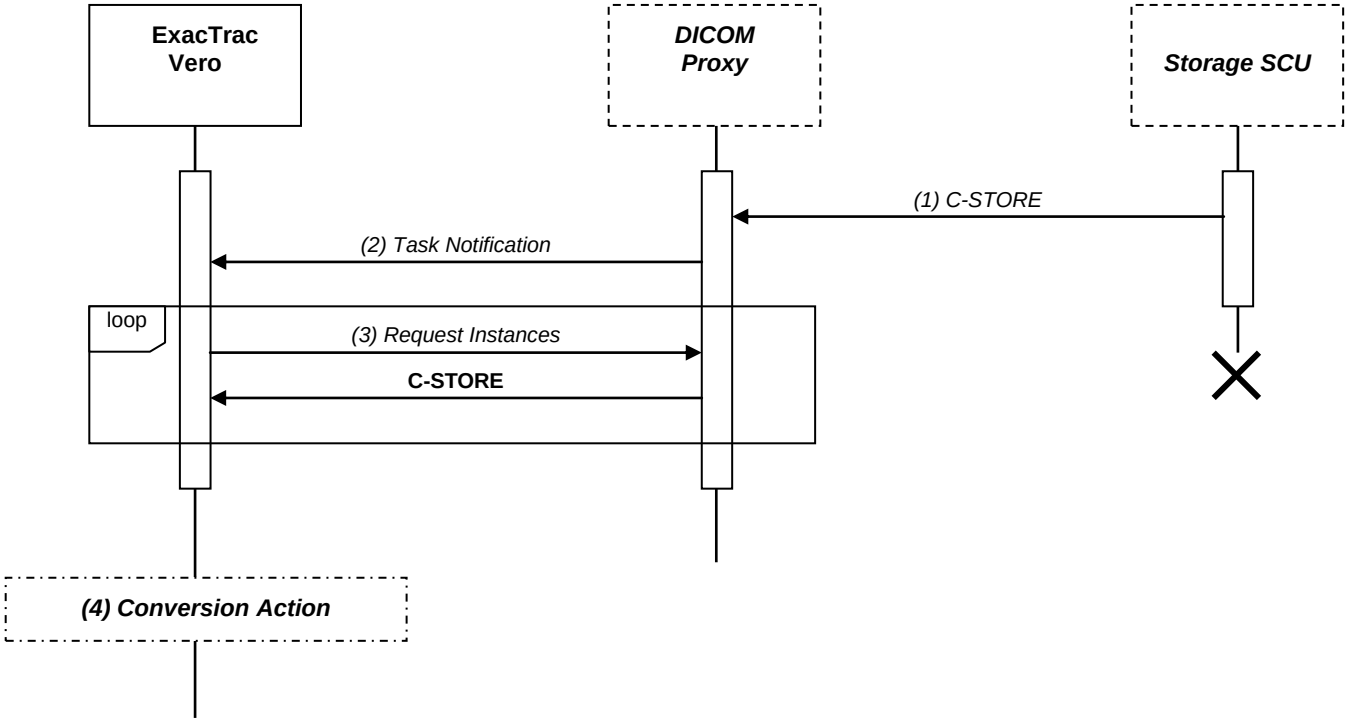

Figure 4-2: Sequencing of DICOM Proxy and ExacTrac Vero

(1) DICOM Proxy receives DICOM instances:
a) Receive DICOM Storage C-STORE requests.

b) Send DICOM Storage C-STORE responses

(2) Notify registered ExacTrac Vero about new task.

(3) The ExacTrac Vero may request these instances:

a) Receive DICOM Storage C-STORE requests with the requested instances.
b) Send DICOM Storage C-STORE responses.

(4) Conversion

4.2 Application Entity Specifications

4.2.1 ExacTrac Vero Specification

4.2.1.1 SOP Classes and Transfer Syntaxes

ExacTrac Vero sends or receives a C-ECHO request in order to test the connection to a remote AE. It provides standard conformance to the following DICOM V3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes

Table 4-1: Supported Verification SOP Classes

ExacTrac Vero imports DICOM image data. It provides Standard Conformance to the following DICOM V3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	No	Yes

Table 4-2: Supported Storage SOP Classes

ExacTrac Vero supports the following transfer syntaxes. In an association negotiation the syntaxes are proposed in the order of appearance in the list.

