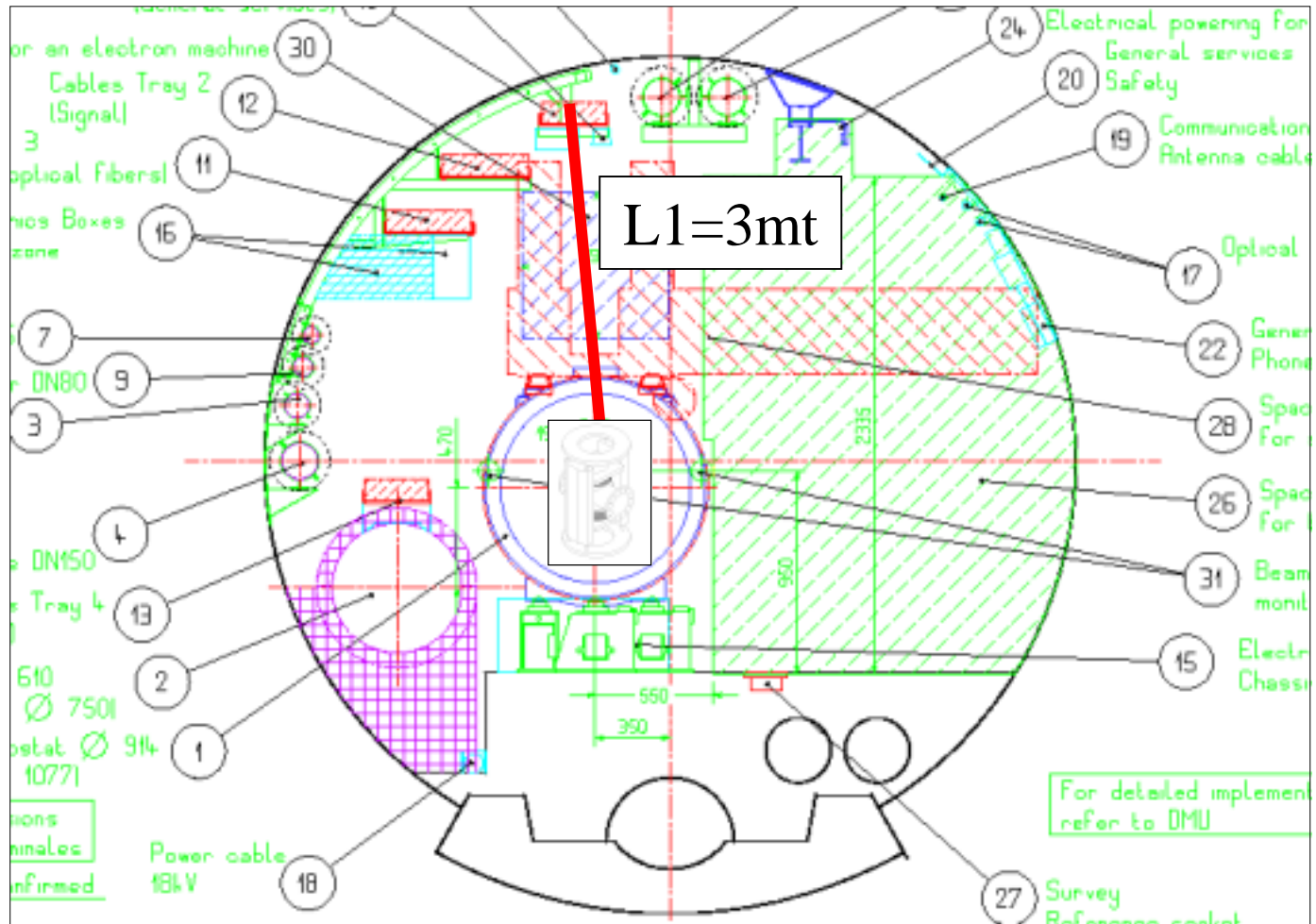
