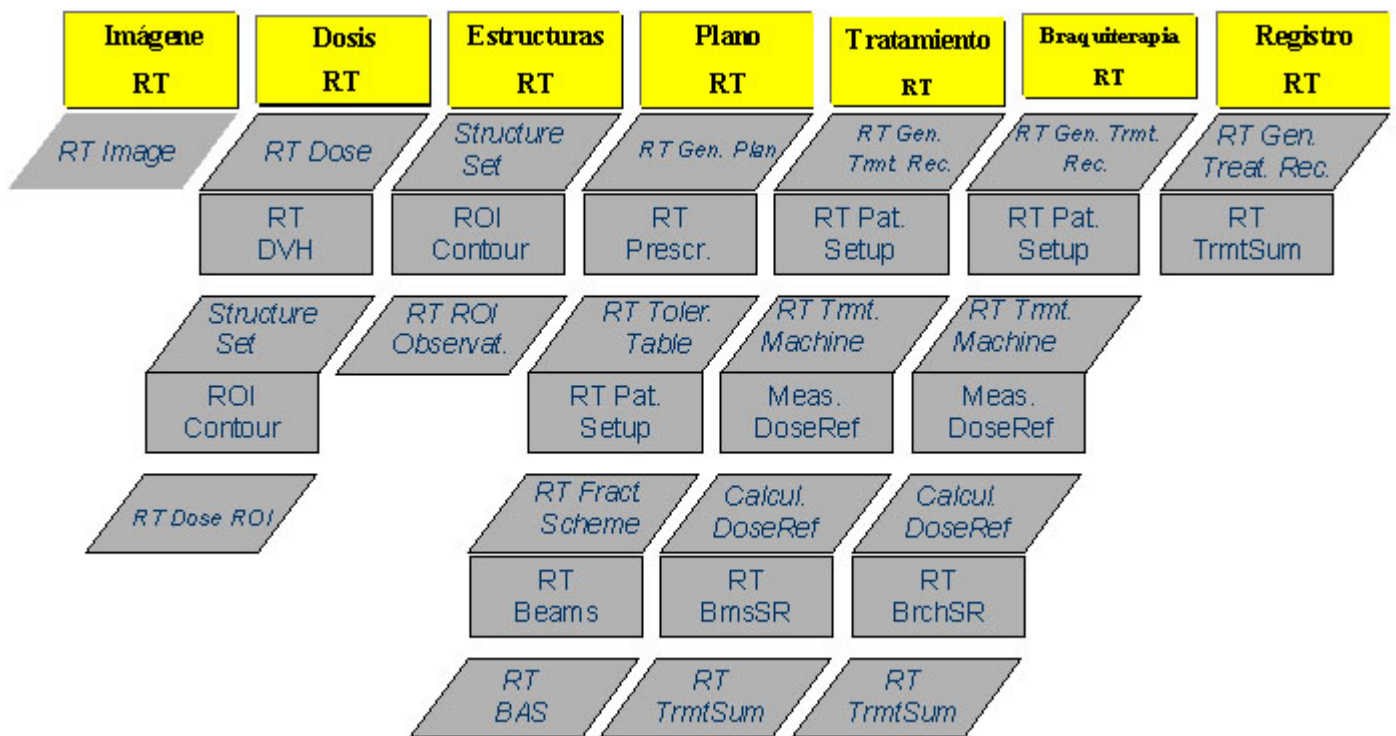
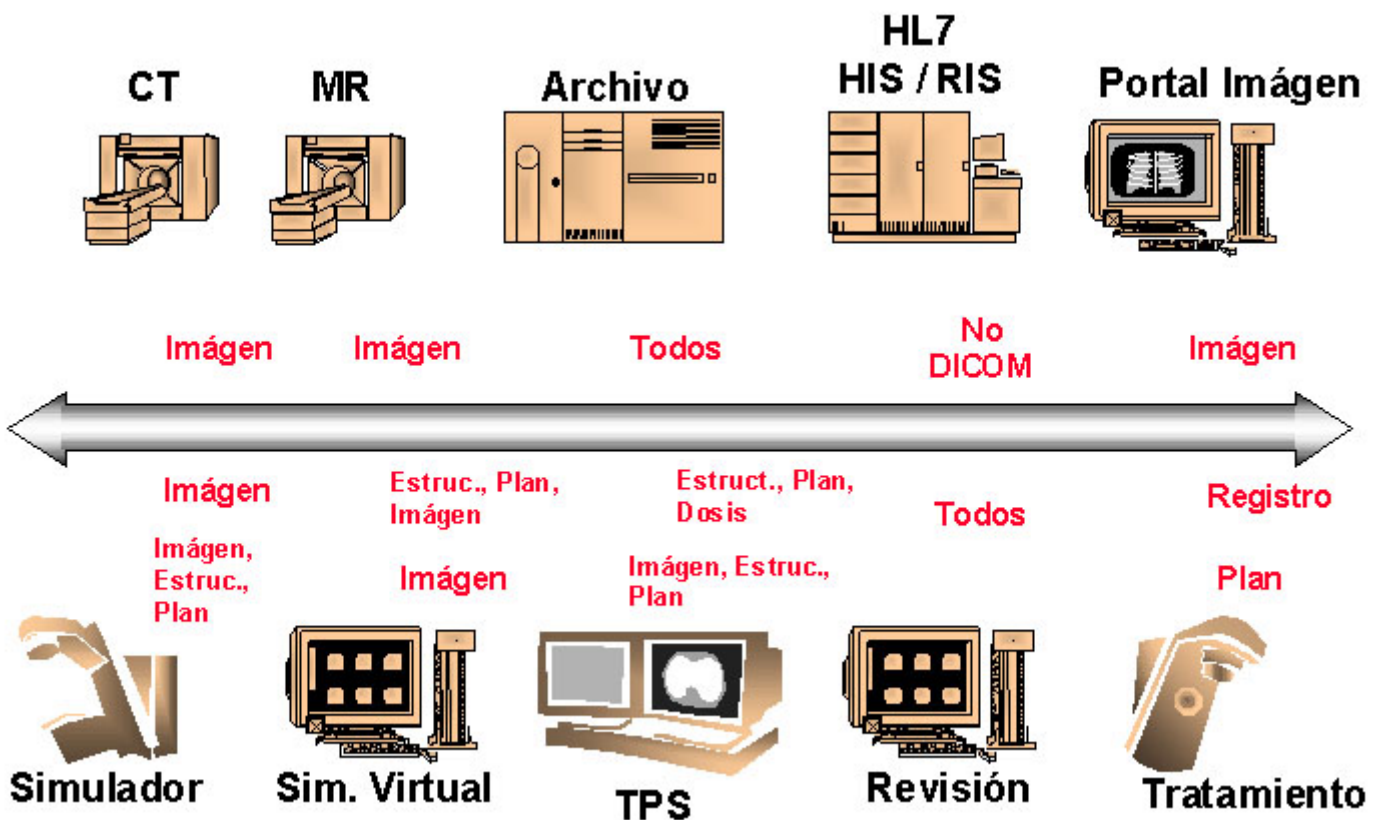


