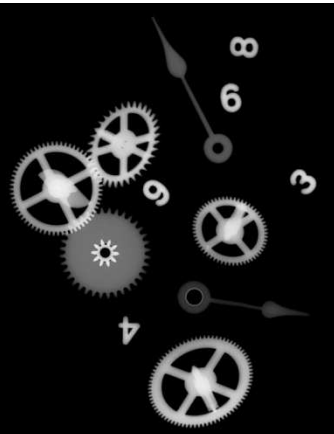


XiO®/Focal

Sistemas de Planificación

Jose Manuel Reinoso Cobo
manuel.reinoso.sspa@juntadeandalucia.es
953 008 095 – corp.: 208095

CMS SOFTWARE
THE ELEKTA GROUP

Funcionalidades

XiO®

- Estación de planificación
- Evolución de Focus®
- v4.2.0(2004) → v4.60(2011)
- SO linux/HP UX

- Haces
  - Fotones
  - Electrones
  - Protones
- Plantillas
- IMRT
- RB
  - TCP, NTCP

Se ha ido añadiendo
- Contorneo 3D y brush
- Evaluación multiplan
- DICOM Bundle
- MC electrones
- Hoja de haces
- Impresión múltiples DRR
- Nuevas Unidades de tratamiento

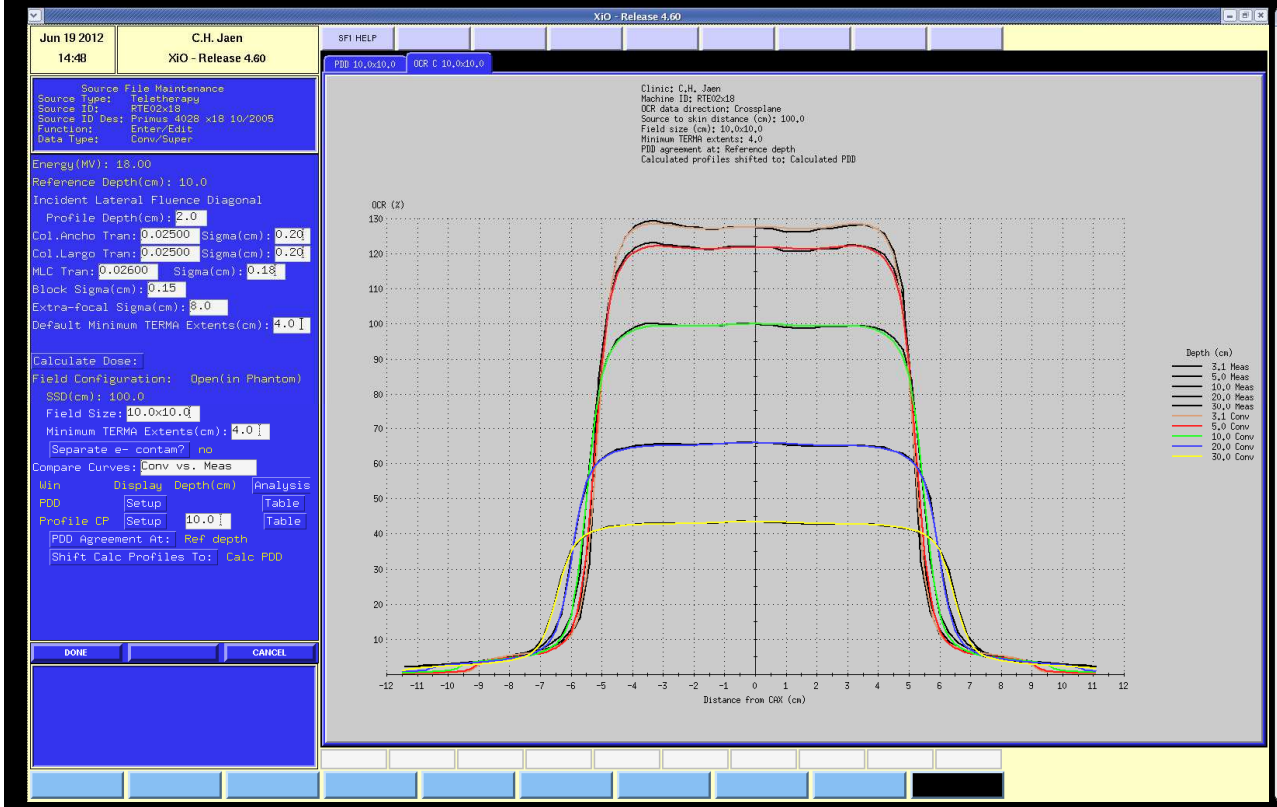
Focal (Pro, Sim, 4D, Monaco)

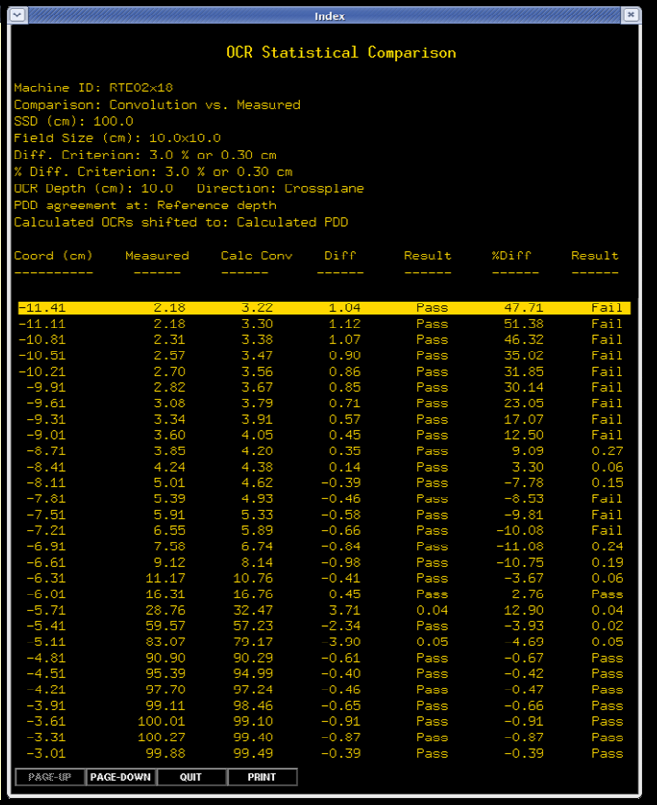
- Simulación
- Contorneo
- Evaluación
- v4.2.0(2004) → v4.60(2011)
- SO Windows

- Láseres: isocentro
- Fusión de imágenes
- Volumenes
  - Suma, resta
  - Expansión anisótropa, contracción isótropa
  - Recorte piel
- Evaluación 3 planes
- Suma y resta de planes

Se ha ido añadiendo
- Contorneo 3D y brush
- Monaco
- Focal 4D
- Autosegmentación

Modelado de las Unidades



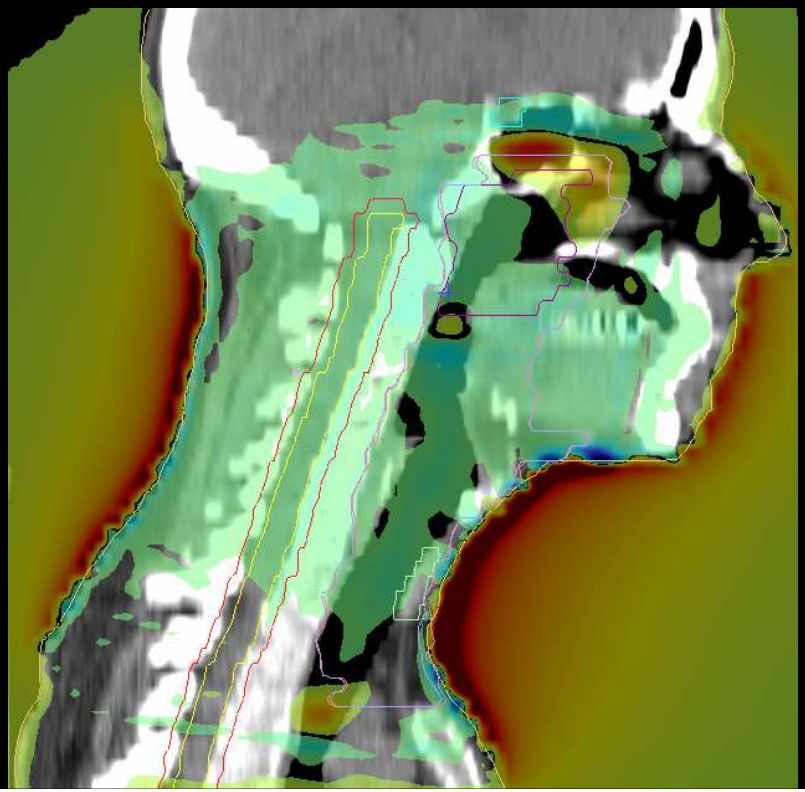


Algoritmos de cálculo I. Fotones

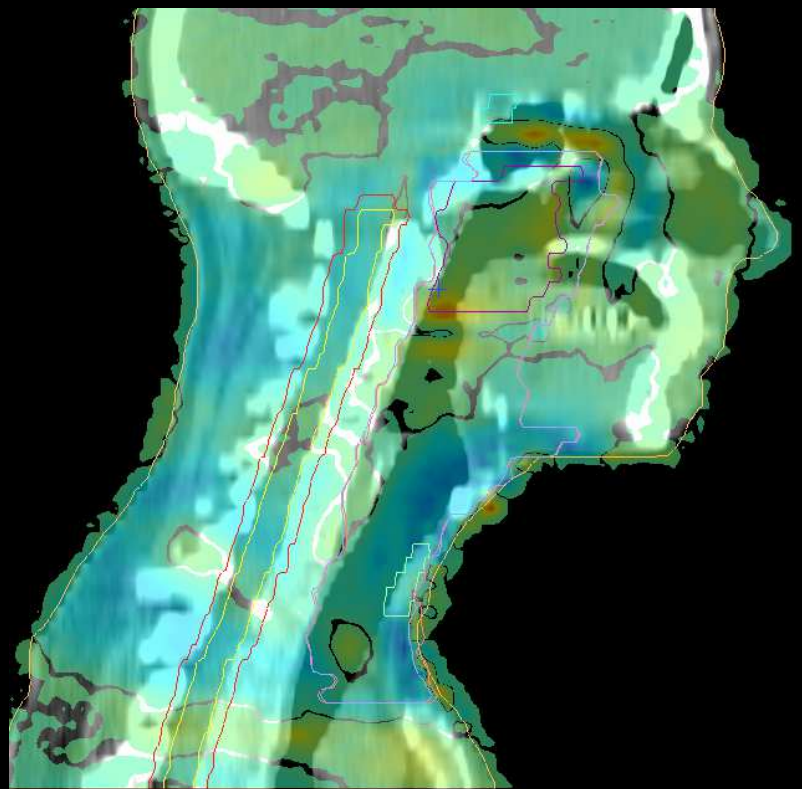
- Clarkson
- FFT convolution
- Fastsuperposition
- Multigrid superposition