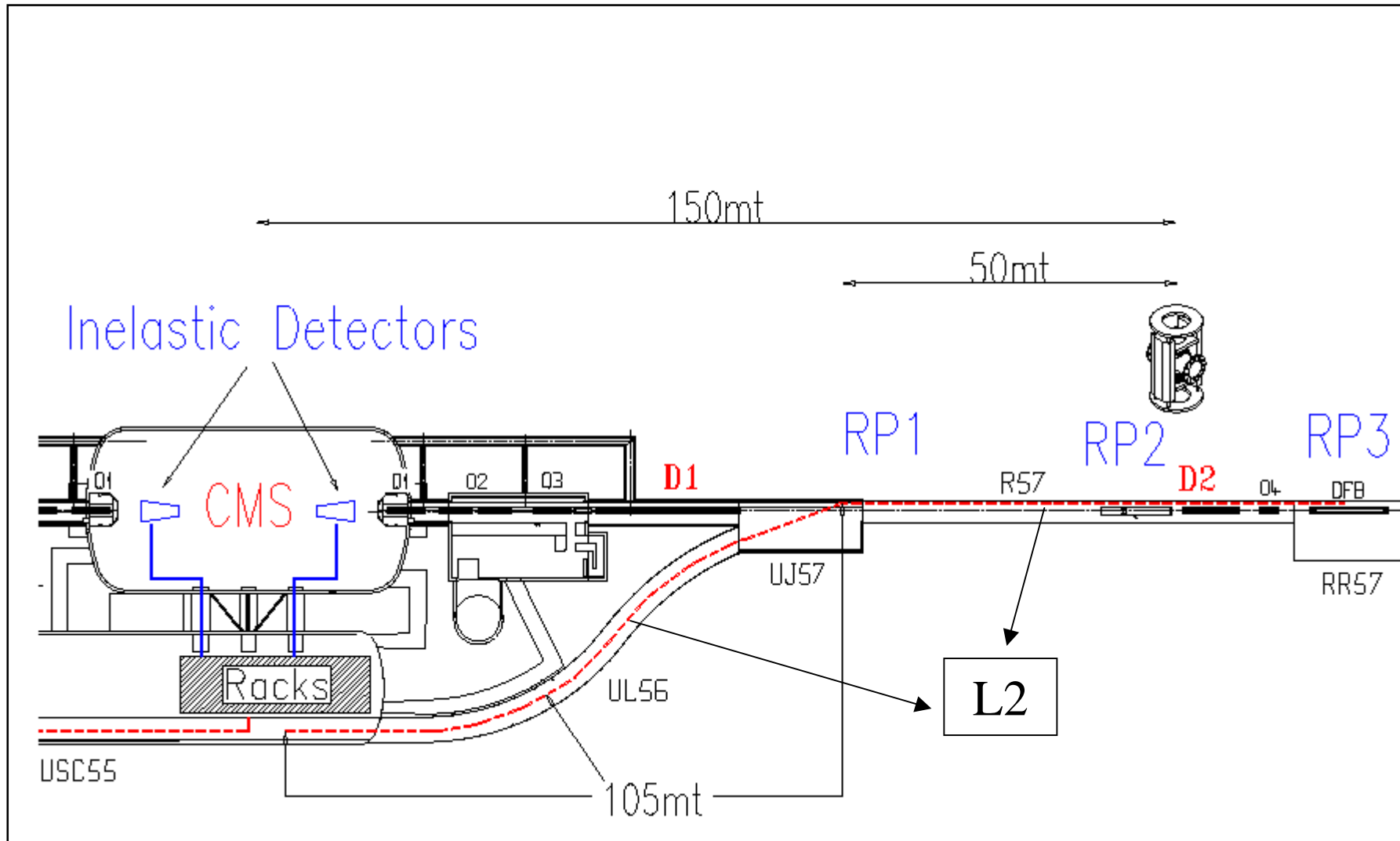