Transfer Syntax Name	Transfer Syntax UID	SCU	SCP	Extended Negotiation
DICOM Implicit VR Little Endian	1.2.840.10008.1.2	Yes	Yes	None
DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	Yes	None
DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	Yes	Yes	None

Table 4-3: Supported Transfer Syntaxes (association negotiation)

4.2.1.2 Association Policies

4.2.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1

Number of Associations

For both association initiation and acceptance:

Maximum number of simultaneous Associations	1

Asynchronous Nature

ExacTrac Vero does not support asynchronous communication (multiple outstanding transactions over a single association).

Maximum number of outstanding asynchronous transactions	1

4.2.1.2.2 Implementation Identifying Information

The implementation information for this Application Entity is:

Implementation Class UID	1.2.276.0.20.1.1.43.1.0.1
Implementation Version Name	Chunkifier1.0

4.2.1.2.3 Association Initiation Policy

ExacTrac Vero initiates no association beside the Brainlab Workflow services.

4.2.1.2.4 Association Acceptance Policy

ExacTrac Vero accepts an association in this case:

1. *Retrieve Instances*:
   After notification of the ExacTrac Vero all referenced instances shall be retrieved from the DICOM Proxy.

4.2.1.2.4.1 Activity – Retrieve Instances

4.2.1.2.4.1.1 Description and Sequencing of Activities

When ExacTrac Vero was notified about new treatment data it initiates a retrieval of all the instances from the DICOM Proxy and waits for a number of storage requests.

4.2.1.2.4.1.2 Accepted Presentation Contexts

Presentation Context Table			
Abstract Syntax	**Transfer Syntax**	**Role**	**Ext. Neg.**
All SCU SOP Classes listed in Table 4-2	All SCU Transfer Syntaxes as listed in Table 4-3	SCU	None
		SCU	None
		SCU	None

Table 4-4: Proposed Presentation Contexts

4.2.1.2.4.1.3 SOP Specific Conformance

ExacTrac Vero provides standard conformance to the DICOM Storage SOP Classes. No extended negotiation is implemented.

See section 8.1 for further information on acceptance of CT, RT Plan and RT Structure Set IODs.

4.3 Network Interfaces

4.3.1 Physical Network Interface

ExacTrac Vero supports the DICOM upper layer using TCP/IP. ExacTrac Vero is indifferent to the physical medium over which TCP/IP executes. It inherits this from the operating system upon which it executes.

4.3.2 Additional Protocols

The usage of DNS and DHCP is possible and is based on the network configuration of the operating system upon which ExacTrac Vero executes.

4.4 Configuration

ExacTrac Vero has no own configuration of AETs and ports. All configuration parameters are automatically assigned during the registration process at the DICOM Proxy.

5 Media Interchange

ExacTrac Vero does not support DICOM media interchange.

6 Support of Extended Character Sets

ExacTrac Vero supports the

- ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set)

7 Security Profiles

No security profiles are supported.

8 Annexes

8.1 IOD Contents

8.1.1 Supported IODs

8.1.1.1 Imported IODs

8.1.1.1.1 Computed Tomography Image

IE	Module	Reference	Support
Patient	Patient	Table 8-4	
	Clinical Trial Subject	-	Not supported
Study	General Study	Table 8-5	
	Patient Study	Table 8-6	
	Clinical Trial Study	-	Not supported
Series	General Series	Table 8-7	
	Clinical Trial Series	-	Not supported
Frame of Reference	Frame of Reference	Table 8-9	
Equipment	General Equipment	Table 8-10	
Image	General Image	Table 8-11	
	Image Plane	Table 8-16	
	Image Pixel	Table 8-12	
	Device	Table 8-12	
	CT Image	Table 8-15	
	VOI LUT	Table 8-13	
	SOP Common	Table 8-14	

Table 8-1: CT Image Storage IOD

8.1.1.1.2 RT Structure Set

IE	Module	Reference	Support
Patient	Patient	Table 8-4	
	Clinical Trial Subject	-	Not supported
Study	General Study	Table 8-5	
	Patient Study	Table 8-6	
	Clinical Trial Study	-	Not supported
Series	RT Series	Table 8-8	
	Clinical Trial Series	-	Not supported
Equipment	General Equipment	Table 8-10	
Structure Set	Structure Set	Table 8-18	
	ROI Contour	Table 8-19	
	RT ROI Observations	Table 8-20	
	Approval	-	Not supported
	SOP Common	Table 8-14	