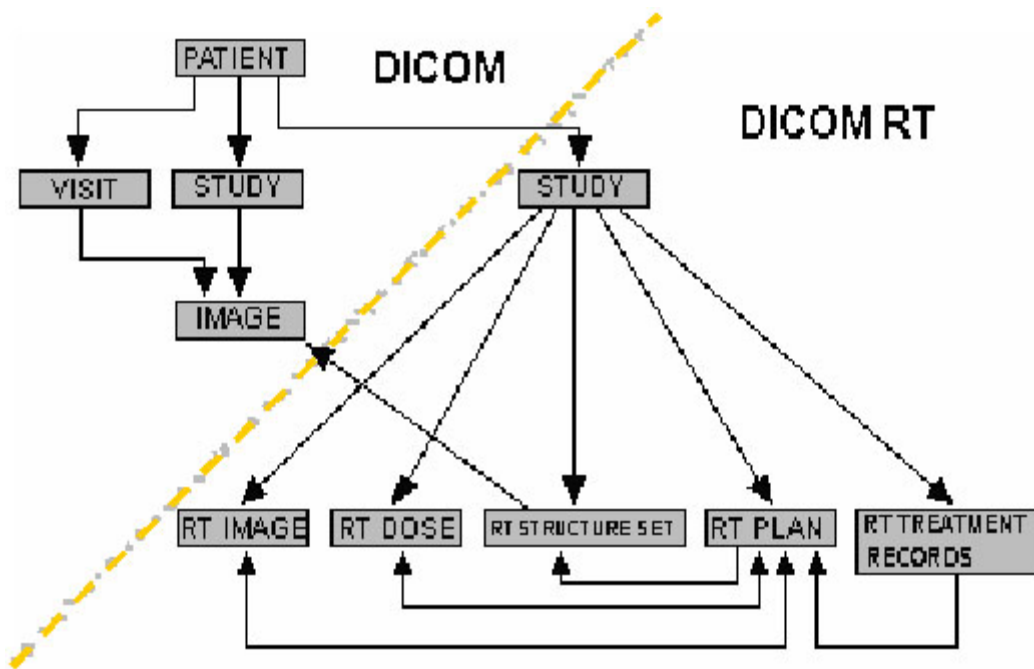
## Objetos De Información En Radioterapia



## Integración en Radioterapia – Situación Típica

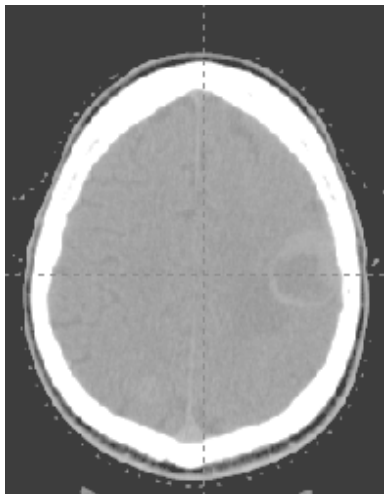


## DICOM – Ejemplo En La Radioterapia

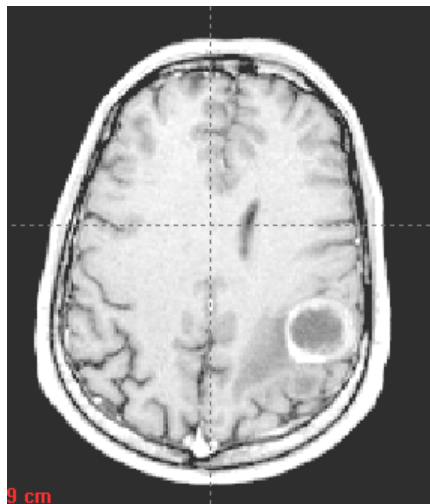


## DICOM: Ejemplo En La Radioterapia

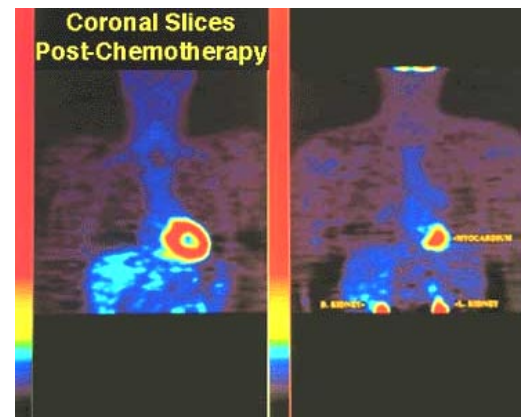
### 1. Adquisición de Imágenes de Estudio