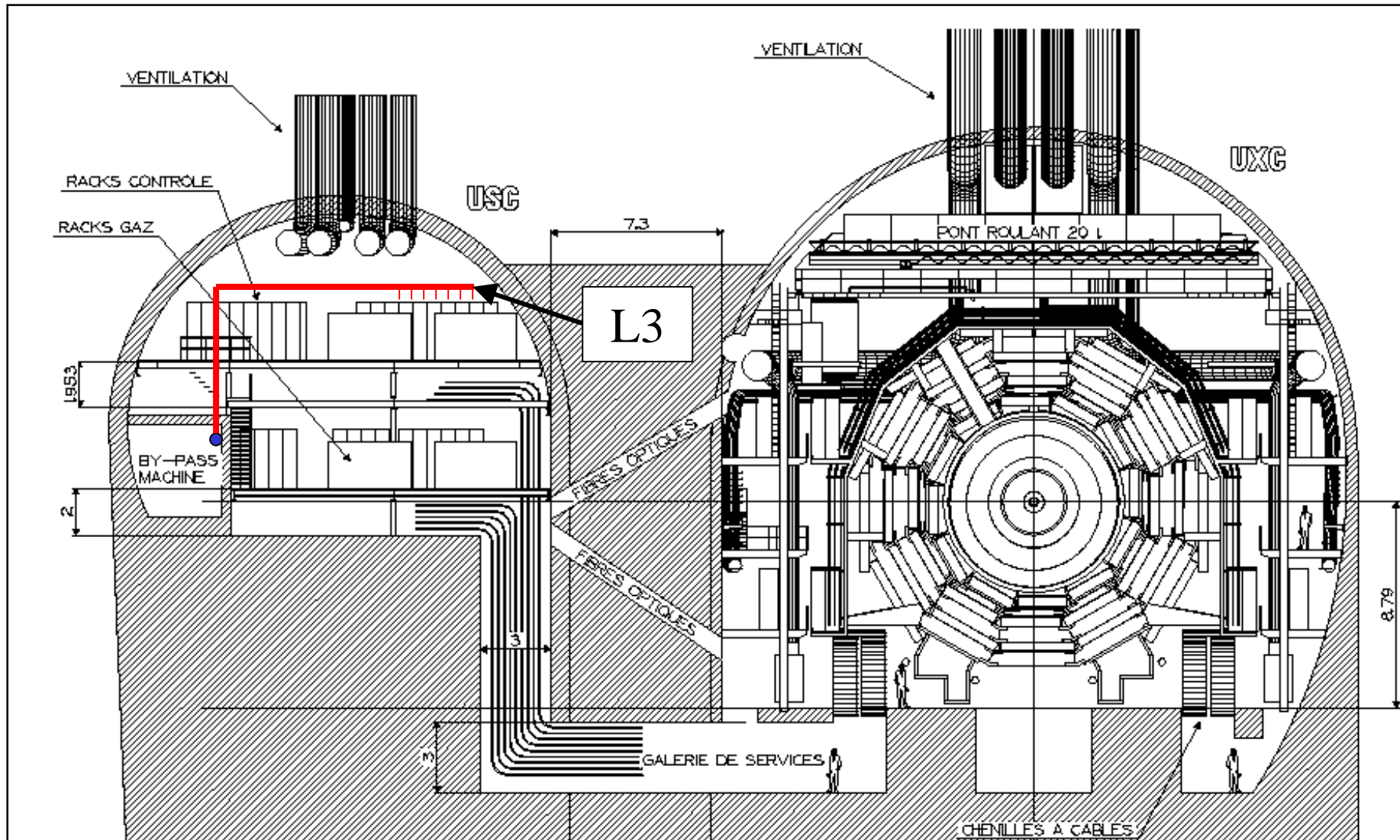
# From the Roman Pot to the cable tray: L1=3mt



