STATUS OF HIGH POWER RF FOR CTF3

G.McMonagle AB/RF

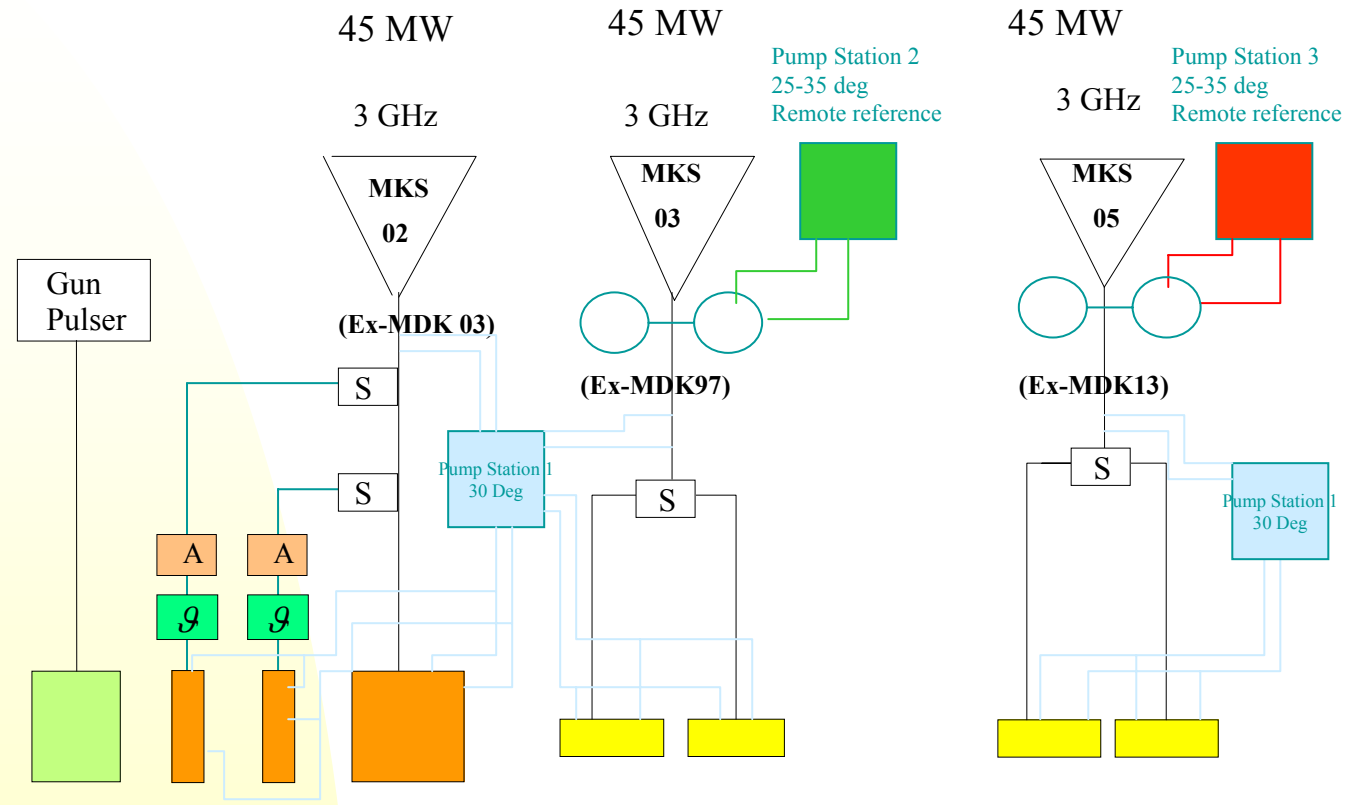
Introduction

- The goal for the high power RF is to have 10 S-Band klystron modulator systems and 2 L-Band klystron modulators to be installed in the CTF3 machine following defined installation planning

Brief Overview

- What has been installed so far for start up next week
- Installation preparations from now until April 2004 and what still needs to be ordered
- Final Installations end 2004 and 2005
- Existing klystron stock,projected lifetime and spares