Table 8-2: RT Structure Set Storage IOD

8.1.1.1.3 RT Plan

IE	Module	Reference	Support
Patient	Patient	Table 8-4	
	Clinical Trial Subject	-	Not supported
Study	General Study	Table 8-5	
	Patient Study	Table 8-6	
	Clinical Trial Study	-	Not supported
Series	RT Series	Table 8-8	
	Clinical Trial Series	-	Not supported
Frame of Reference	Frame of Reference	Table 8-9	
Equipment	General Equipment	Table 8-10	
Plan	RT General Plan Module	Table 8-22	
	RT Prescription Module	Table 8-23	
	RT Tolerance Tables	-	Not supported
	RT Patient Setup	Table 8-24	
	RT Fraction Scheme	Table 8-25	
	RT Beams Module	Table 8-26	
	Approval	-	Not supported
	SOP Common	Table 8-14	

Table 8-3: RT Plan Storage IOD

8.1.2 Supported Modules

8.1.2.1 Imported Modules

8.1.2.1.1 Patient

Attribute Name	Tag	VR	Import
Patient's Name	0010,0010	PN	Used to create internal patient information
Patient ID	0010,0020	LO	Used to create internal patient information
Patient's Birth Date	0010,0030	DA	
Patient's Sex	0010,0040	CS	

Table 8-4: Patient Module

8.1.2.1.2 General Study

Attribute Name	Tag	VR	Import
Study Instance UID	0020,000D	UI	
Study Date	0008,0020	DA	
Referring Physician's Name	0008,0090	PN	
Study ID	0020,0010	SH	
Study Description	0008,1030	LO	

Table 8-5: General Study Module

8.1.2.1.3 Patient Study

Attribute Name	Tag	VR	Import
Patient’s Height	0010,1020	DS	
Patient’s Weight	0010,1030	DS	

Table 8-6: Patient Study Module

8.1.2.1.4 General Series

Attribute Name	Tag	VR	Import
Modality	0008,0060	CS	
Series Instance UID	0020,000E	UI	
Series Number	0020,0011	IS	
Series Date	0008,0021	DA	
Series Time	0008,0031	TM	
Series Description	0008,103E	LO	
Patient Position	0018,5100	DA	Prone and supine orientations only.

Table 8-7: General Series Module

8.1.2.1.5 RT Series Module

Attribute Name	Tag	VR	Import
Modality	0008,0060	CS	Only "RTPLAN" or "RTSTRUCT"
Series Instance UID	0020,000E	UI	
Series Number	0020,0011	IS	
Series Description	0008,103E	LO	

Table 8-8: RT Series Module

8.1.2.1.6 Frame Of Reference

Attribute Name	Tag	VR	Import
Frame of Reference UID	0020,0052	UI	If not provided in RTPLAN then RTSTRUCT must have a single CT referenced (frame of reference).
Position Reference Indicator	0020,1040	LO	

Table 8-9: Frame of Reference Module

8.1.2.1.7 General Equipment

Attribute Name	Tag	VR	Import
Manufacturer	0008,0070	LO	
Station Name	0008,1010	SH	
Manufacturer's Model Name	0008,1090	LO	
Software Version(s)	0018,1020	LO	

Table 8-10: General Equipment Module

8.1.2.1.8 General Image

Attribute Name	Tag	VR	Import
Instance Number	0020,0013	IS	
Content Date	0008,0023	DA	
Content Time	0008,0033	TM	
Referenced Image Sequence	0008,1140	SQ	
>Include 'Image SOP Instance Reference Macro' Table 10-3			

Table 8-11: General Image Module

8.1.2.1.9 Image Pixel

Attribute Name	Tag	VR	Import
Rows	0028,0010	US	Even values only
Columns	0028,0011	US	Even values only
Pixel Data	7FE0,0010	OB OW	

Table 8-12: Image Pixel Module

8.1.2.1.10 VOI LUT

Attribute Name	Tag	VR	Import
Window Center	0028,1050	DS	
Window Width	0028,1051	DS	

Table 8-13: VOI LUT Module

8.1.2.1.11 SOP Common

Attribute Name	Tag	VR	Import
SOP Class UID	0008,0016	DS	
SOP Instance UID	0008,0018	DS	
Specific Character Set	0008,0005	CS	
Instance Creation Date	0008,0012	DA	
Instance Creation Time	0008,0013	TM	