} un solo modelado

FFT-Multigrid: Máxima diferencia 13.82Gy



Fastsuperposition-Multigrid: Máxima diferencia 0.91Gy

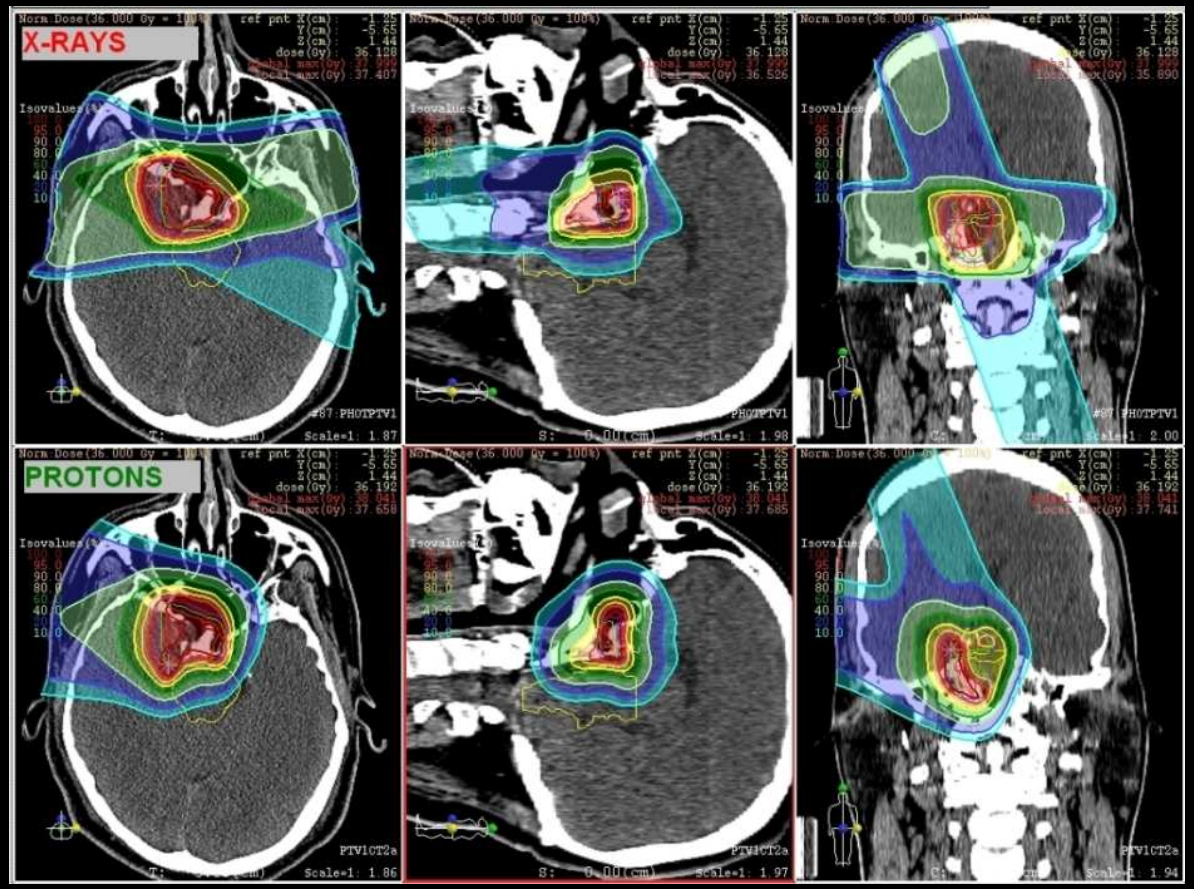


Algoritmos de cálculo II

Electrones

- Pencil beam
- eMC

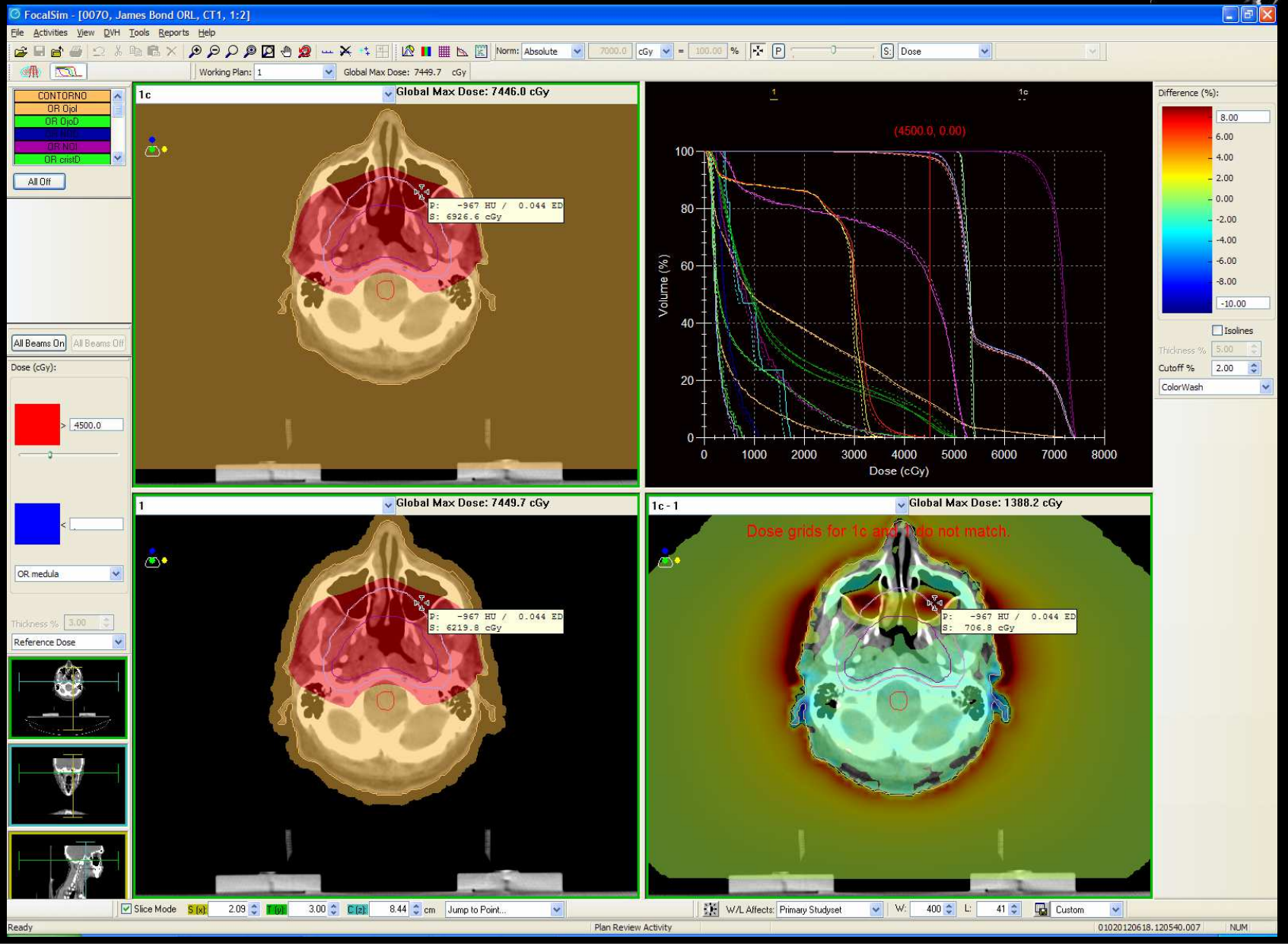
Protones



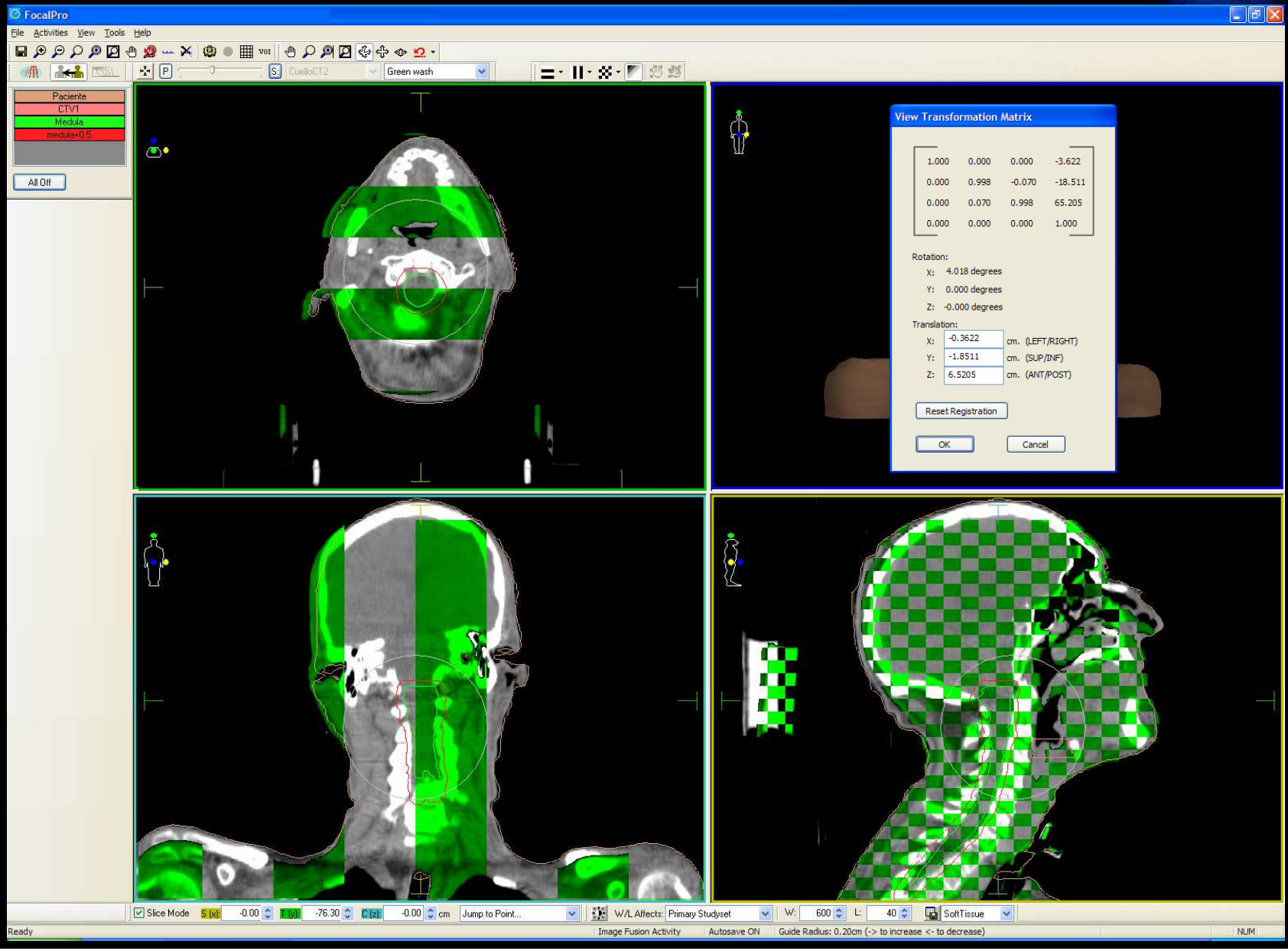
Herramientas de simulación Virtual

- Focal 4D
  - Import and export of RCCT and nonRCCT images
  - Layouts supporting 4D image sets
  - Creation of MIP, MinIP, and Average images
  - Definable grid to determine tumor motion
  - Cine view with contouring
  - Contouring on sagittal and coronal images
  - Automatic ITV creation
  - Boolean creation
- Láseres
- Haces

Herramientas evaluación

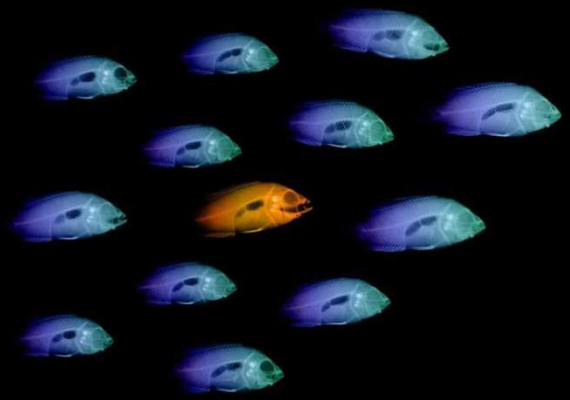


Fusión de imágenes



Otras cuestiones

- No hay base de datos de pacientes
- Si hay plantillas
- Informes
  - Si selección información
  - No formato
  - Impresión en pdf
  - No exporta a ASCII ni Excel
- CMS.Direct
  - Storage
  - Access