Klystrons for CTF3 in 2003 with water stabilization distribution

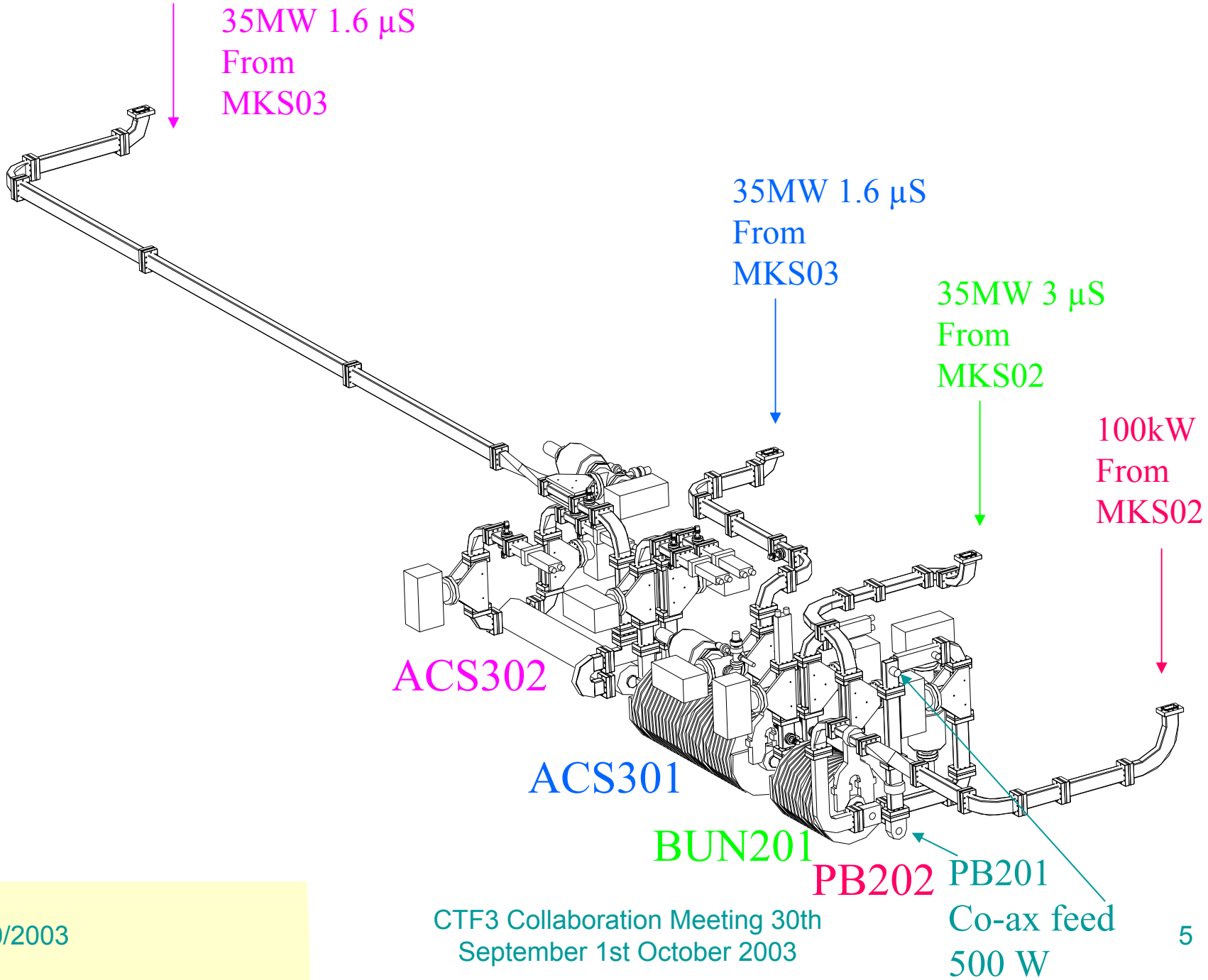


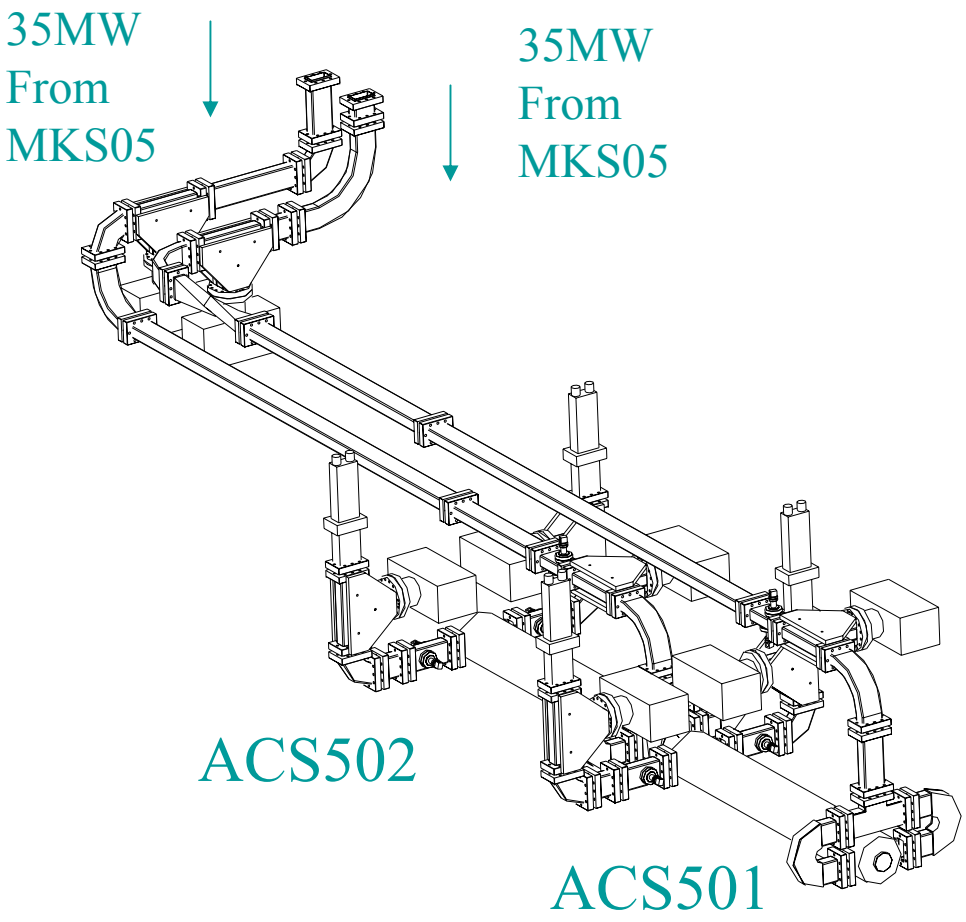
PB = Pre-Buncher

BUN = Buncher

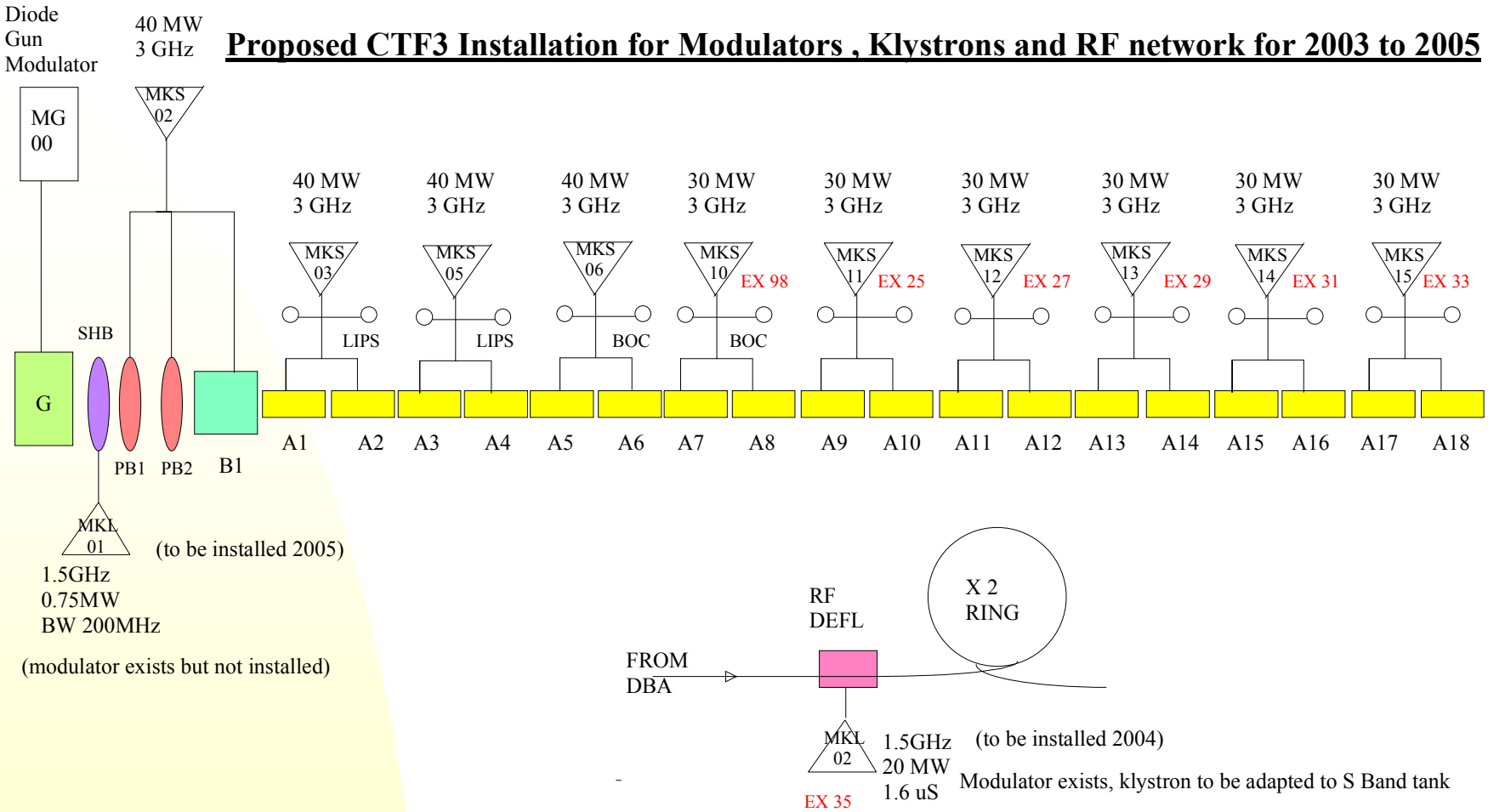
ACS = Accelerating structure

S = Power Splitter


35MW 1.6 µS
From
MKS03
35MW 1.6 µS
From
MKS03
35MW 3 µS
From
MKS02
100kW
From
MKS02
ACS302
ACS301
BUN201
PB202
PB201
Co-ax feed
500 W


35MW
From
MKS05
35MW
From
MKS05
ACS502
ACS501

Proposed CTF3 Installation for Modulators , Klystrons and RF network for 2003 to 2005