$L2 = \text{Machine Tunnel} + \text{By Pass tunnel} = \text{distance from IP} + 5\text{mt}$



From By pass tunnel to Racks in USC : L3= 15mt



Length of trigger cables  $L_{tr} = L1 + L2 + L3$

Roman Pot 1: Z position from IP = 112mt

$$L_{tr} = 3\text{mt} + (112+5)\text{mt} + 15\text{mt} = \mathbf{135\text{mt}}$$

Roman Pot 2: Z position from IP = 150mt

$$L_{tr} = 3\text{mt} + (150+5)\text{mt} + 15\text{mt} = \mathbf{173\text{mt}}$$

Roman Pot 3: Z position from IP = 182mt

$$L_{tr} = 3\text{mt} + (182+5)\text{mt} + 15\text{mt} = \mathbf{205\text{mt}}$$

Roman Pot 4: Z position from IP = 215mt

$$L_{tr} = 3\text{mt} + (215+5)\text{mt} + 15\text{mt} = \mathbf{238\text{mt}}$$

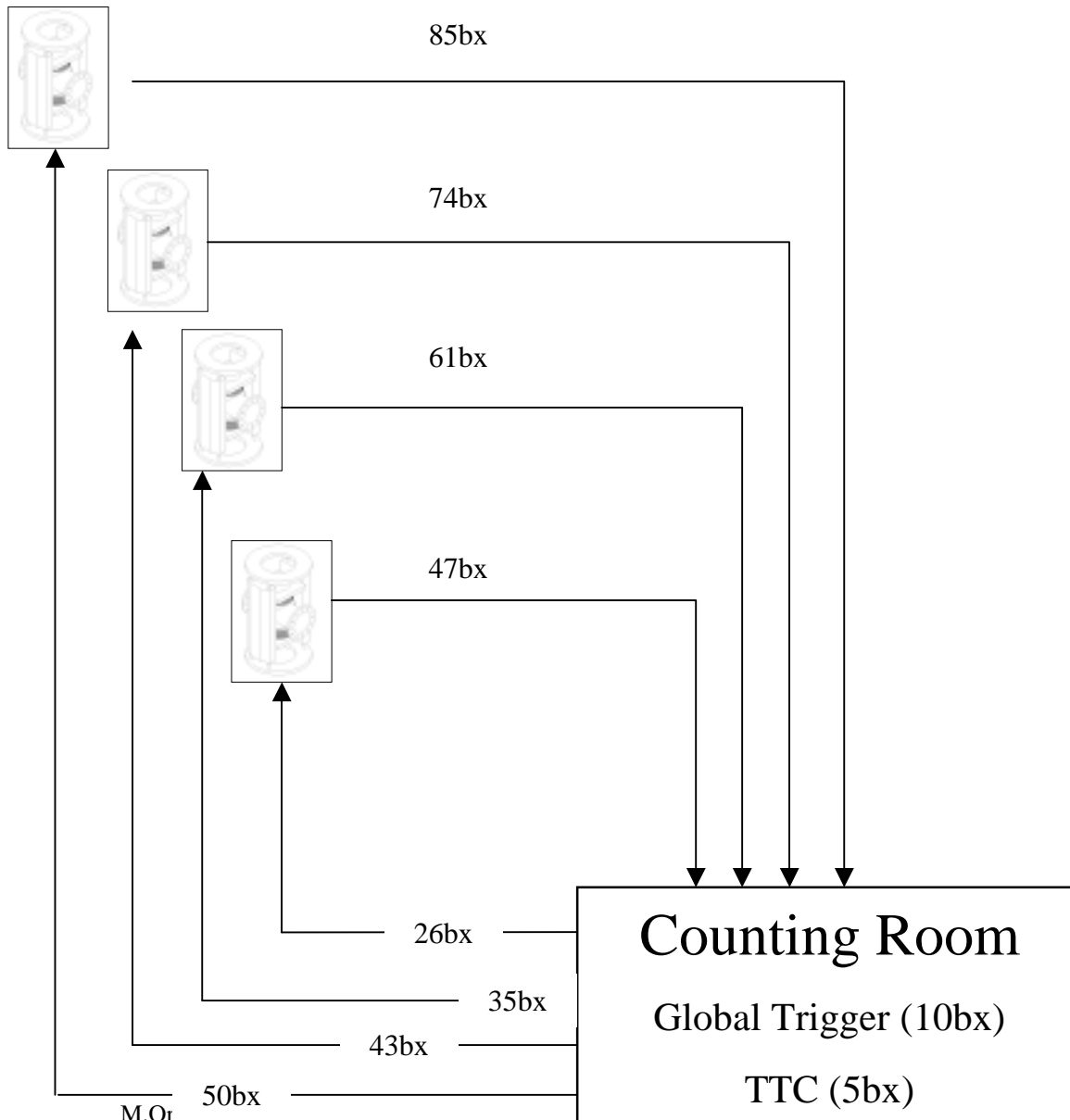
# Latency Budget

	Roman Pot 1 Z = 112mt	Roman Pot 2 Z = 150mt	Roman Pot 3 Z = 182mt	Roman Pot 4 Z = 215mt
Time of flight	15bx	20bx	25bx	29bx
Propagation Time	1bx	1bx	1bx	1bx
Trigger Primitive Generation	5bx	5bx	5bx	5bx
Cable Runs to the counting Room*	26bx (135mt)	35bx (173mt)	43bx (205mt)	50bx (238mt)
Global Trigger	10bx	10bx	10bx	10bx
Timing, Trigger & Control	5bx	5bx	5bx	5bx
Cable Runs Back *	26bx (135mt)	35bx (173mt)	43bx (205mt)	50bx (238mt)
TOTAL	88bx	111bx	132bx	150bx