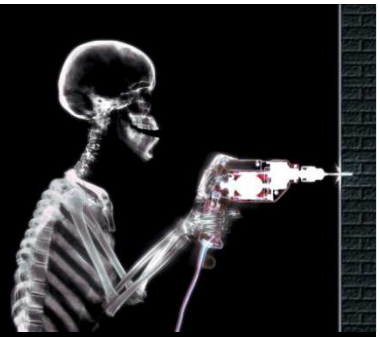
DICOM

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
CT Image Storage	Yes	Yes
MR Image Storage	No	Yes
PET Image Storage	No	Yes
SECONDARY CAPTURE Storage	Yes	No
STRUCTURE SET Storage	Yes	Yes
RT ION PLAN Storage (4.41 release only)	Yes	Yes
RT PLAN Storage	Yes	Yes
RT DOSE Storage	Yes	No
Print Management		
Basic Grayscale Print Management	Yes	No

UID Value	UID Name	Category
1.2.840.10008.1.1	Verification	Transfer
1.2.840.10008.5.1.4.1.1.2	CT Image Storage	Transfer
1.2.840.10008.5.1.4.1.1.4	MR Image Storage	Transfer
1.2.840.10008.5.1.4.1.1.128	PET Image Storage	Transfer
1.2.840.10008.5.1.4.1.1.7	Secondary Capture Image Storage	Transfer
1.2.840.10008.5.1.4.1.1.481.3	RT Structure Set Storage	Transfer
1.2.840.10008.5.1.4.1.1.481.5	RT Plan Storage	Transfer
1.2.840.10008.5.1.4.1.1.481.8	RT Ion Plan Storage	Transfer
1.2.840.10008.5.1.4.1.1.481.2	RT Dose Storage	Transfer
1.2.840.10008.5.1.1.9	Basic Grayscale Print Management Meta SOP Class	Print Management

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
Compact Disk- Recordable		
General Purpose CD-R	No	Yes
Magneto-Optical Disk		
CT/MR MOD	No	Yes

Mantenimiento



Assurance 1.0 : software support

- Unlimited telephone and online support
- Applicable right-to-use licenses
- All software updates (excluding marketable features)

Assurance 2.0 : software and hardware support

- Unlimited telephone and online support
- Repair and replacement of all covered hardware
- Applicable right-to-use licenses
- All software updates (excluding marketable features)

Assurance 2.1 : software and hardware support with training

- Unlimited telephone and online support
- Repair and replacement of all covered hardware
- Applicable right-to-use licenses
- All software updates (excluding marketable features)
- Tuition, travel and accommodations for one person to any CMS in-house training course

Assurance 3.0 : Anti-obsolescence (one replacement)

- Unlimited telephone and online support
- Repair and replacement of all covered hardware
- Applicable right-to-use licenses
- All software updates (excluding marketable features)
- Tuition, travel and accommodations for one person to any CMS in-house training course
- Replacement of covered CPUs one time during the contract term. Replacement takes place during the final quarter of the contract term. This agreement is a three-year obligation for existing customers and a two-year obligation for new customers.

Assurance 4.0 : Anti-obsolescence (two replacements)

- Unlimited telephone and online support
- Repair and replacement of all covered hardware
- Applicable right-to-use licenses
- All software updates (excluding marketable features)
- Tuition, travel and accommodations for one person to any CMS in-house training course
- Replacement of covered CPUs two times during the contract term. Replacement takes place immediately, and again during the final quarter of the contract term. This agreement is a three-year obligation.

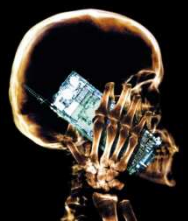
A destacar

Me gusta

- Estabilidad
- Planes temporales
- Rapidez de cálculo
- Cálculo en background
- Recorte de la piel
- Opciones de pesado de los haces

No me gusta o no está

- Base de datos de pacientes
- Volúmenes 2,5D
  - No admite estructuras tipo donut
  - …
- RB poco desarrollada
- Definición bloques
  - Sólo expansión isotrópica
- Modelado muy desfasado
- Ventanas emergentes
- Desarrollo software



Casos prácticos

Próstata

Fase 1: 50Gy

•AP	1700cGy	0º
•PA	1100cGy	180º
•LD	1150cGy	270º
•LI	1150cGy	90º

Fase 2: +26Gy

•OPD	325cGy	245º
•LD	650cGy	270º
•OAD	325cGy	320º
•OAI	325cGy	40º
•LI	650cGy	90º
•OPI	325cGy	115º