**CT**

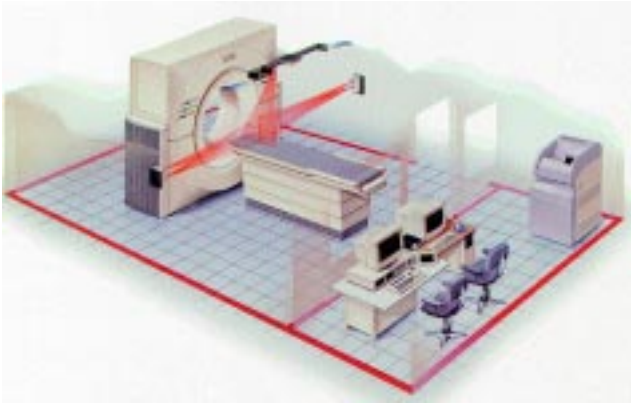


**RFI**



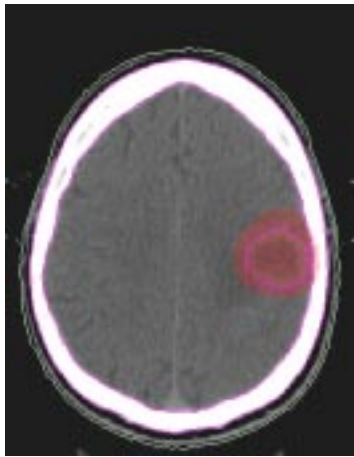
**PET**

## 2. Simulación Virtual



Se requiere CT con DICOM

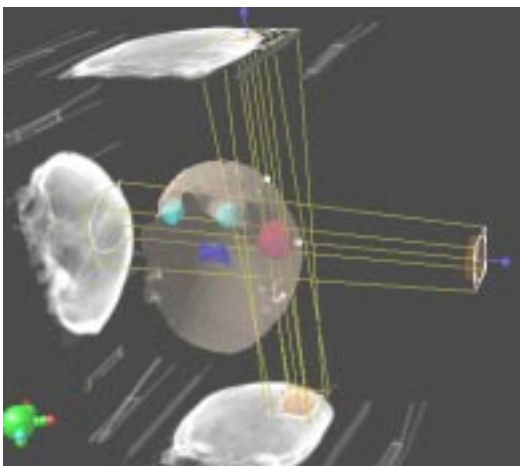
Recibe las imagenes y realiza la Simulación Virtual



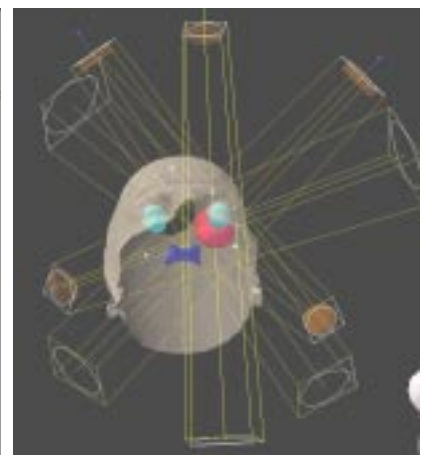
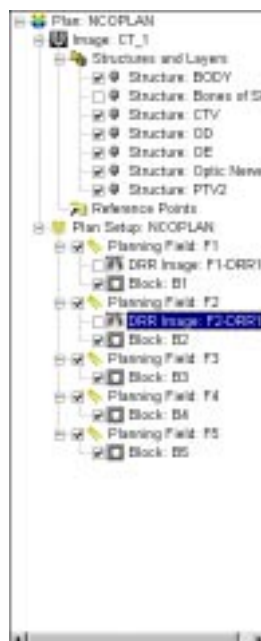
**Objeto:** conjunto de estructuras

## 2. Simulación Virtual

Son también creados los objetos:



**Objeto:** Imagenes de RT (DRR)



**Objeto:** Plan

### 3. Sistema De Planeamiento

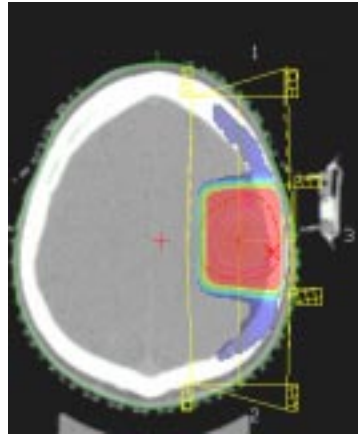
Lee los Objetos: Imágenes del CT, MR, PET

Conjunto de estructuras

Plan de RT

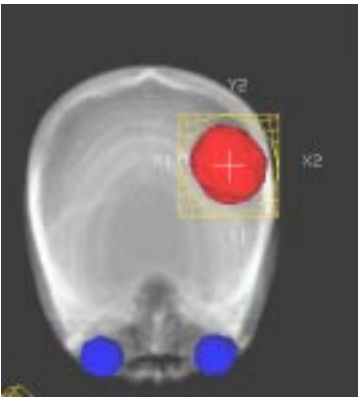
Adiciona: Modificadores del haz

Calcula datos de dosimetría

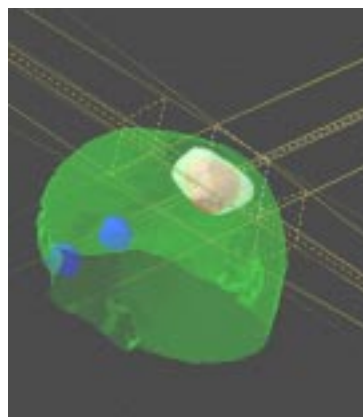


Dosis

Crea nuevos Objetos:



Imágenes de RT (DRR)