Table 8-14: SOP Common Module

8.1.2.2 Imported Modules

8.1.2.2.1 CT Image

Attribute Name	Tag	VR	Import
Image Type	0008,0008	CS	If type is LOCALIZED Device Sequence is parsed for Localizer Definitions.
Samples per Pixel	0028,0002	US	
Photometric Interpretation	0028,0004	CS	
Bits Allocated	0028,0100	US	
Bits Stored	0028,0101	US	
High Bit	0028,0102	US	
Pixel Representation	0028,0103	US	
Rescale Intercept	0028,1052	DS	
Rescale Slope	0028,1053	DS	
KVP	0018,0060	DS	
Acquisition Number	0020,0012	IS	

Table 8-15: CT Image Module

8.1.2.2.2 Image Plane

Attribute Name	Tag	VR	Import
Pixel Spacing	0028,0030	DS	Pixels must be square.
Image Orientation (Patient)	0020,0037	DS	Axial orientation must not be more than 3° angulated if image type is not LOCALIZED.
Image Position (Patient)	0020,0032	DS	CT scan length within 1024 mm and up to 400 images.
Slice Thickness	0018,0050	DS	

Table 8-16: Image Plane Module

8.1.2.2.3 Device

Attribute Name	Tag	VR	Import
Device Sequence	0050,0010	SQ	
>Include 'Code Sequence Macro'			Baseline CID 4051 (see chapter 8.3 for details)
>Device ID	0018,1003	LO	Only LOC_BL_HN is supported if Code Meaning is Localizer.
>Device Description	0050,0020	LO	

Table 8-17: Device Module

8.1.2.2.4 Structure Set Module

Attribute Name	Tag	VR	Import
Structure Set Label	3006,0002	SH	
Structure Set Name	3006,0004	LO	
Structure Set Description	3006,0006	ST	
Instance Number	0020,0013	IS	
Structure Set Date	3006,0008	DA	
Structure Set Time	3006,0009	TM	
Referenced Frame of Reference Sequence	3006,0010	SQ	Only one item is permitted in this sequence if no Frame of Reference is specified by RTPLAN.
>Frame of Reference UID	0020,0052	UI	
>RT Referenced Study Sequence	3006,0012	SQ	

Attribute Name	Tag	VR	Import
>>Referenced SOP Class UID	0008,1150	UI	Must reference the SOP Class for image modality CT.
>>Referenced SOP Instance UID	0008,1155	UI	
>>RT Referenced Series Sequence	3006,0014	SQ	
>>Series Instance UID	0020,000E	UI	
>>>Contour Image Sequence	3006,0016	SQ	
>>>>Referenced SOP Class UID	0008,1150	UI	
>>>>Referenced SOP Instance UID	0008,1155	UI	
Structure Set ROI Sequence	3006,0020	SQ	Up to 48 ROIs are permitted in this sequence. Maximum number of ROIs is configurable. Interpreted Type is evaluated to prioritize import of certain ROIs.
>ROI Number	3006,0022	IS	
>Referenced Frame of Reference UID	3006,0024	UI	
>ROI Name	3006,0026	LO	Only the first 22 characters are displayed.
>ROI Volume	3006,002C	DS	
>ROI Generation Algorithm	3006,0038	CS	

Table 8-18: Structure Set Module

8.1.2.2.5 ROI Contour Module

Attribute Name	Tag	VR	Import
ROI Contour Sequence	3006,0039	SQ	
>Referenced ROI Number	3006,0084	IS	
>ROI Display Color	3006,002A	IS	
>Contour Sequence	3006,0040	SQ	
>>Contour Number	3006,0048	IS	
>>Contour Image Sequence	3006,0016	SQ	
>>>Referenced SOP Class UID	0008,1150	UI	Must be "1.2.840.10008.5.1.4.1.1.2"
>>>Referenced SOP Instance UID	0008,1155	UI	
>>Contour Geometric Type	3006,0042	CS	Only “CLOSED_PLANAR” is supported
>>Contour Offset Vector	3006,0045	DS	If value is provided it must be 0.0.
>>Number of Contour Points	3006,0046	IS	
>>Contour Data	3006,0050	DS	Distance of contour data to referenced CT image must be less than 0.1 mm or must be within half slice thickness if slice thickness is provided.