Próstata

Tolerancias

Recto

- $V_{60Gy} < 40\%$
- $V_{70Gy} < 25\%$
- $D_{máx} < 76Gy$ en cara posterior

Vejiga

- $V_{60Gy} < 40\%$
- $V_{70Gy} < 25\%$
- $D_{máx} < 80Gy$

Cabeza femoral

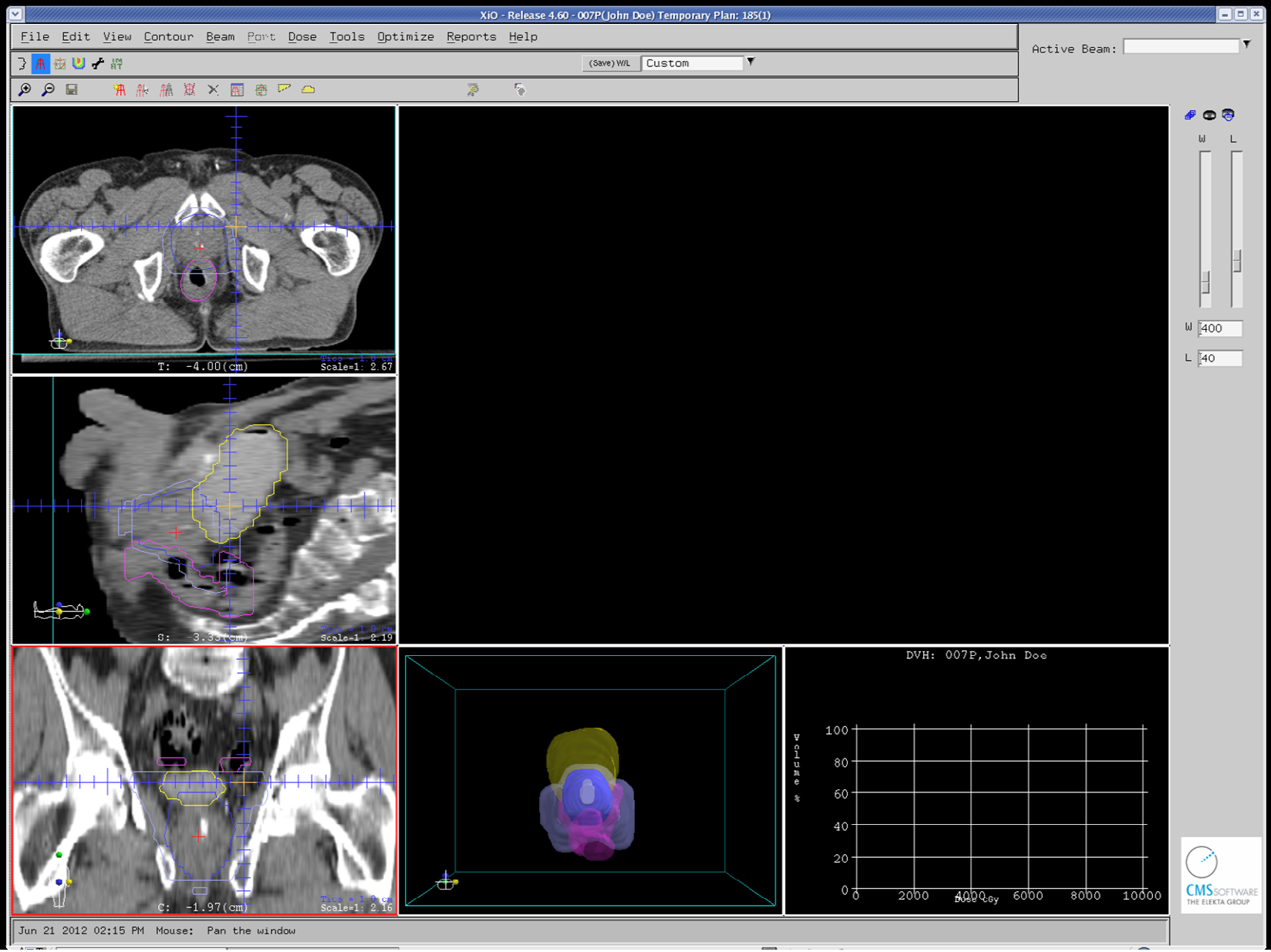
- $V_{50Gy} < 5\%$

Bulbo peneano

- $V_{40Gy} < 50\%$

Próstata

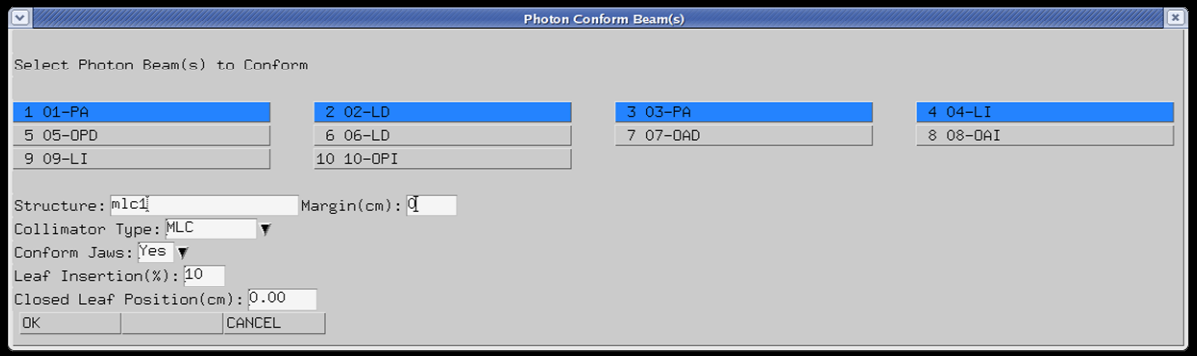
Punto ICRU y elección de template



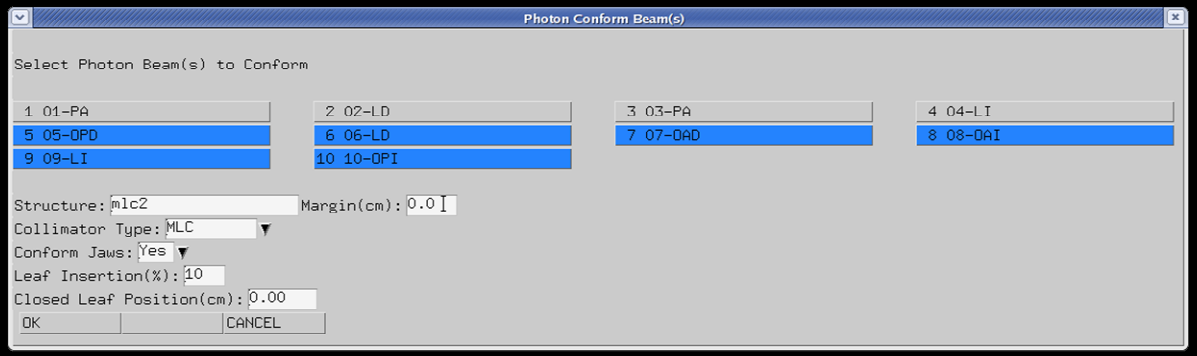
Próstata

Auto conformado de los haces

Fase 1

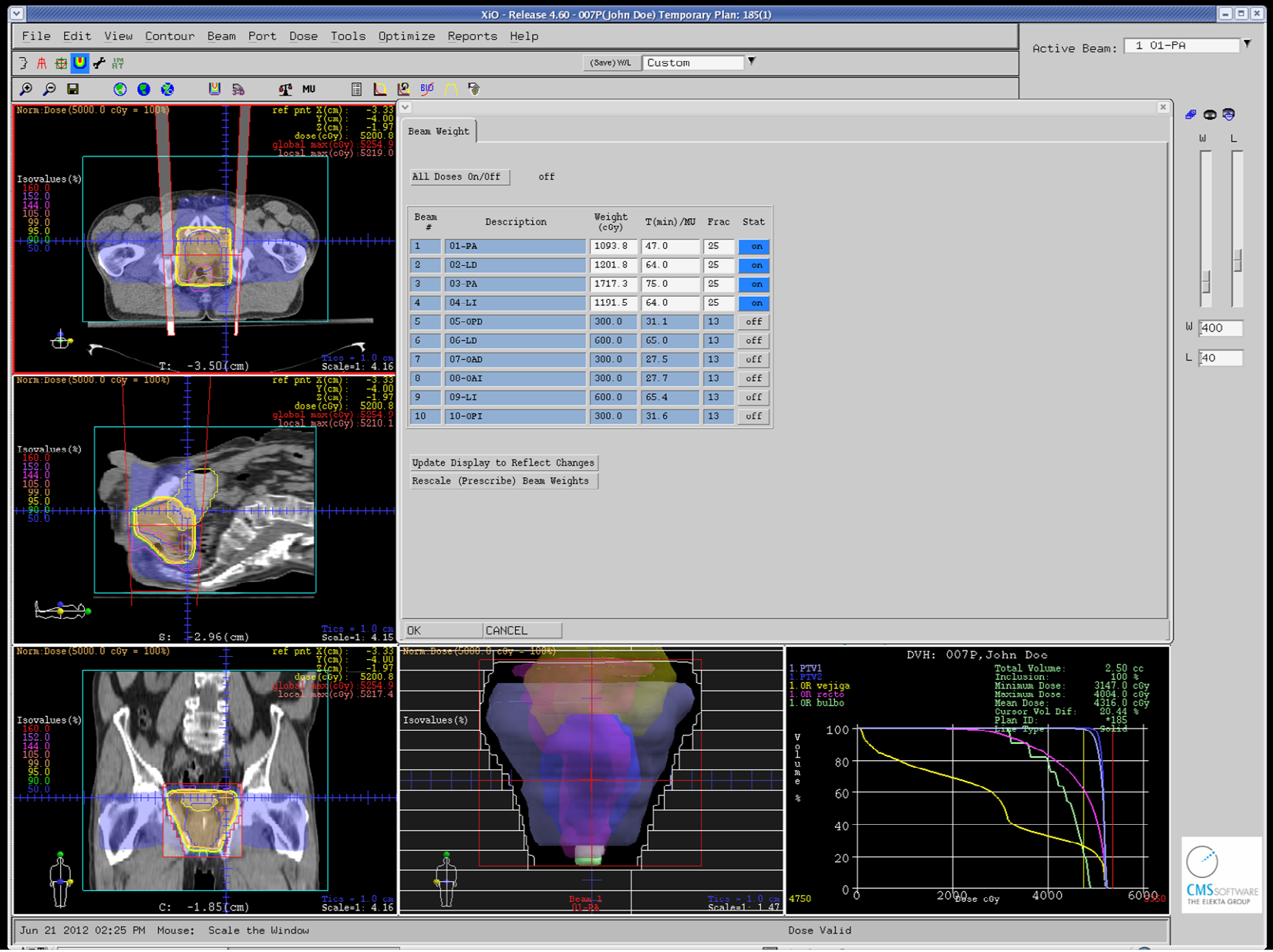


Fase 2



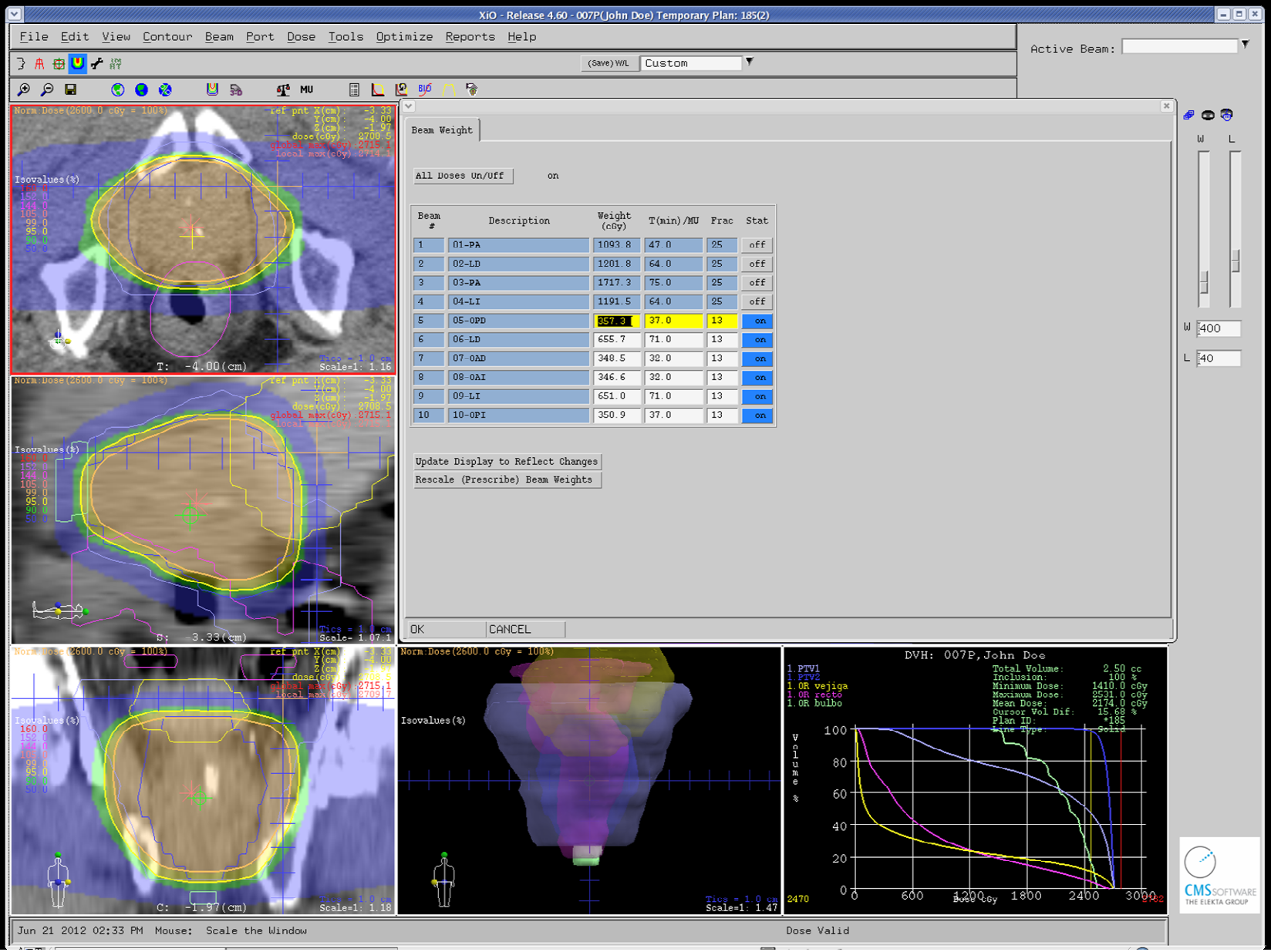