Plan de RT

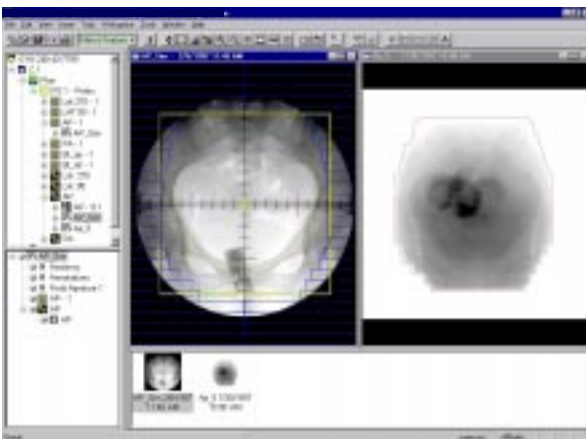
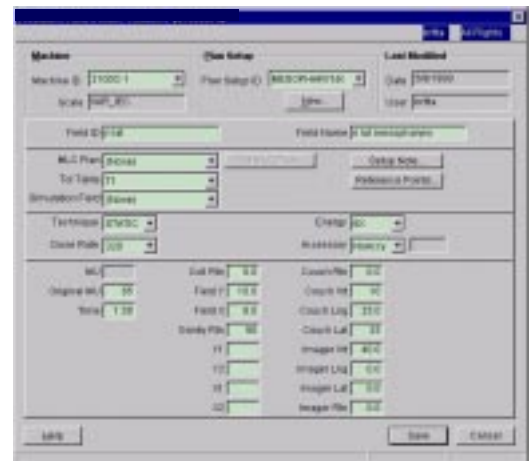
### 4. Sistema rv

Obtiene el objeto plan RT

Utiliza datos para iniciar el

tratamiento o el AL utiliza

directamente el Objeto



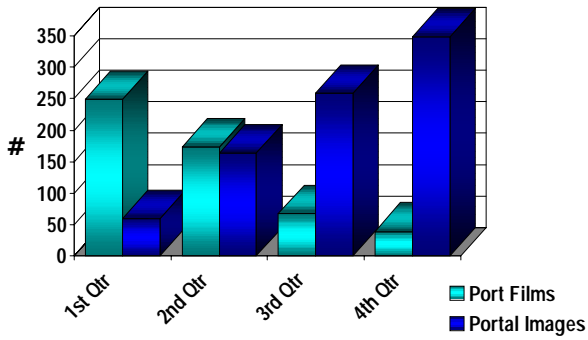
Objetos de Imágenes RT



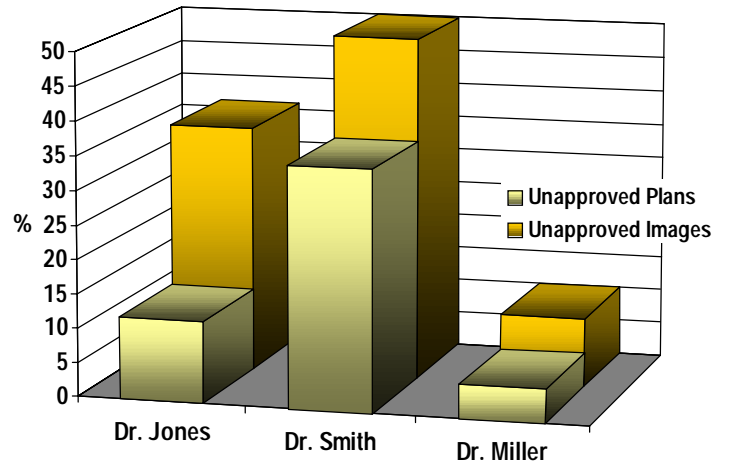
EPID

## 5. Curso Del Tratamiento

### Portfilm versus Portal Images

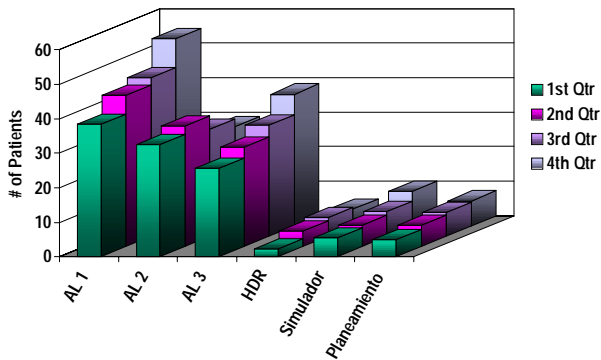


### Aprobación Médica

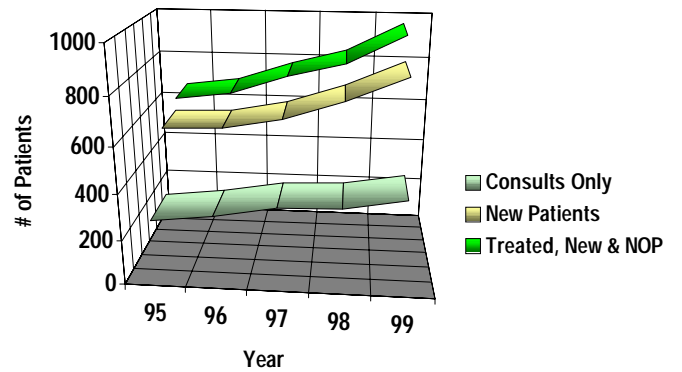


## Objetos del registro del tratamiento

### Tratamientos por Equipo



### Appointment Type



## DICOM - RT

- Describen la mayoría de los datos en RT
- Las compañías están adoptando un mismo padrón
- DICOM es apropiado para la comunicación
- DICOM puede ser usado como un modelo de datos

## **DICOM RT Restricciones**

- **DICOM no maneja todos los datos:**
  - **Administrativos**
  - **Agendas (Equipo, grupo)**
  - **Anotaciones, notas médicas**
  - **Quimioterapia, Dietas, Recetas Farmaceuticas**
  - **Cobranza**
  - **Datos relacionados con Control de Calidad (datos dosimétricos)**