Table 8-19: ROI Contour Module

8.1.2.2.6 ROI Observations Module

Attribute Name	Tag	VR	Import
RT ROI Observations Sequence	3006,0080	SQ	
>Observation Number	3006,0082	IS	

Attribute Name	Tag	VR	Import
>Referenced ROI Number	3006,0084	IS	
>RT ROI Interpreted Type	3006,00A4	CS	ROIs of type “EXTERNAL” are prioritized during import by default. Further exclude types can be configured. ROIs of types “PTV”, “AVOIDANCE”, “CTV”, “ORGAN" is by default imported prioritized. Further types can be configured.
>ROI Interpreter	3006,00A6	PN	

Table 8-20: RT ROI Observations Module

8.1.2.2.7 Approval Module

Attribute Name	Tag	VR	Import
Approval Status	300E,0002	CS	Only if the status is APPROVED all of the following attributes must be available: Review Date, Review Time and Reviewer Name so that the approval status is displayed in the patient case comment.
Review Date	300E,0004	DA	
Review Time	300E,0005	TM	
Reviewer Name	300R,0008	PN	

Table 8-21: Approval Module

8.1.2.2.8 RT General Plan Module

Attribute Name	Tag	VR	Import
RT Plan Label	300A,0002	LO	Used for plan identification in patient case comment.
RT Plan Name	300A,0003	SH	Used for plan identification in patient case comment if RT Plan Label is empty.
RT Plan Description	300A,0004	ST	
Instance Number	0020,0013	IS	
Operators’ Name	0008,1070	PN	
RT Plan Date	300A,0006	DA	
RT Plan Time	300A,0007	TM	
Plan Intent	300A,000A	CS	Not used.
RT Plan Geometry	300A,000C	CS	Geometry must be “PATIENT”.
Referenced Structure Set Sequence	300C,0060	SQ	
>Referenced SOP Class UID	0008,1150	UI	
>Referenced SOP Instance UID	0008,1155	UI	
Referenced RT Plan Sequence	300C,0002	SQ	(see Note 8-1) ExacTrac Vero requires at least 1 entry with Plan Relationship "EQUIVALENT".
>Referenced SOP Class UID	0008,1150	UI	
>Referenced SOP Instance UID	0008,1155	UI	
>RT Plan Relationship	300A,0055	CS	(see Note 8-1)
>Private Creator Code	300B,00xx	LO	Brainlab - ONC - Beam Parameters
>Referenced Beam List	300B,xx10	IS	

Table 8-22: RT General Plan Module

Note 8-1: ExacTrac Vero supports only one conceptual plan in one plan instance. In case a conceptual plan is split into several instances, ExacTrac Vero also supports the Defined Term "EQUIVALENT". This way, several equivalent plans can be listed in the Referenced RT Plan Sequence (which may be linked to each other using the standard term CONCURRENT) in order to describe that these concurrent plans in total equal a single treatment plan instance.

8.1.2.2.9 RT Prescription Module

Attribute Name	Tag	VR	Import
Dose Reference Sequence	300A,0010	SQ	
>Dose Reference Number	300A,0022	IS	
>Dose Reference Structure Type	300A,0014	CS	
>Dose Reference Description	300A,0016	ST	
>Referenced ROI Number	3006,0084	IS	For automatic isocenter PTV assignment to find ROI in RTSTRUCT.
>Dose Reference Type	300A,0020	CS	Not used.

Table 8-23: RT Prescription Module

8.1.2.2.10 RT Patient Setup Module

Attribute Name	Tag	VR	Import
Patient Setup Sequence	300A,0180	SQ	
>Patient Setup Number	300A,0182	IS	
>Patient Setup Label	300A,0183	LO	Not used.
>Patient Position	0018,5100	CS	Only head-first prone orientations are allowed.

Table 8-24: RT Patient Setup Module

8.1.2.2.11 RT Fraction Scheme Module

Attribute Name	Tag	VR	Import
Fraction Group Sequence	300A,0070	SQ	
>Fraction Group Number	300A,0071	IS	
>Referenced Dose Reference Sequence	300C,0050	SQ	
>>Referenced Dose Reference Number	300C,0051	IS	Used to assign isocenter positions to target volumes.
>Number of Beams	300A,0080	IS	
>Referenced Beam Sequence	300C,0004	SQ	
>>Referenced Beam Number	300C,0006	IS	

Table 8-25: RT Fraction Scheme Module

8.1.2.2.12 RT Beams Module

Attribute Name	Tag	VR	Import
Beam Sequence	300A,00B0	SQ	
>Beam Number	300A,00C0	IS	
>Beam Name	300A,00C2	LO	Used to identify isocenters from 3rd party TPS. Note: Plan can only be loaded from 3rd party if ExacTrac