\*Optical Fiber delay, 5ns/m

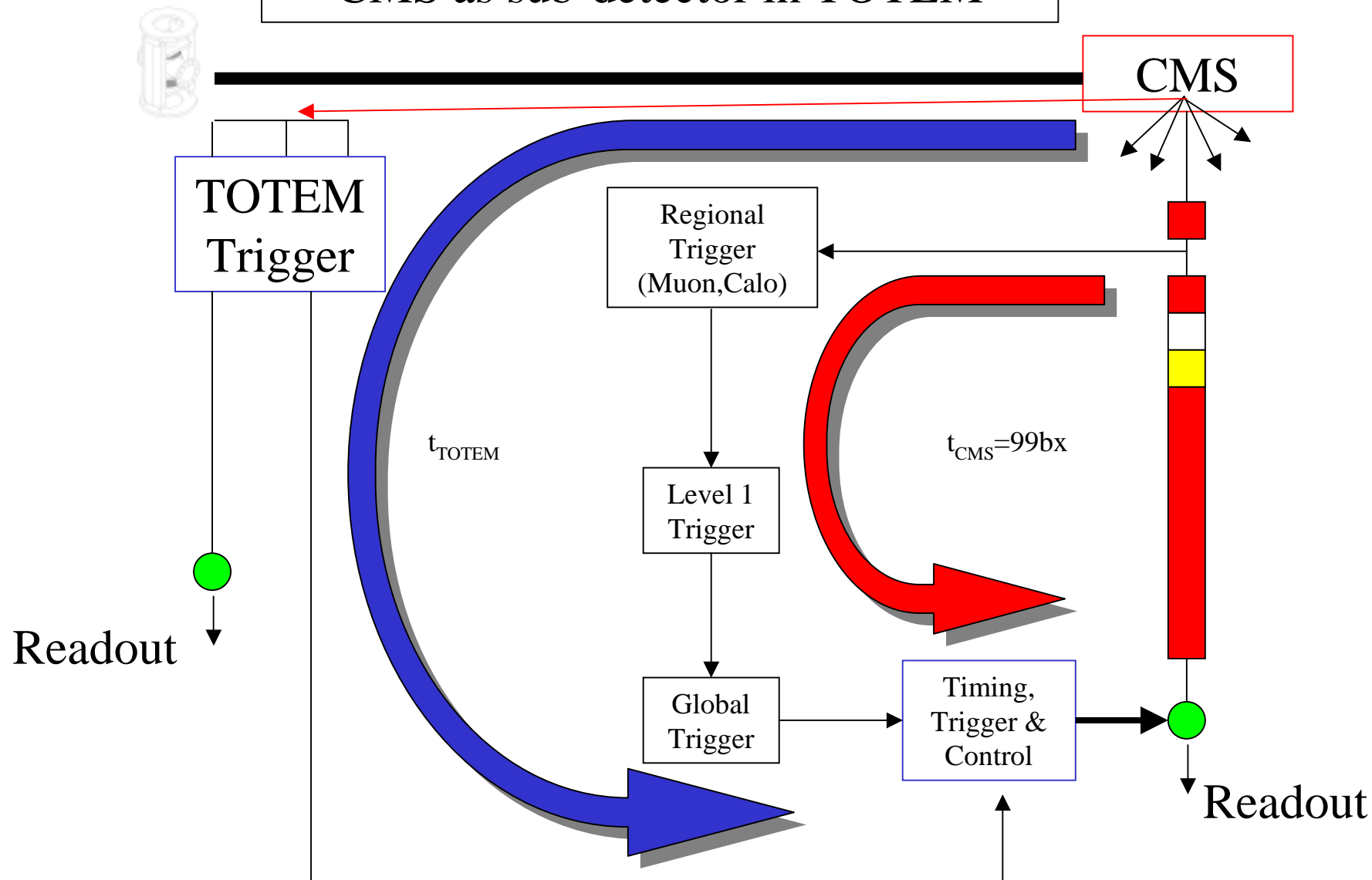
1bx = 25ns

# Latency Budget



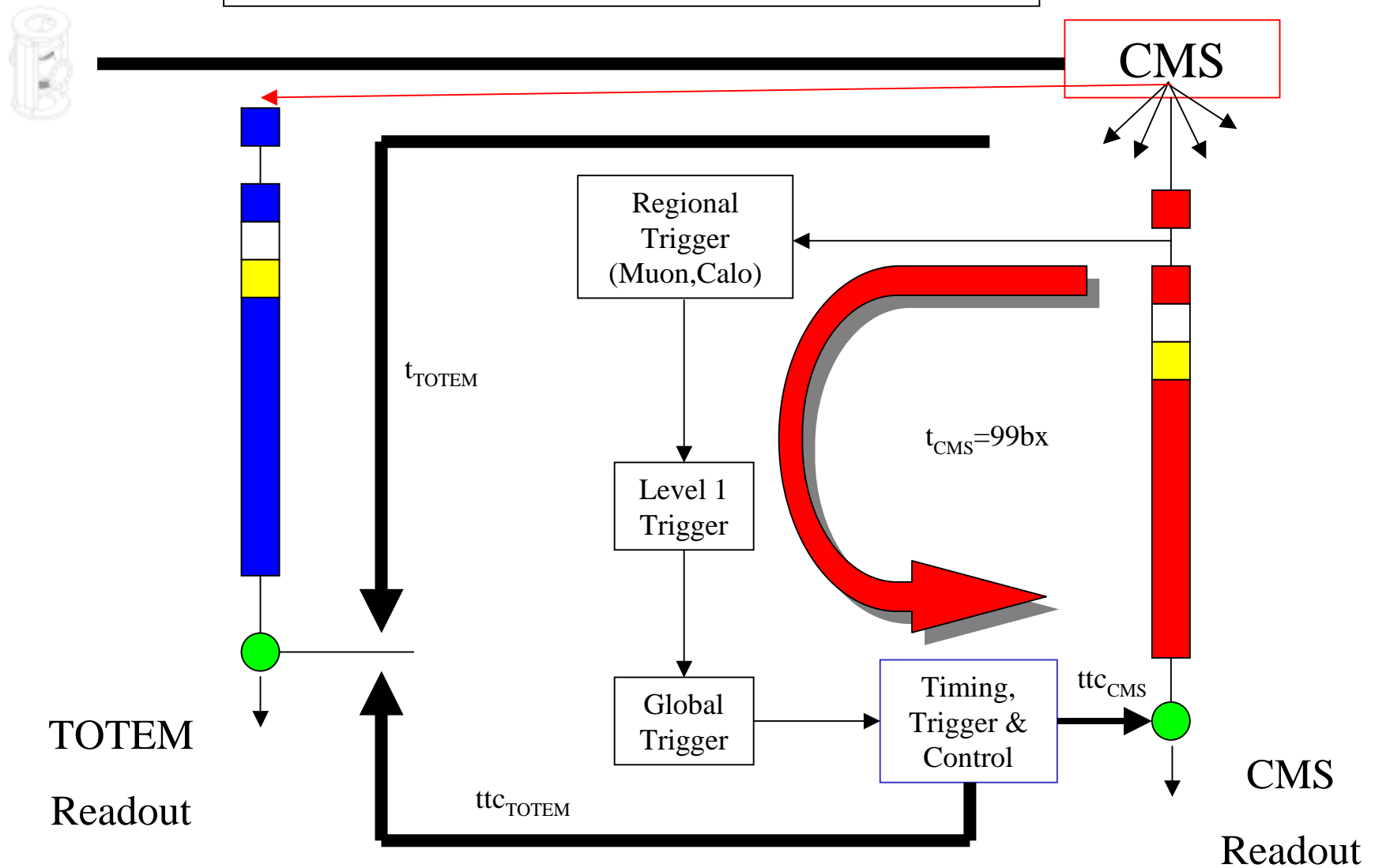
RP1	88bx
RP2	111bx
RP3	132bx
RP4	150bx

# CMS as sub-detector in TOTEM



$$t_{TOTEM} < t_{CMS} = 99bx (2.5\mu s)$$

# TOTEM as sub-detector in CMS



$$t_{\text{TOTEM}} + \text{ttc}_{\text{TOTEM}} = t_{\text{CMS}} + \text{ttc}_{\text{CMS}} = 128\text{bx} (3.2\mu\text{s})$$