# COLIMADOR DE MÚLTIPLAS FOLHAS MLC



Cineo © Aceleradores Cineo 23EX Interior

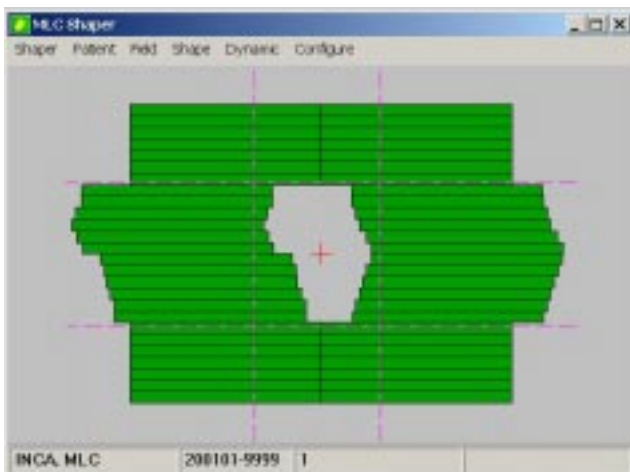
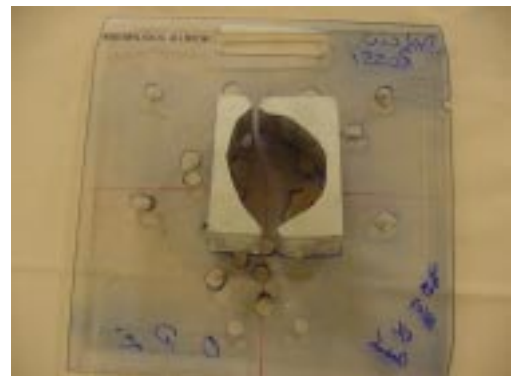


COPYRIGHT ©1999 VARIAN MEDICAL SYSTEMS

## Introdução:

### BLOCOS:

- fabricação: trabalhosa
- consome tempo
- metais: eliminação de pó e gases
- blocos pesados: manuseio difícil
- reprodutibilidade: possíveis deslocamentos



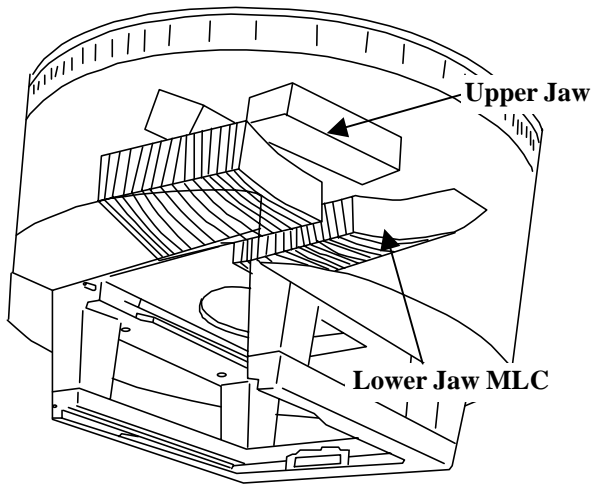
### MLC:

- lâminas controladas por computador
  - substitui o bloco com vantagens
  - possibilita a modulação do feixe:
- Dynamic Conformal Therapy**  
**IMRT**