Próstata

Fase 1. Ajuste pesos y UM



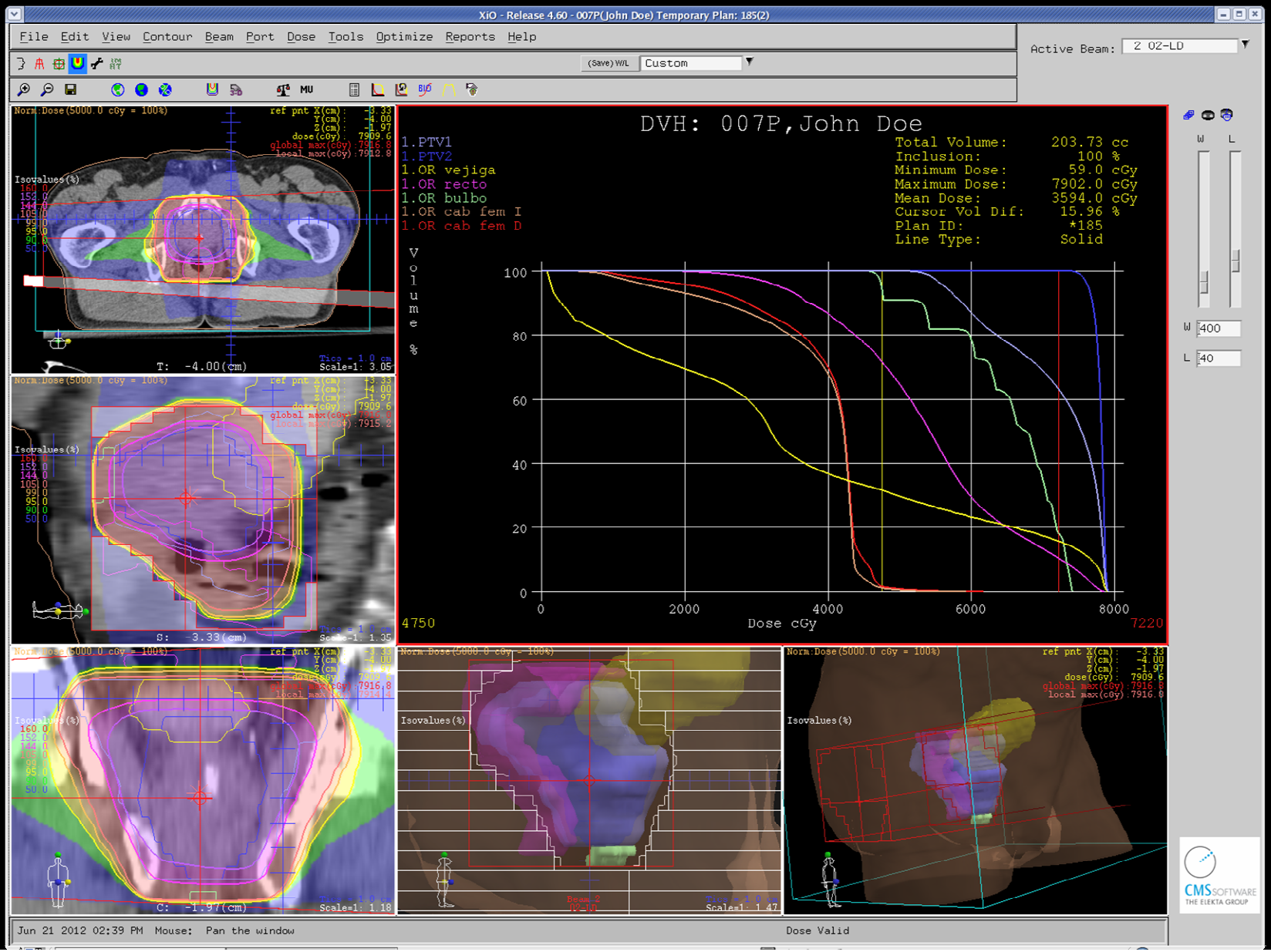
Próstata

Fase 2. Ajuste pesos y UM



Próstata

Suma de fases y resultado



ORL opción 1

Fase 1: 50Gy

Mesa a 0º

- m0g60 50um w30º
- m0g0
- m0g300 50um w30º

Mesa a 340º

- m340g90 10um
- m340g90r
- m340g110 15um
- m340g110b 8um
- m340g135 20um
- m340g135b 10um
- m340g165 25um
- m340g165b 12um
- m340g165r

Mesa a 20º

- m20g270 10um
- m20g270r
- m20g250 15um
- m20g250b 8um
- m20g225 20um
- m20g225b 10um
- m20g195 25um
- m20g195b 12um
- m20g195r

