



**TÉCNICO  
LISBOA**

# LINEAR ACCELERATOR

control room  
working area  
and bunker entrance



Control room.  
In front it is possible to see  
a view of the concrete shielding  
wall of the electron accelerator



View of part of the  
cooling system where  
the primary circuit  
transfers heat to the  
secondary circuit



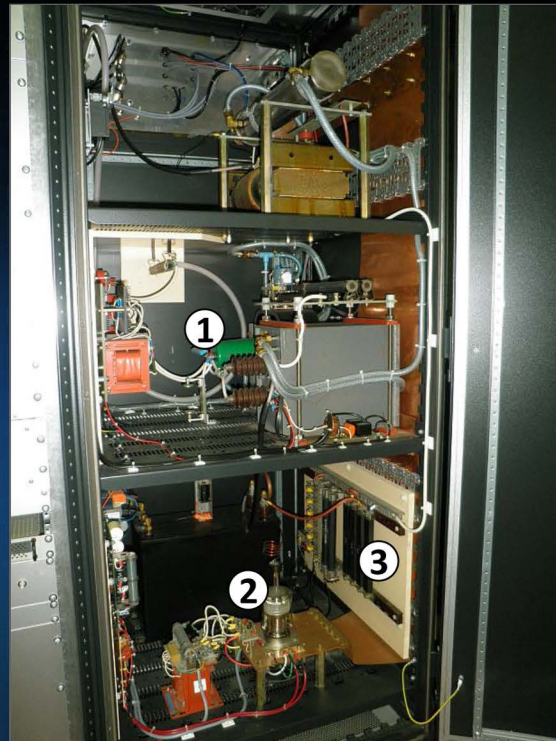
View of the  
bunker entrance



TÉCNICO  
LISBOA

# LINEAR ACCELERATOR

modulator



1 - Magnetron (3 GHz)

2 - Thyatron

3 - Pulse Forming Network

The radiofrequency for electron acceleration is produced by high voltage pulses (20 - 30 kV) applied to the magnetron

Pulsed frequency (10 - 300 Hz) is delivered by the thyatron (high energy electrical switch)

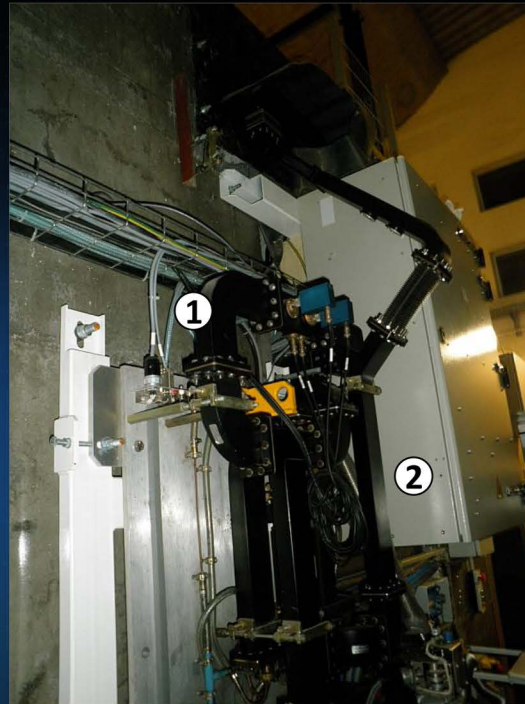
The thyatron discharges the accumulated energy of the PFN capacitors and triggers the magnetron



TÉCNICO  
LISBOA

# LINEAR ACCELERATOR

waveguide  
electron gun



1 - Waveguide

2 - Electron gun

The radio frequency (RF) produced in the magnetron is sent to the accelerator through a RF waveguide system

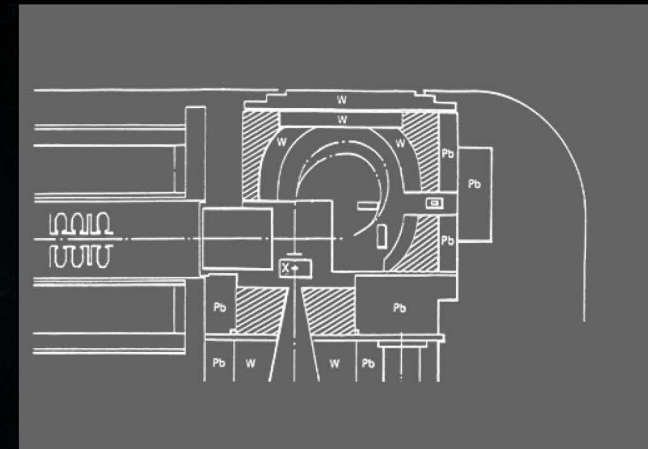
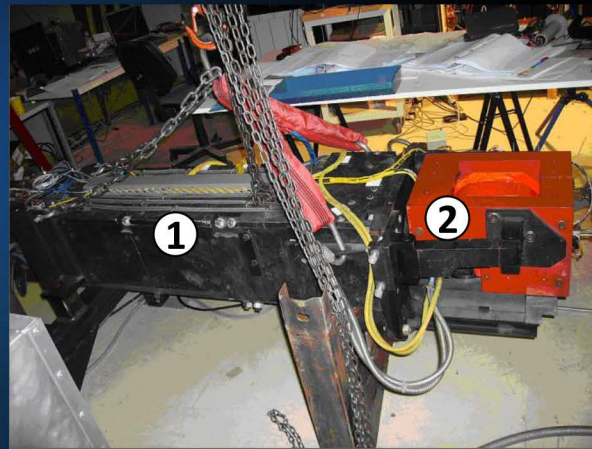
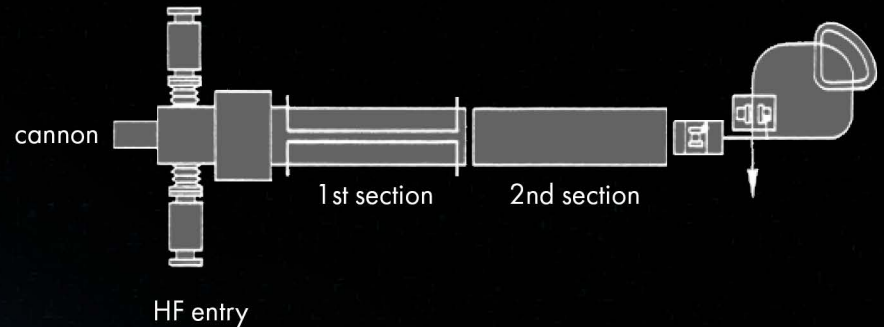
Electrons are produced by heating a tungsten filament (electron gun)

The RF is injected into the waveguide where electrons are accelerated, focused and guided by electromagnets



# LINEAR ACCELERATOR

acceleration section



- 1 - Acceleration section; RF injected in two points (grouping electrons and increasing their energy)
- 2 - Bending electromagnet ( $270^\circ$ ); target manifold for X-ray production (in a tungsten target)



TÉCNICO  
LISBOA

# LINEAR ACCELERATOR

Electron beam  
Photon beam  
(tungsten target)



Acceleration section  
top view



Beam exit