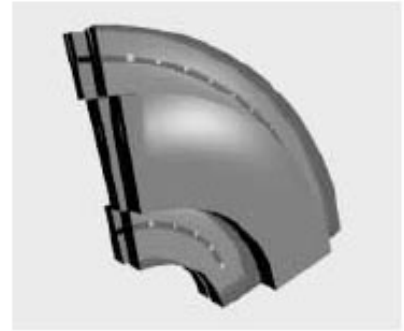


## Tipos de Mlc

**SIEMENS**



**DOUBLE-FOCUSED**



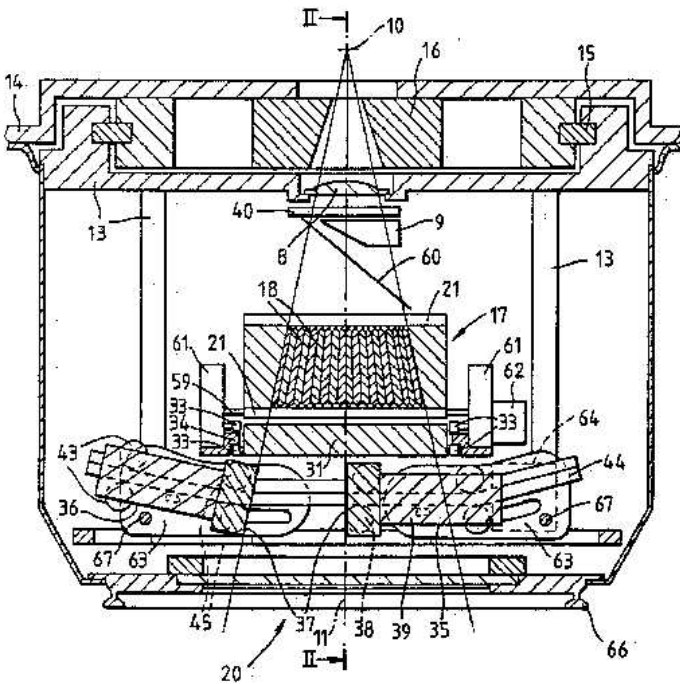
**PRIMUS MLC bearing technology**



**Siemens large MLC field**

## Tipos de Mlc

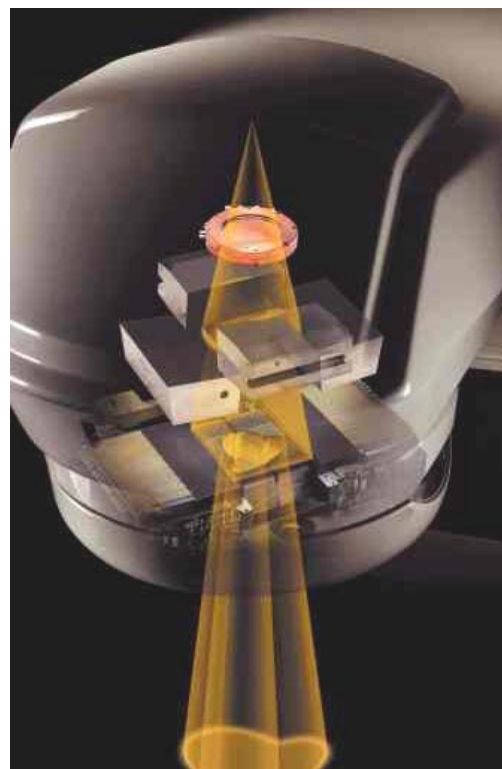
**ELEKTA**



**DOUBLE-FOCUSED**

## Mlc Millenium - Características

Model	No. Leaves	Field Size	Leaf Widths @ Isocenter
Millennium MLC-120	120	40 x 40 cm <sup>2</sup>	Central 20 cm of field: 0.5 cm Outer 20 cm of field: 1.0 cm
Millennium MLC-80*	80	40 x 40 cm <sup>2</sup>	1 cm
Millennium MLC-52**	52	26 x 40 cm <sup>2</sup>	1 cm
BrainLab m3™	52	10 x 10 cm <sup>2</sup>	3.0 mm, 4.5 mm and 5.5 mm
* Upgradeable in field to MLC-120			
** Upgradeable in field to either MLC-80 or MLC-120			

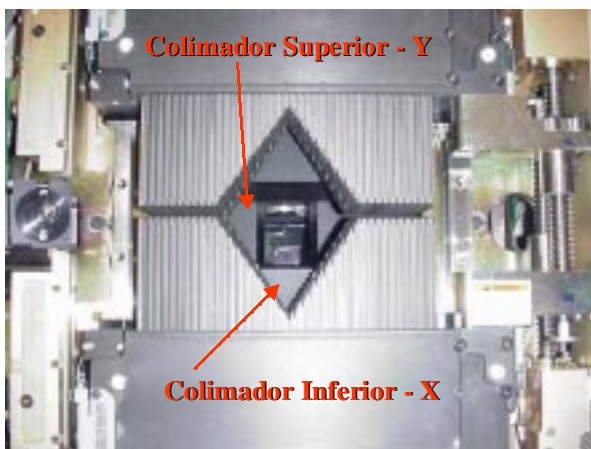
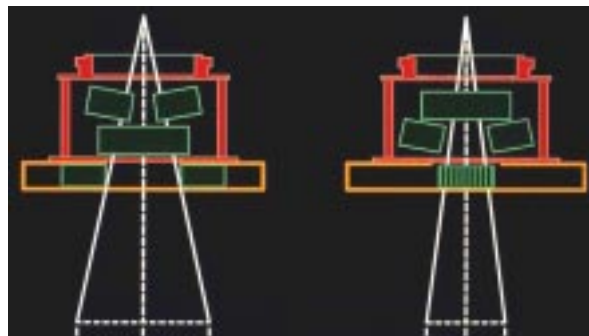
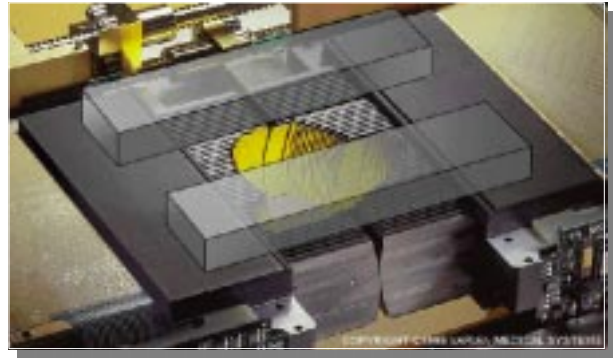


## Mlc - Características: Standard E Millennium

Feature	Standard MLC	Millennium MLC
Highest Resolution	1 cm, on 52 & 80	1 cm, 52 & 80; 0.5 cm, 120
Over-center Travel	16 cm past midline	20 cm past midline
Leaf Extension from Bank	14.5 cm	15.0 cm
MLC Head Diameter		Reduced by 10cm

## MLC - MILLENNIUM

- Dois pares de colimadores primários (X and Y)
  - Todas as lâminas são blindadas por DOIS conjuntos completos de colimadores primários
  - MLC/sistema de colimação primário - satisfazem a especificação IEC de  $<0.5\%$
  - MLC/sistema de colimação primário - suportam cálculo dosimétrico linear



**120 LÂMINAS**

## Posicionamento Das Lâminas

- Movimento linear
- Tolerância da posição da lâmina
- 1.0 mm precisão
- 0.5 mm reprodutibilidade
- Dois sensores de posição, independentes e redundantes
- motor encoders
- linear encoders
- Frequência de verificação da posição da lâmina
- verificação com o planejado: a cada 50 ms