Fase 2: +20Gy

- LD 2000cGy270º
- LI 2000cGy 90º

ORL opción 1

Tolerancias

Médula espinal

- $D_{max} < 45Gy$

Médula espinal + 5mm

- $V_{45Gy} < 1\%$

Nervio óptico

- $D_{max} < 45Gy$

Globo ocular

- $D_{max} < 45Gy$

Cristralino

- $D_{max} < 10Gy$

Hipófisis

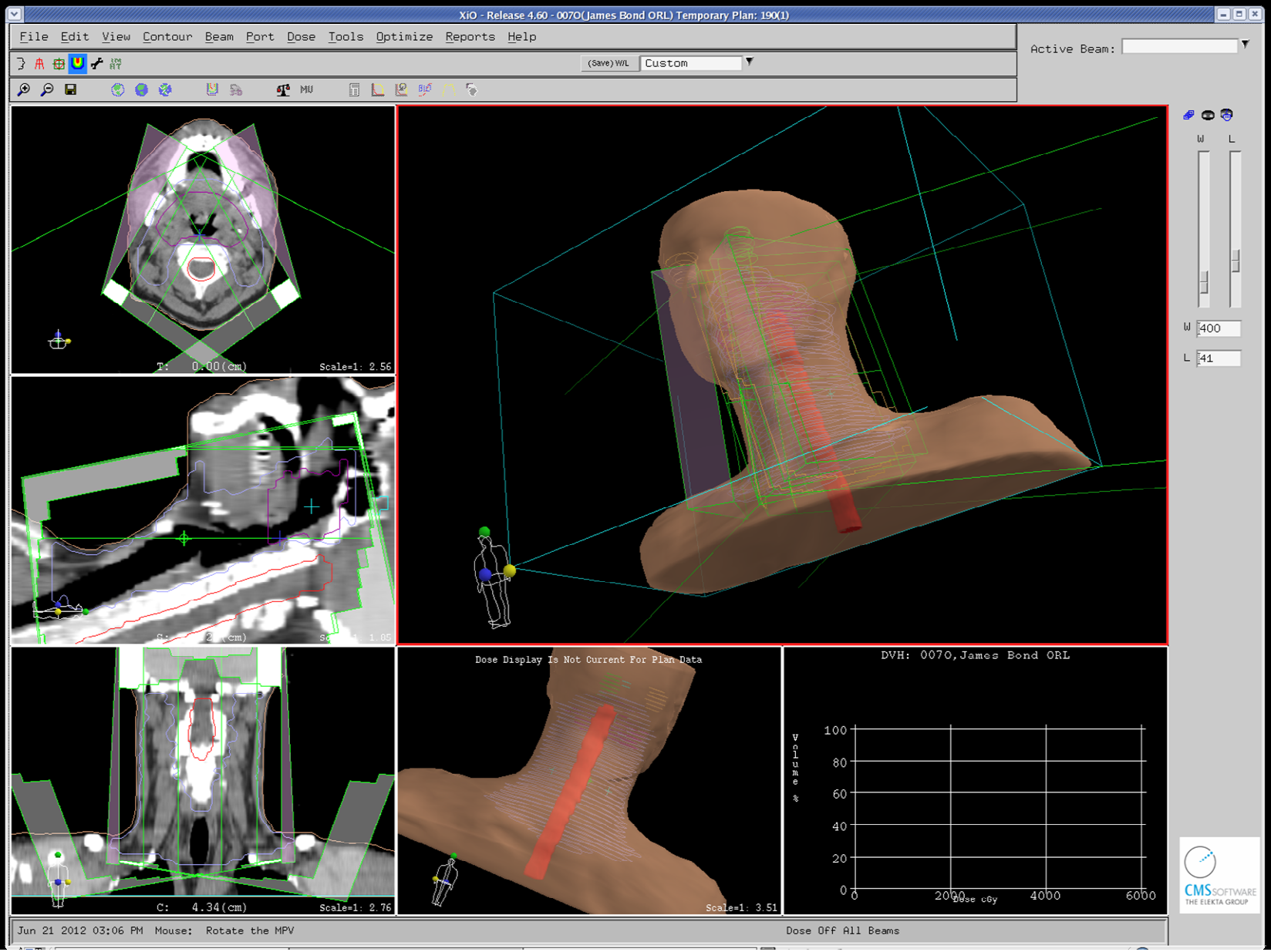
- ---

Tiroides

- ---

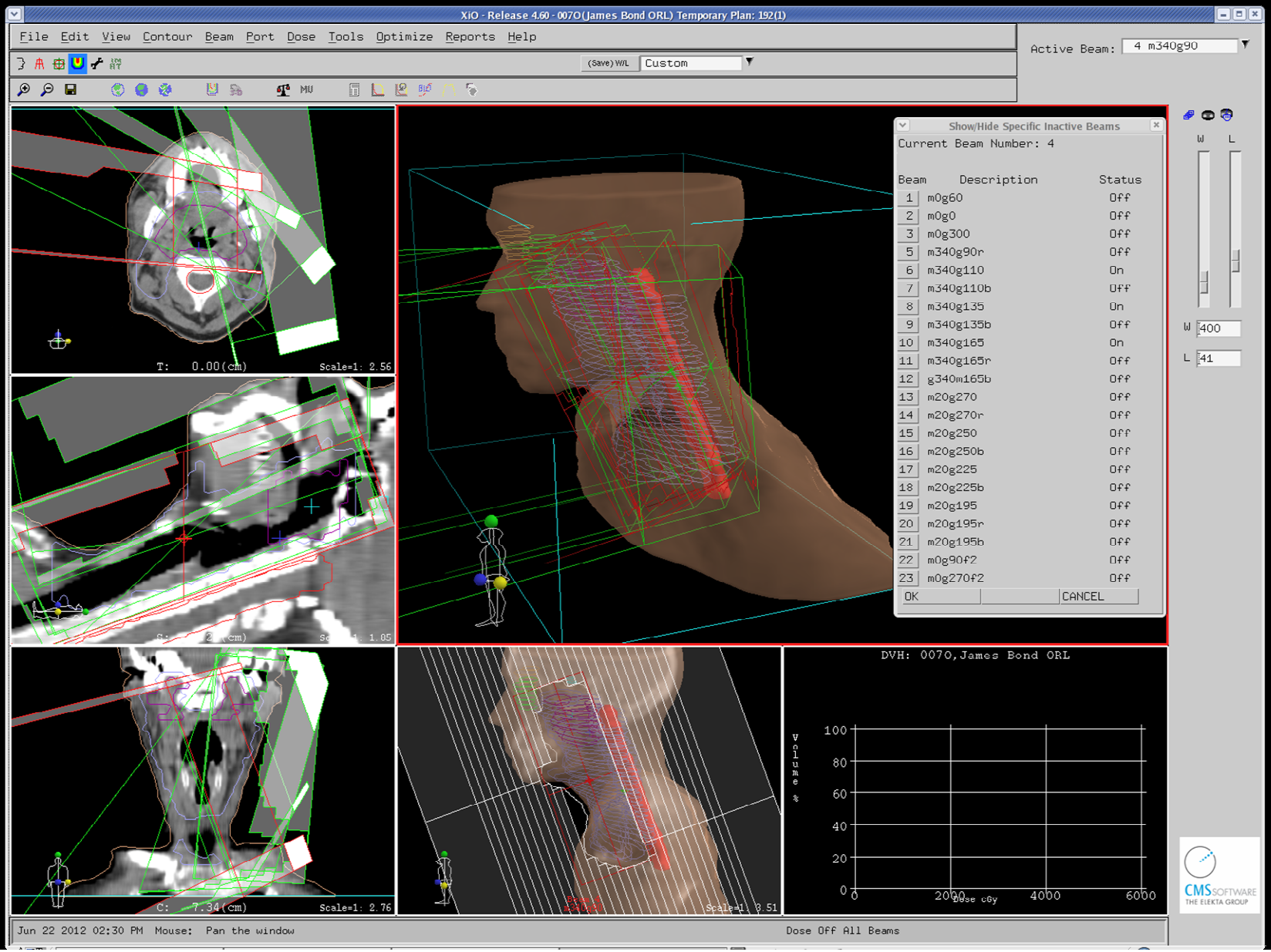
ORL opción 1

Campos anteriores con cuñas



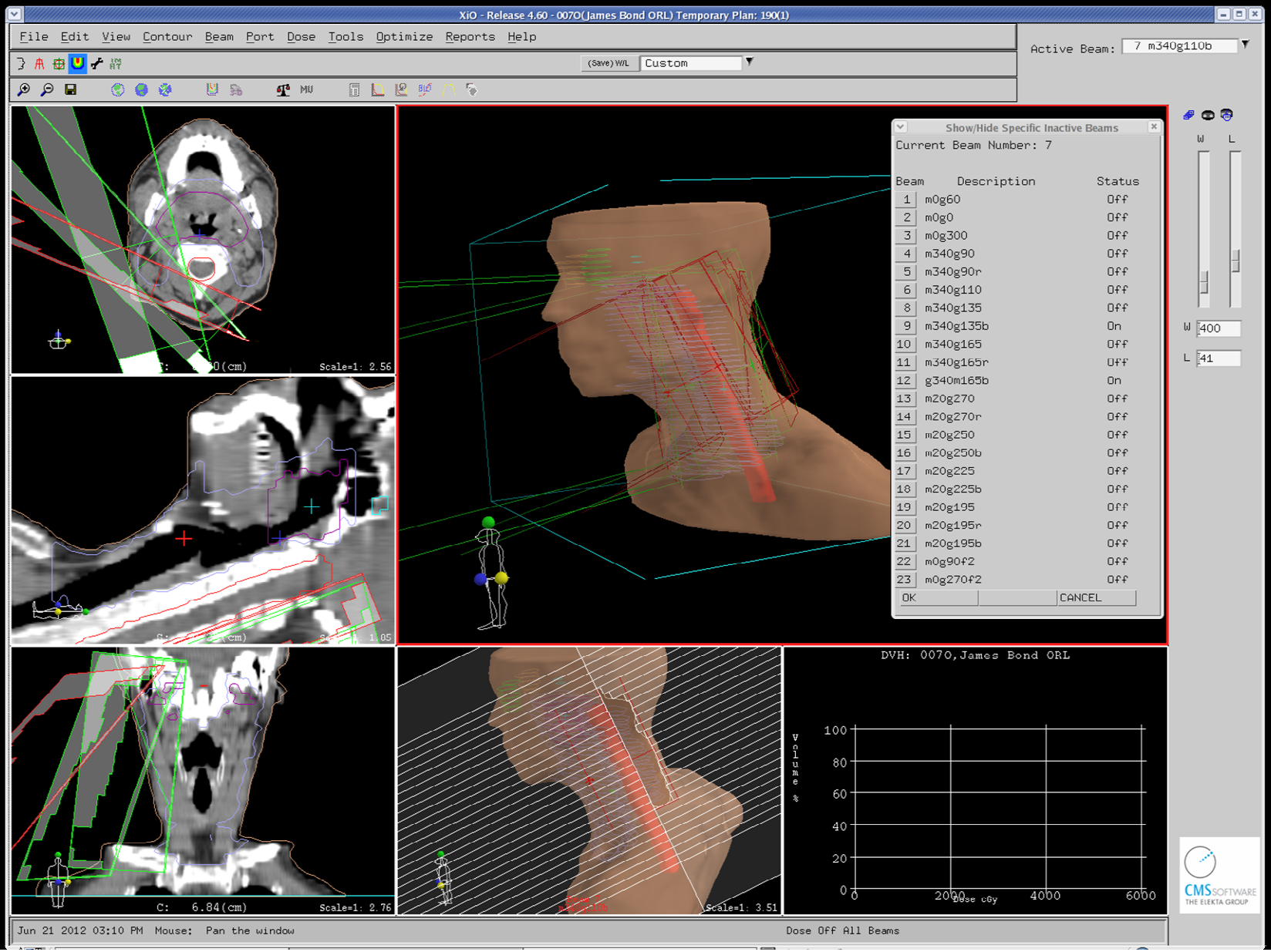
ORL opción 1

Mesa a 340º



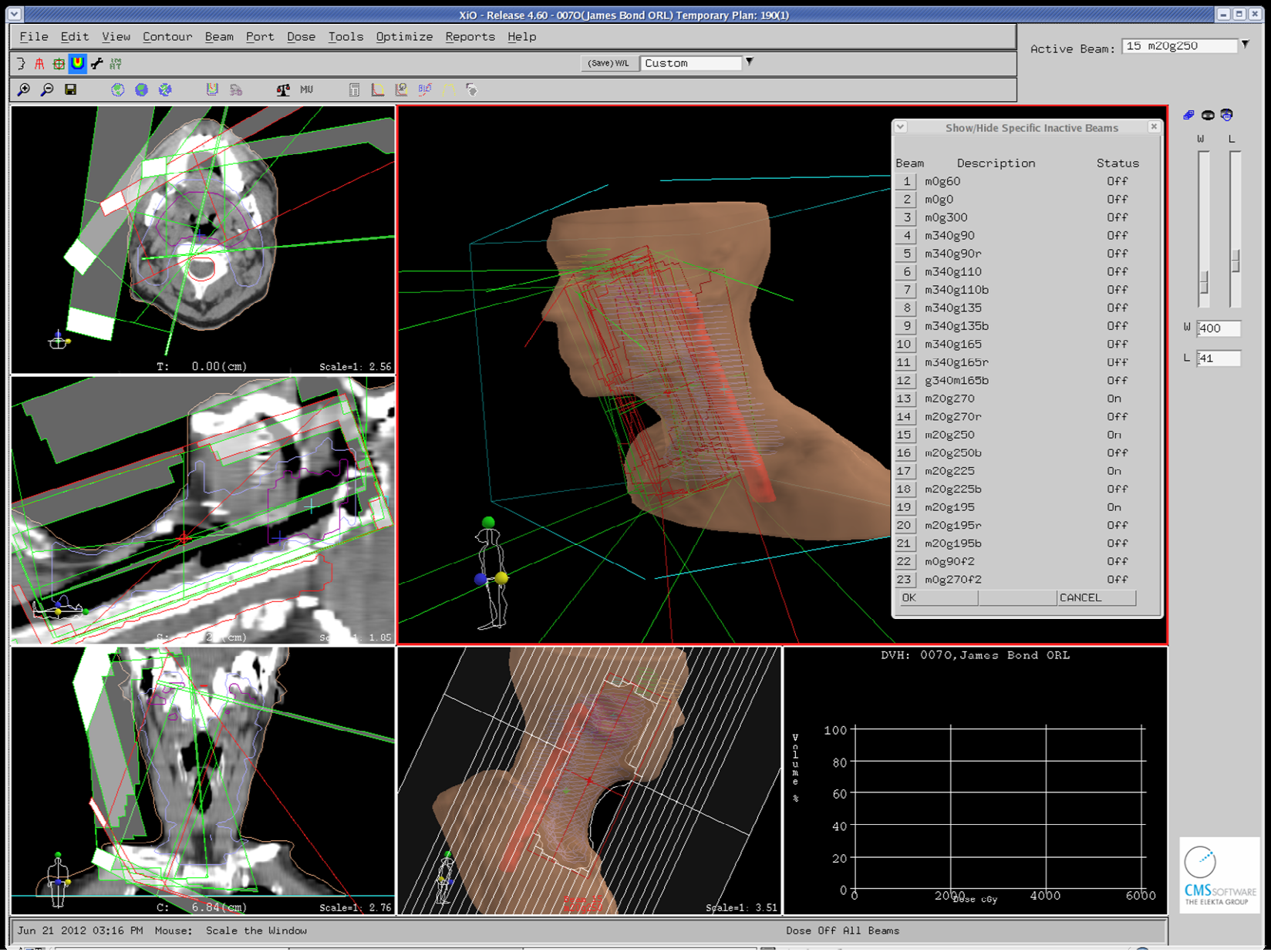
ORL opción 1