Attribute Name	Tag	VR	Import
			isocenter name (constructed from beam names by Dcm2chk) corresponds to beam description of MHI Vero plan).
>Beam Description	300A,00C3	LO	Used to identify isocenters from iPlan RT TPS of Brainlab
>Beam Type	300A,00C4	CS	
>Radiation Type	300A,00C6	CS	Not used.
>Treatment Machine Name	300A,00B2	SH	
>Manufacturer	0008,0070	LO	
>Institution Name	0008,0080	LO	
>Institutional Department Name	0008,1040	LO	
>Manufacturer's Model Name	0008,1090	LO	
>Primary Dosimeter Unit	300A,00B3	CS	Not used.
>Source-Axis Distance	300A,00B4	DS	
>Beam Limiting Device Sequence	300A,00B6	SQ	
>>RT Beam Limiting Device Type	300A,00B8	CS	
>>Number of Leaf/Jaw Pairs	300A,00BC	IS	
>>Leaf Position Boundaries	300A,00BE	DS	
>Referenced Patient Setup Number	300C,006A	IS	
>Treatment Delivery Type	300A,00CE	CS	For automatic isocenter PTV assignment only "TREATMENT" beams are used.
>Number of Wedges	300A,00D0	IS	
>Number of Blocks	300A,00F0	IS	
>Number of Compensators	300A,00E0	IS	
>Number of Boli	300A,00ED	IS	
>Final Cumulative Meterset Weight	300A,010E	DS	
>Number of Control Points	300A,0110	IS	
>Control Point Sequence	300A,0111	SQ	
>>Control Point Index	300A,0112	IS	
>>Cumulative Meterset Weight	300A,0134	DS	
>>Referenced Dose Reference Sequence	300C,0050	SQ	
>>>Referenced Dose Reference Number	300C,0051	IS	Only used by automatic isocenter PTV assignment to find related target volume for this beam.
>>>Cumulative Dose Reference Coefficient	300A,010C	DS	
>>Nominal Beam Energy	300A,0114	DS	
>>Dose Rate Set	300A,0115	DS	
>>Beam Limiting Device Position Sequence	300A,011A	SQ	
>>>RT Beam Limiting Device Type	300A,00B8	CS	
>>>Leaf/Jaw Positions	300A,011C	DS	
>>Gantry Angle	300A,011E	DS	
>>Gantry Rotation Direction	300A,011F	CS	
>>Beam Limiting Device Angle	300A,0120	DS	

Attribute Name	Tag	VR	Import
>>Beam Limiting Device Rotation Direction	300A,0121	CS	
>>Patient Support Angle	300A,0122	DS	
>>Patient Support Rotation Direction	300A,0123	CS	
>>Table Top Eccentric Angle	300A,0125	DS	
>>Table Top Eccentric Rotation Direction	300A,0126	CS	
>>Table Top Pitch Angle	300A,0140	DS	
>>Table Top Pitch Rotation Direction	300A,0142	CS	
>>Table Top Roll Angle	300A,0144	DS	
>>Table Top Roll Rotation Direction	300A,0146	CS	
>>Table Top Vertical Position	300A,0128	DS	
>>Table Top Longitudinal Position	300A,0129	DS	
>>Table Top Lateral Position	300A,012A	DS	
>>Isocenter Position	300A,012C	DS	Used for positioning

Table 8-26: RT Beams Module

8.2 Data Dictionary of Private Attributes

The Private Attributes added to created SOP Instances are listed in the Table below. Brainlab reserves blocks of private attributes in group 0009 and 0099. Further details on usage of these private attributes are contained in Section 8.1.

8.2.1 Group 300B

Tag	Attribute Name	VR	VM
(300B,00xx)	Private Creator Code 'Brainlab - ONC - Beam Parameters'	LO	1
(300B,xx10)	Referenced Beam List	IS	1

Table 8-27: Beam Parameters

8.3 Coded Terminology and Templates

CID 4051 General Devices

Context ID 4051
General Devices
Type: Extensible **Version:** 20061023

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
INCLUDE CID BL-GEN-00001		

CID BL-GEN-00001 Brainlab Device Definitions

Context ID BL-GEN-00001

Localizer Definitions

Type: Extensible **Version:** 20100812

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
BL-GEN-LOC	LOC-HEADRING	Headring
BL-GEN-LOC	LOC-LOCALIZER	Localizer

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8.4 Grayscale Image Consistency

Not supported.

8.5 Standard Extended/Specialized/Private Sop Classes

None supported.

8.6 Private Transfer Syntaxes

None supported.

9 Indexes

9.1 Index of Tables

9.2 Index of Figures