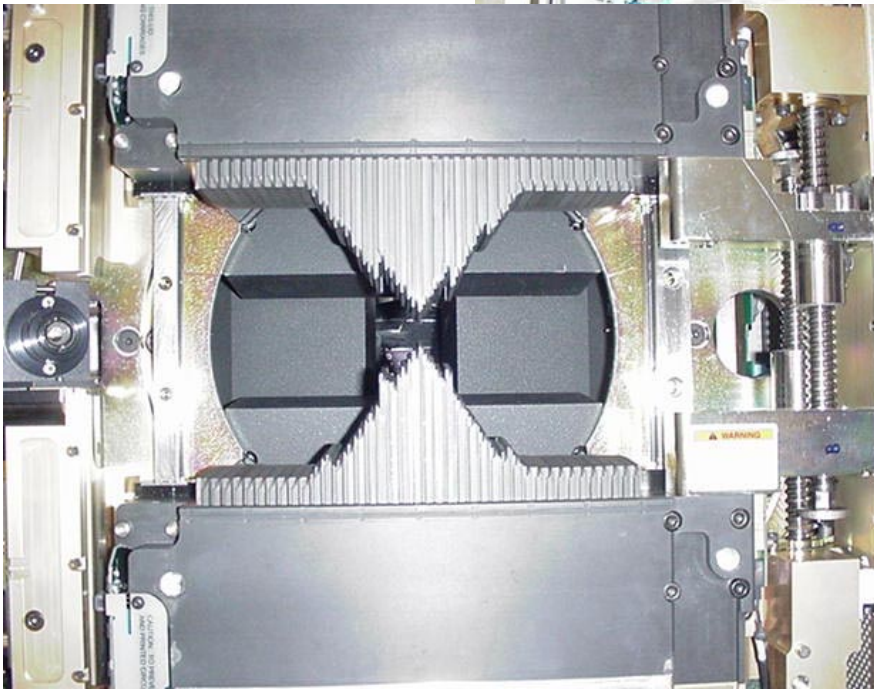
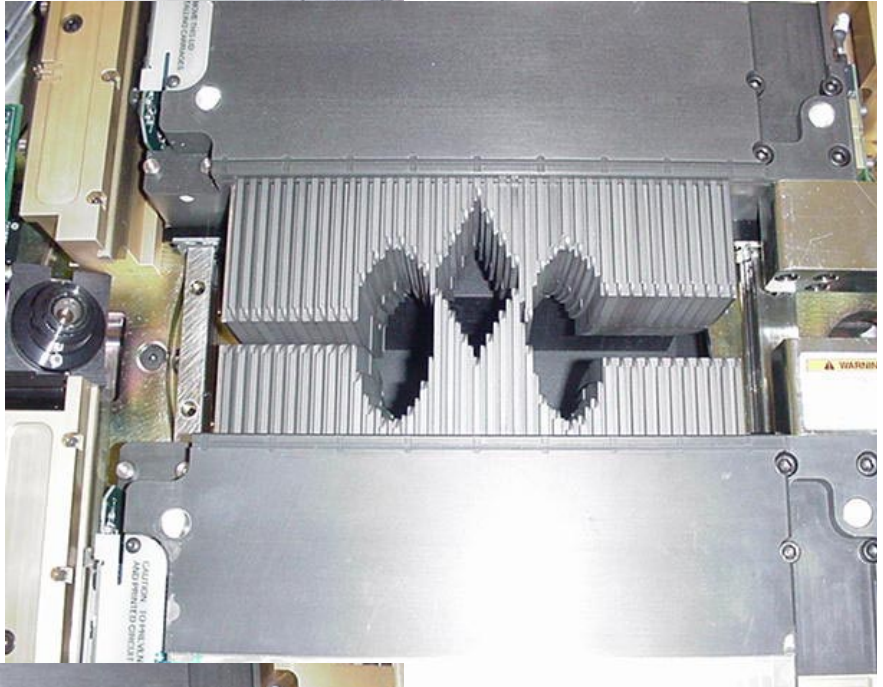
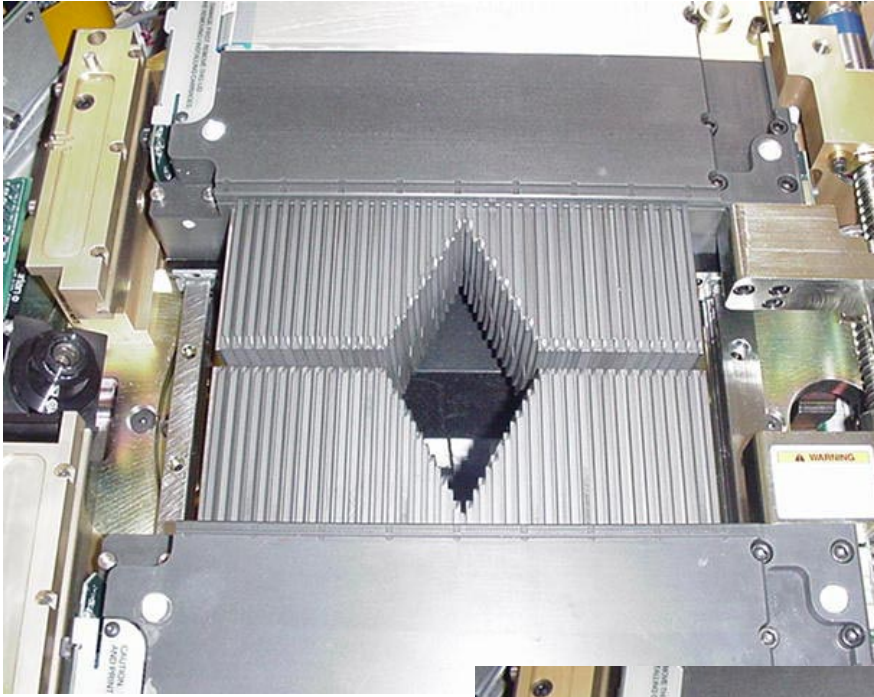
Velocidade máxima da lâmina: 2,5 cm/seg no isocentro