Mesa a 340º complementarios



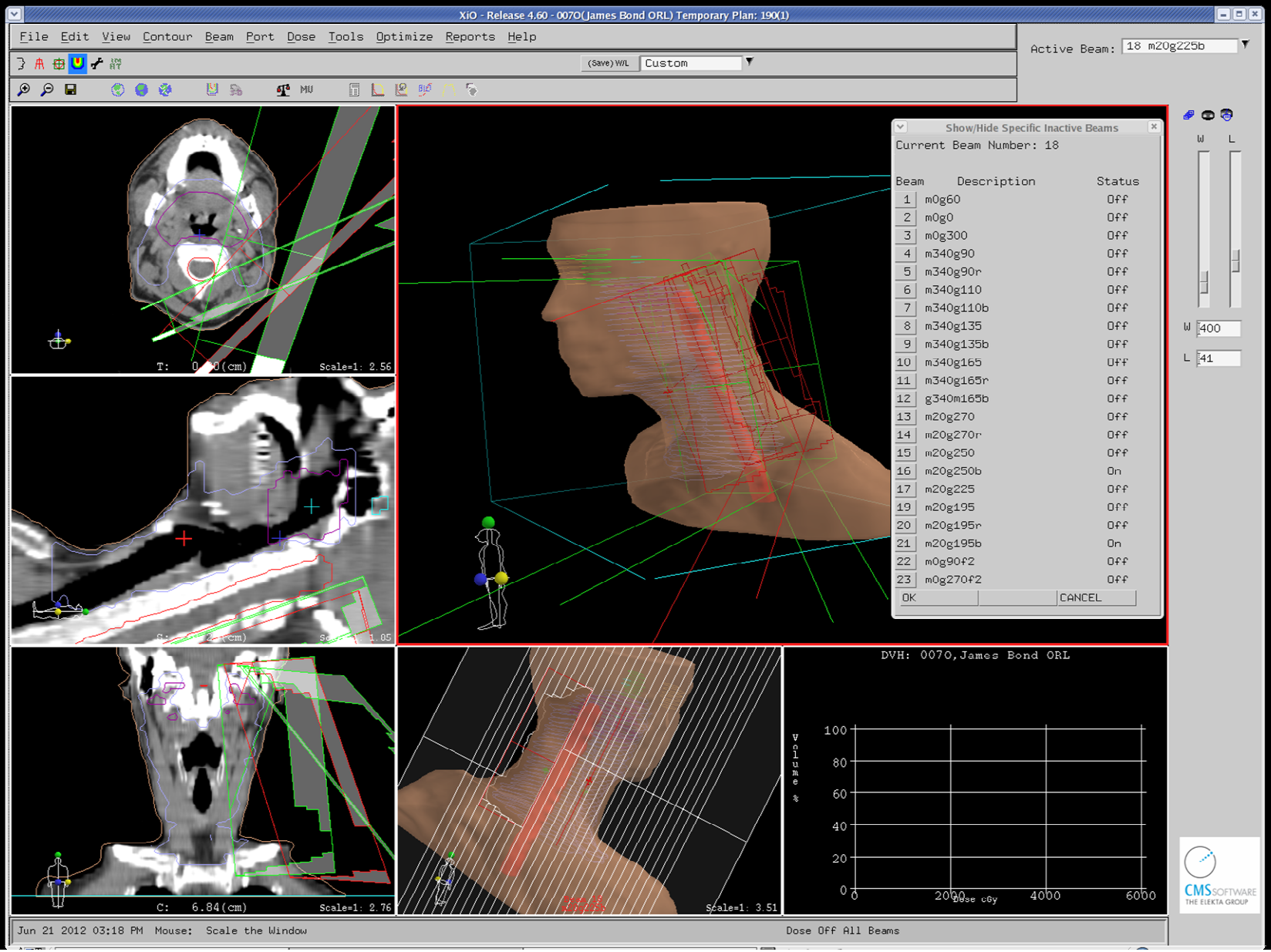
ORL opción 1

Mesa a 20º



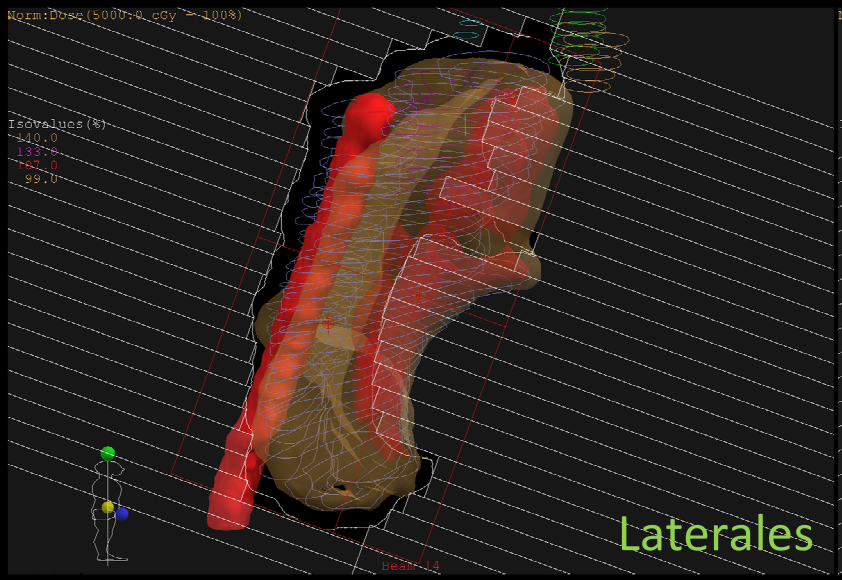
ORL opción 1

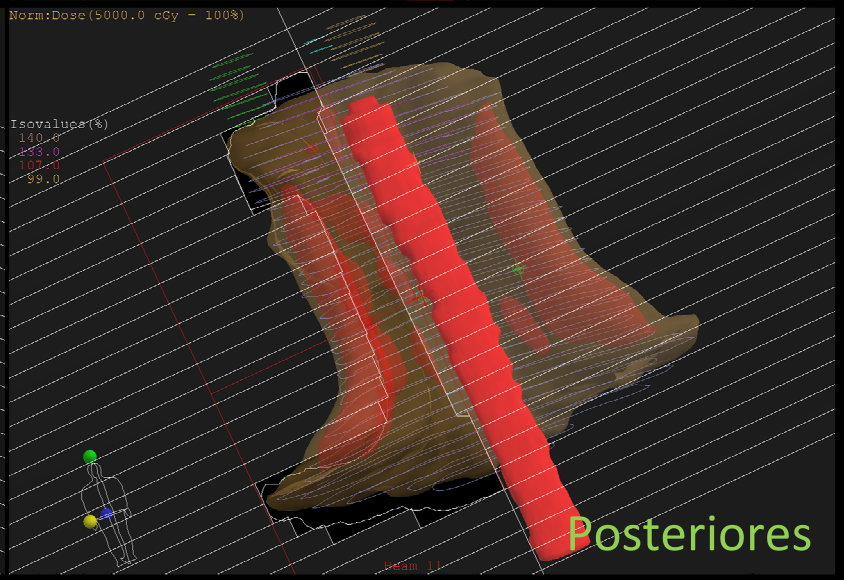
Mesa a 20º complementarios



ORL opción 1

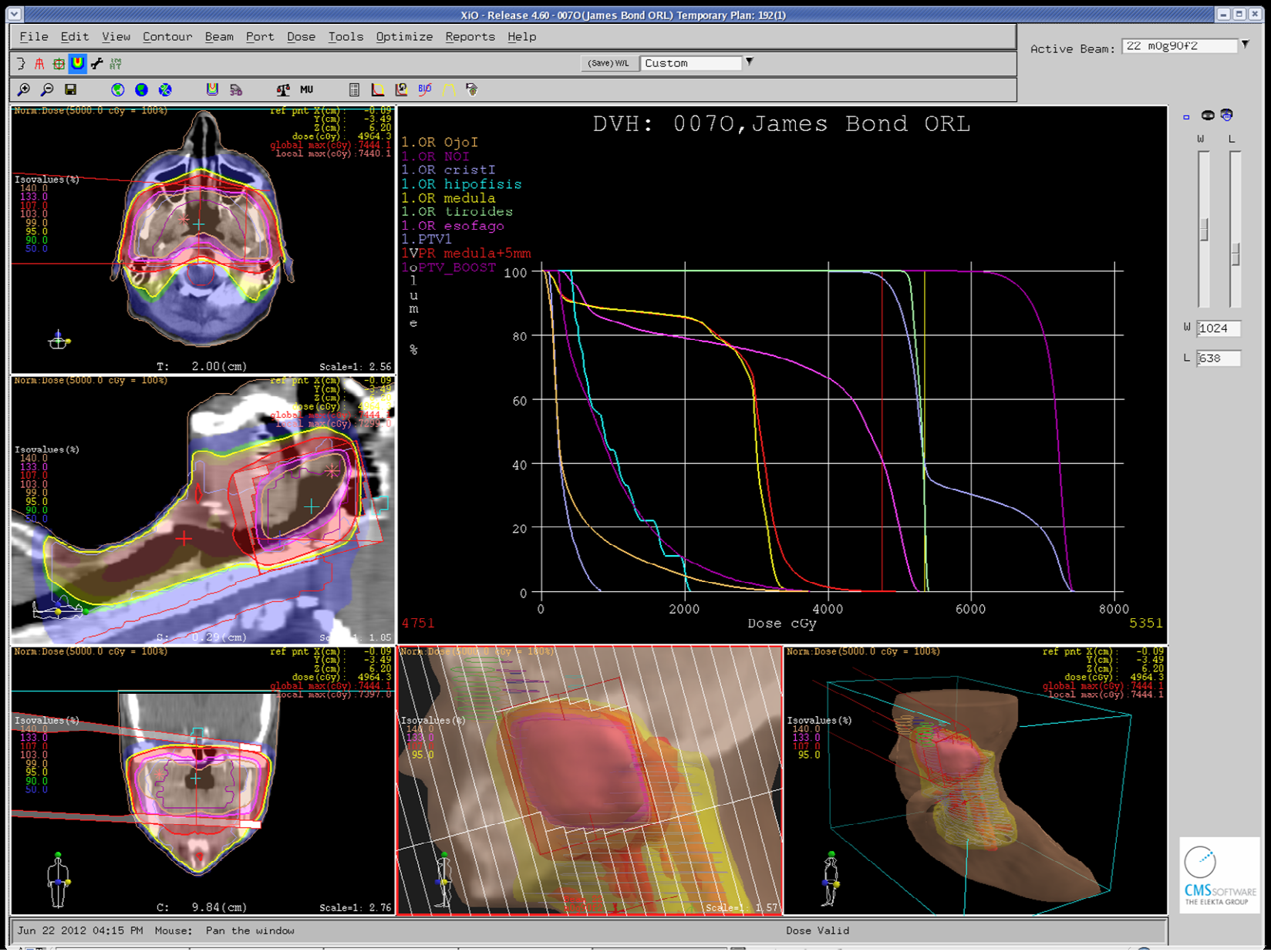
Campos reducidos





ORL opción 1

Suma con fase 2



ORL opción 2

Fase 1: 50Gy

Mesa a 0º

- g90r
- g60 75um
- g60r
- g300 75um
- g300r
- g270r

Mesa a 270º

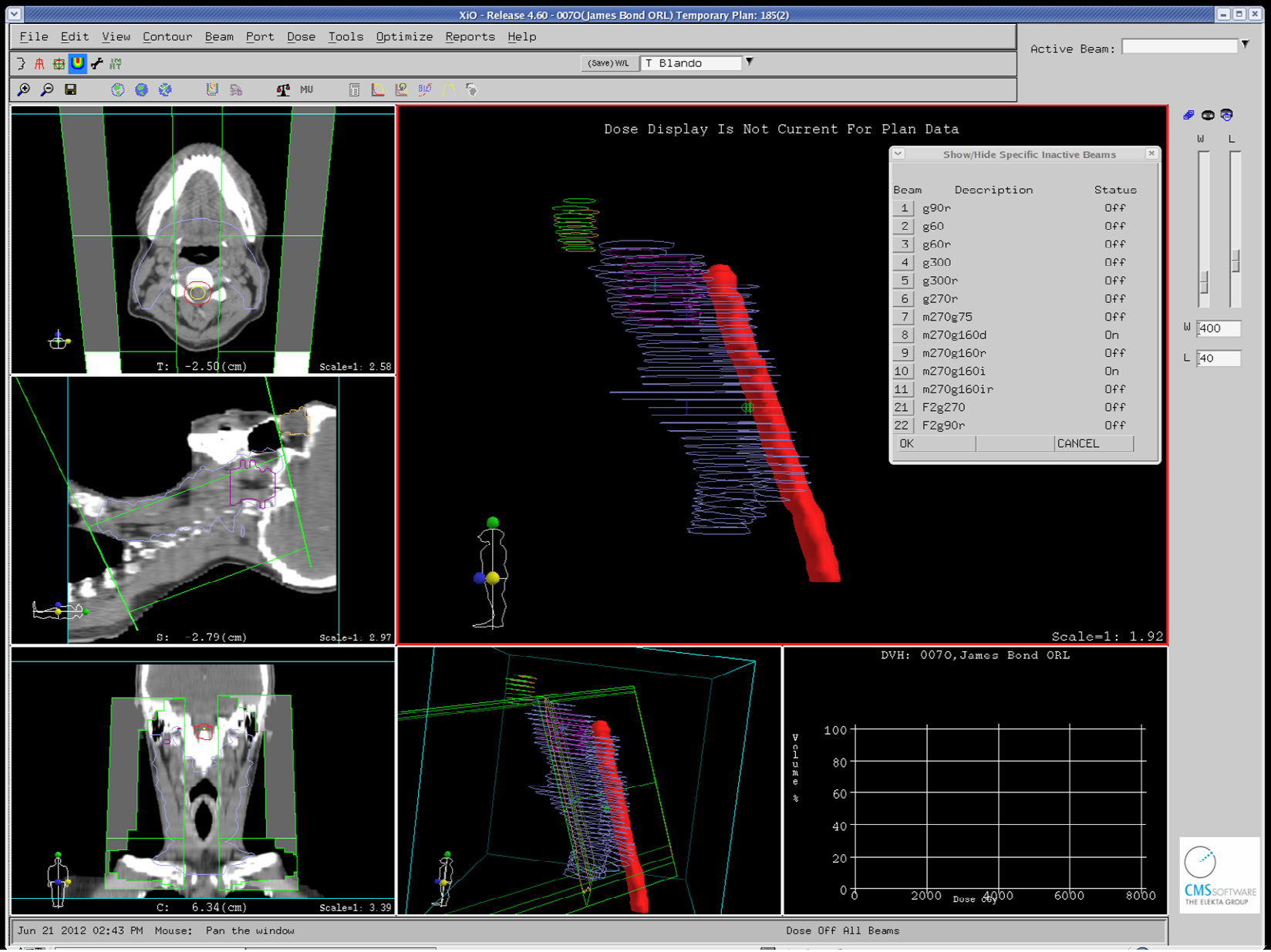
- m270g75 55um w45º
- m270g160d 50um
- m270g160dr
- m270g160i 50um
- m270g160ir