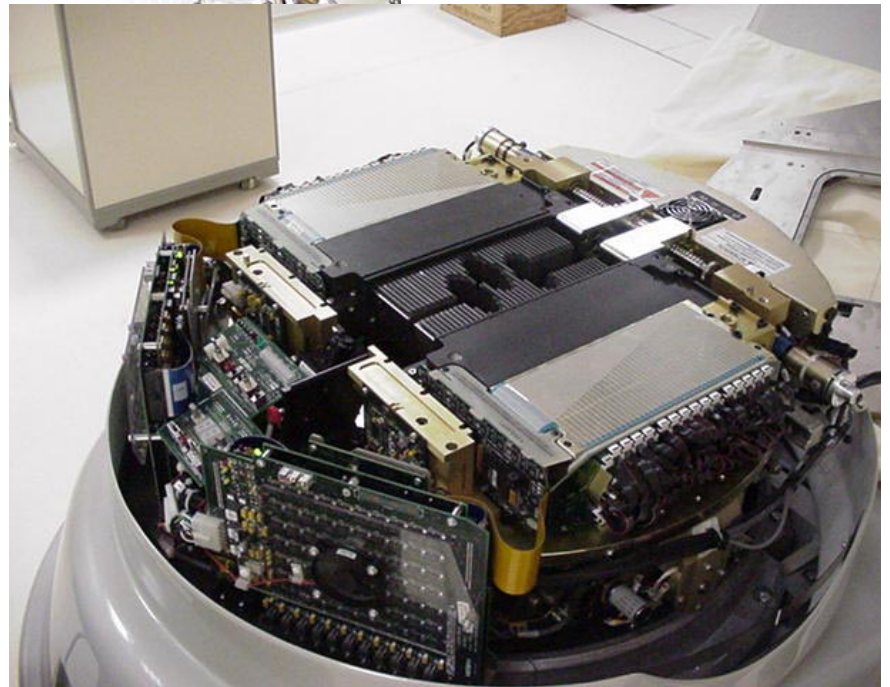
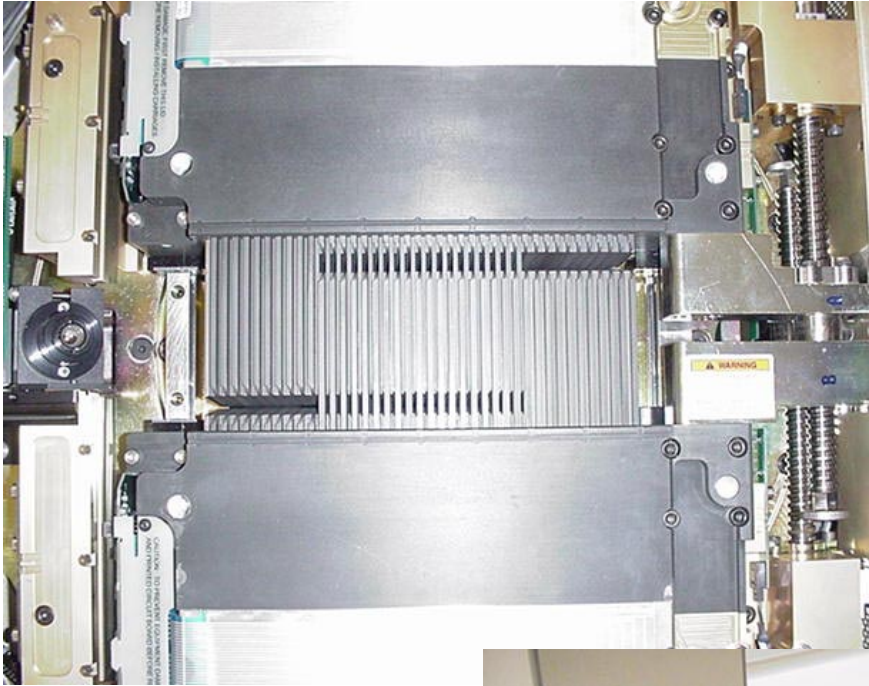
## MLC



**Espessura da lâmina – 60.0 mm**  
**Material – liga 90% tungstênio**

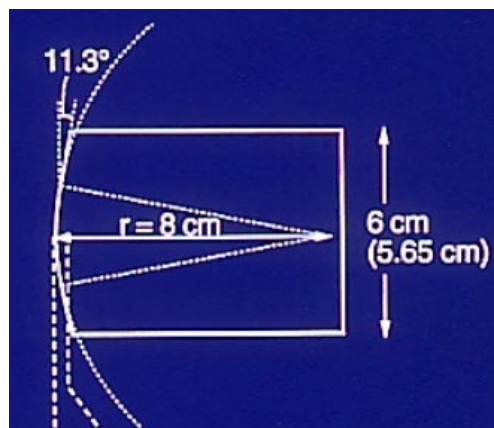


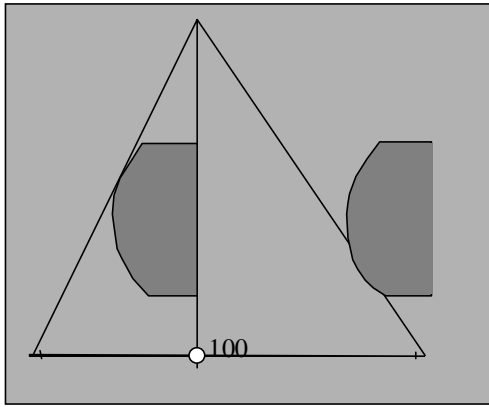




## Desenho Da Lâmina

- Penumbra pequena e constante ao longo do campo máximo 40x40cm
- Simples e preciso

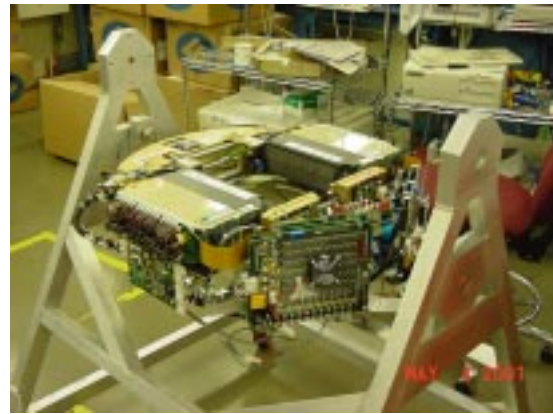
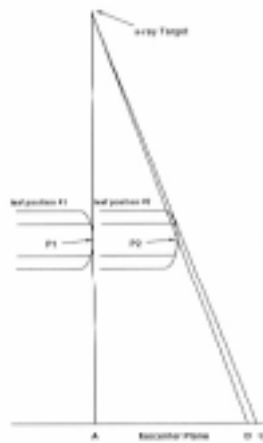




**Coincidência com campo luminoso = 1mm**

**Tamanho campo: controlado por software**

### Campo Luminoso - Penumbra



### Penumbra