Fase 2: +20Gy

- LD 2000cGy 270º
- LI 2000cGy 90º

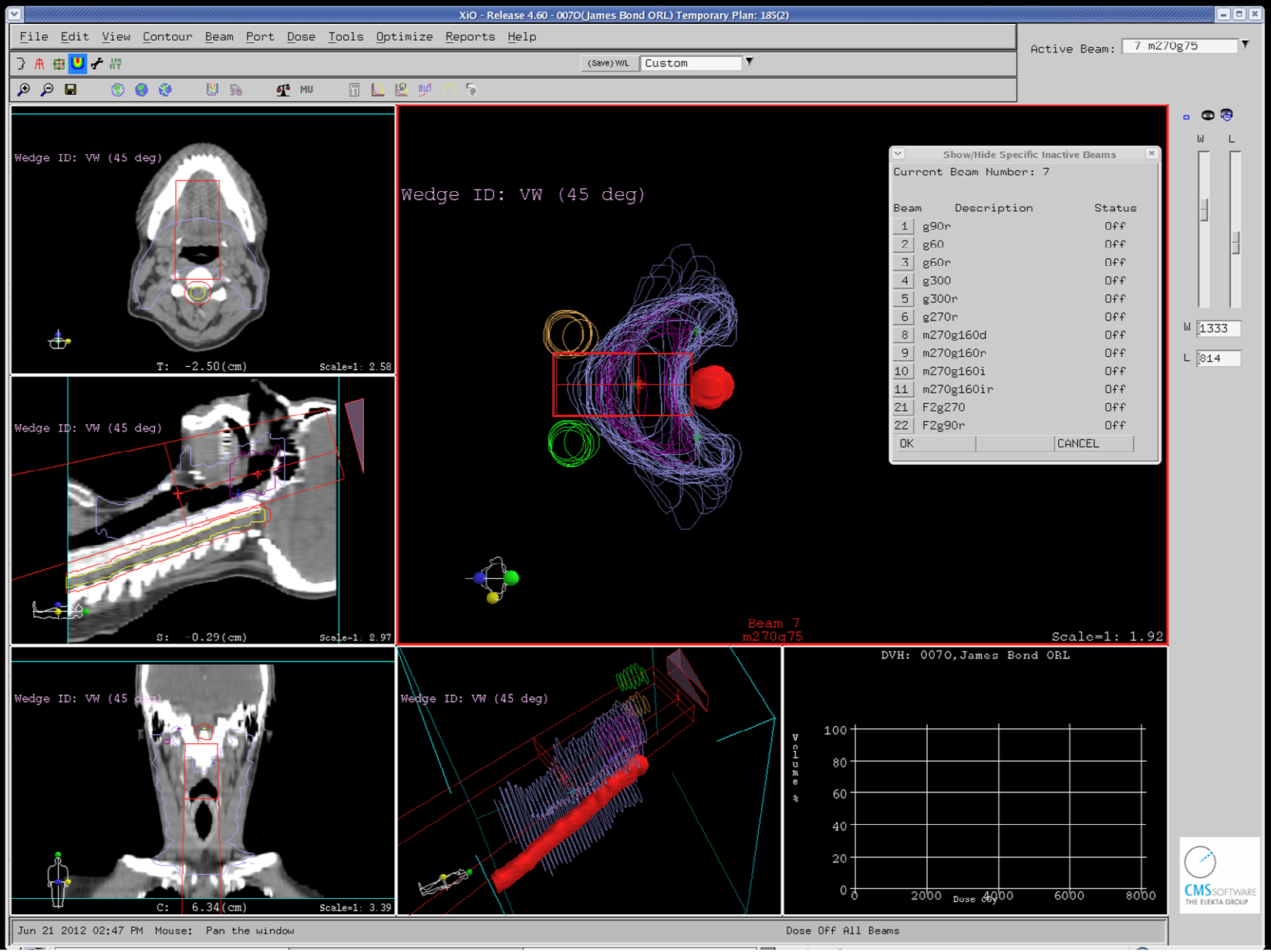
ORL opción 2

Mesa a 270º campos posteriores



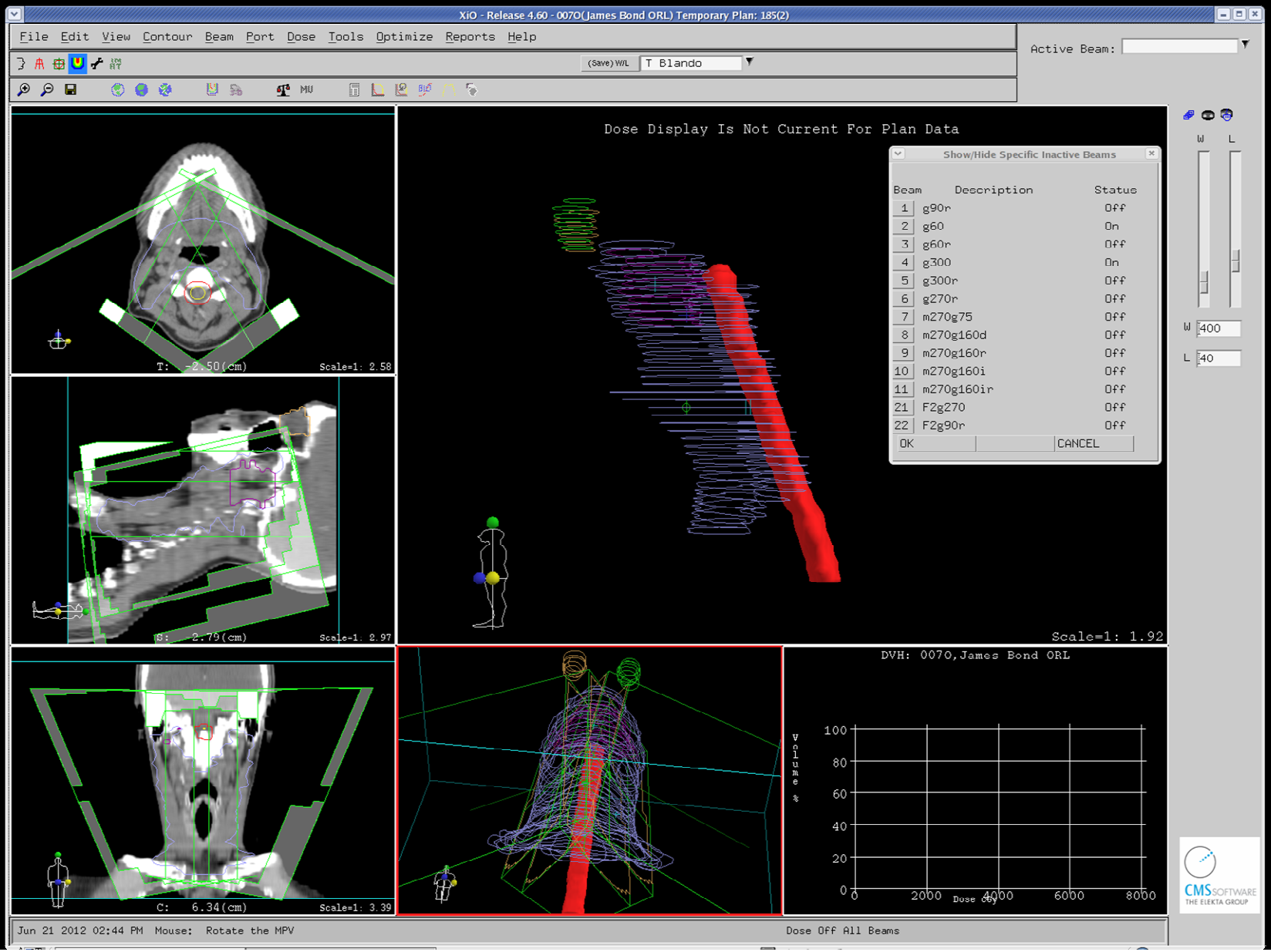
ORL opción 2

Mesa a 270º campo coronal



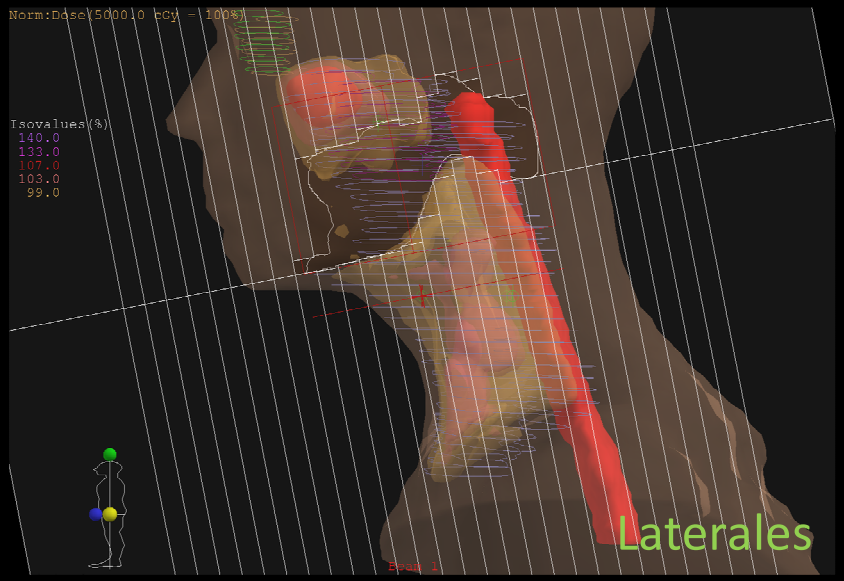
ORL opción 2

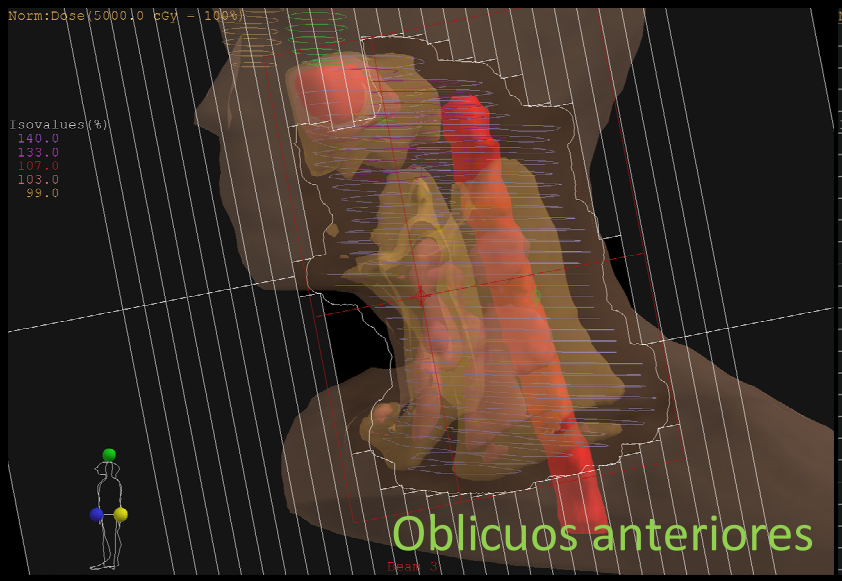
Campos anteriores

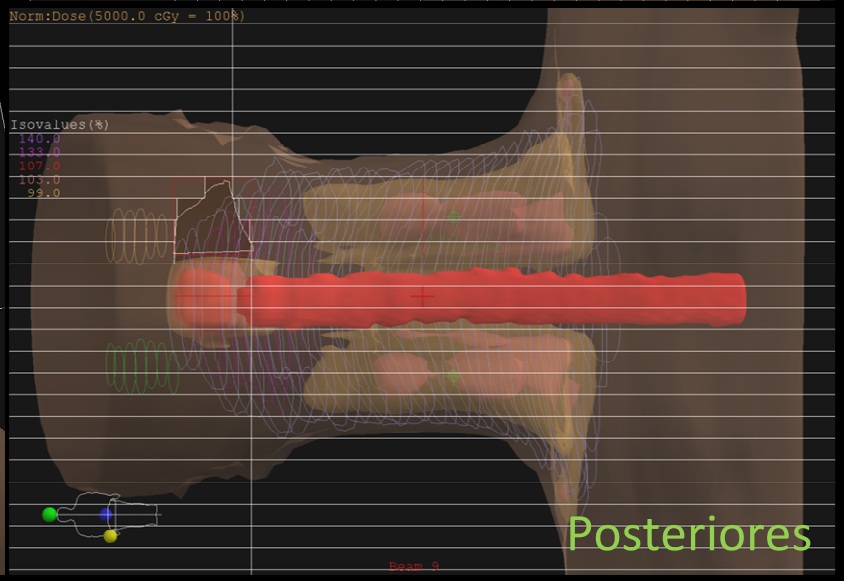


ORL opción 2

Campos reducidos

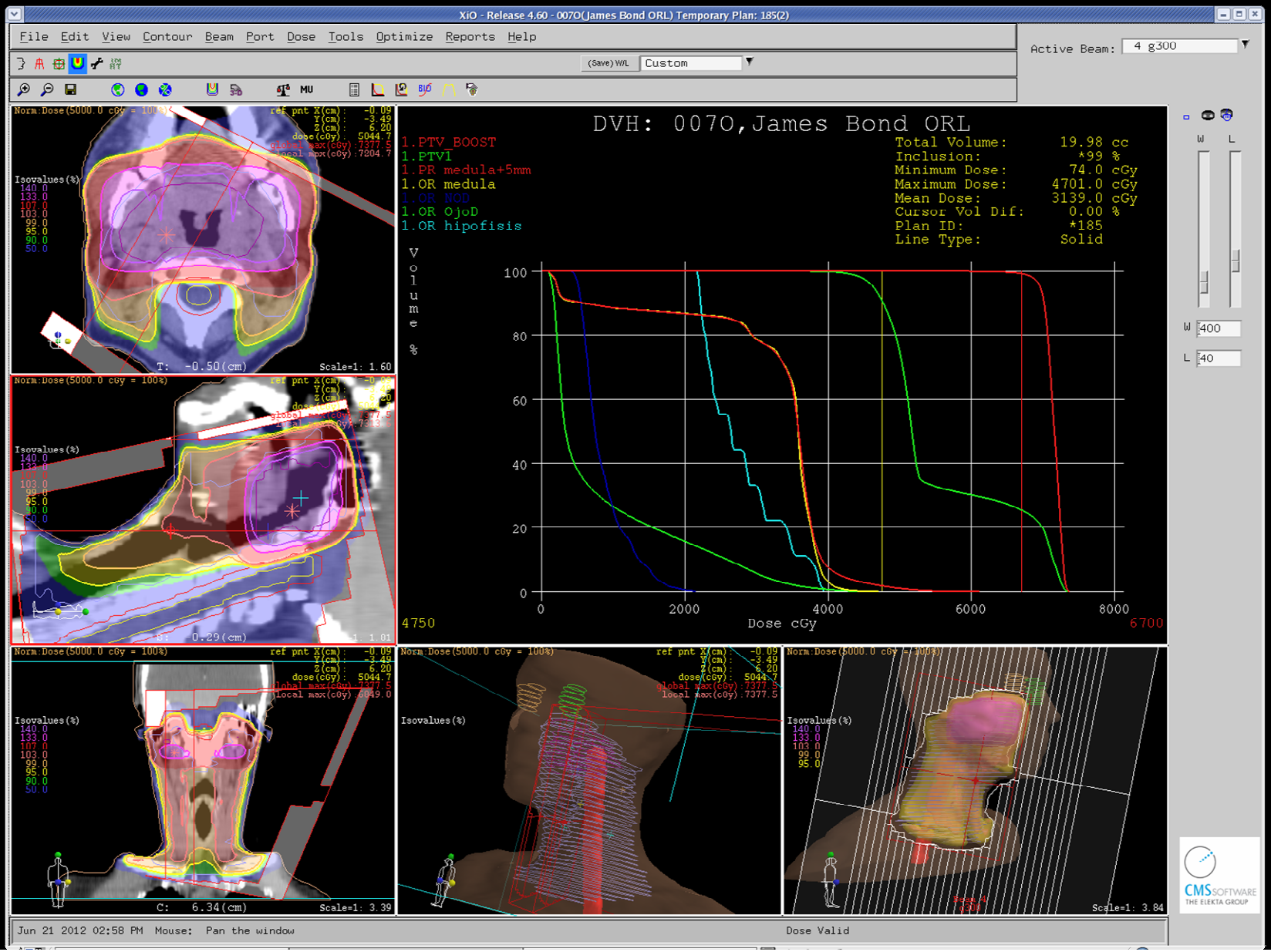






ORL opción 2

Suma con fase 2




Gracias por
su atención


Gracias por
su atención