N.B. This Installation scenario assumes that we do not build a reserve modulator for testing purposes and that all tests on faulty equipment will be done in shutdown or to the detriment of available machine time

G. McMonagle AB/RF 07/08/03

NEXT PHASE

- Install the 14 other accelerating sections

1. Mock up of girder in lab to see if split can be done in tunnel rather than in gallery.Phase measurements etc.
2. Order waveguides for 7 girders
3. If split can be done in tunnel will save on waveguides and pumping ports (at least 15 less).
4. Urgent !! need to order pumping ports a.s.a.p.
5. If new high power loads not ready we need to order 12 more of existing type

- Change capacitors in PFN of remaining modulators for larger pulse width
- New support pillar for BOC on MDK98

NEXT PHASE (CONT.)

- Define and order water stations for pulse compressors.
- Need data from next run to finish temperature control spec for each pulse compressor
- New security interlock chassis to be built to incorporate all modulator systems in the one security chain

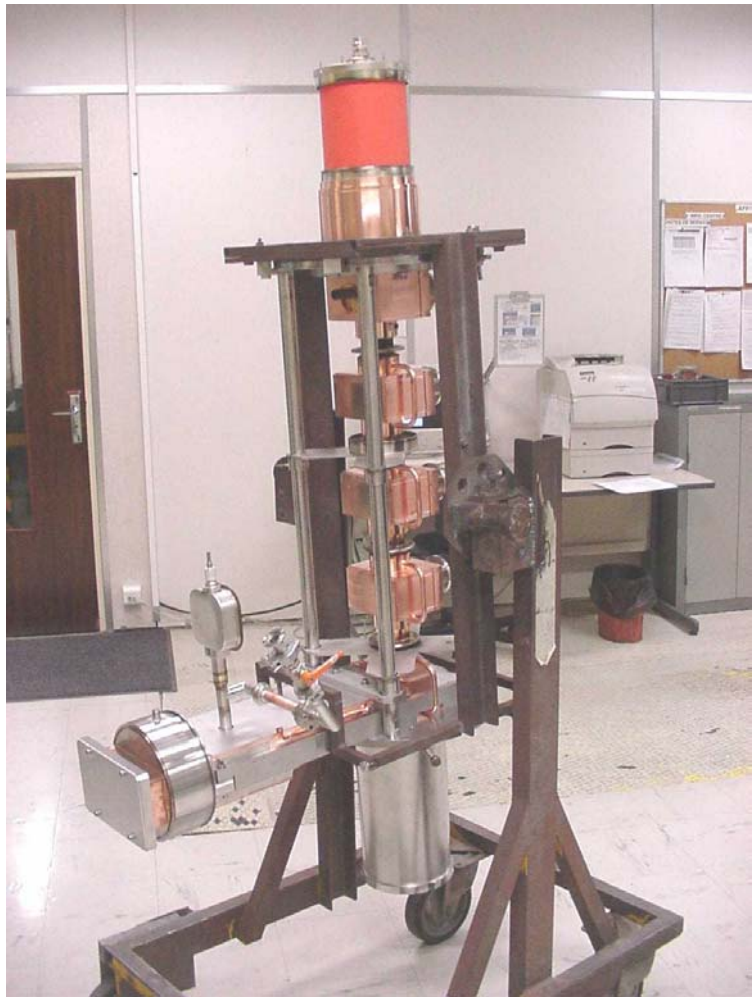
L-Band Klystrons

- One narrow band 20 MW ordered

1. Waveguide, RF window, load etc. Specifications ready for price enquiries
2. S-band Klystron tank to be modified, including new lead shielding
3. Focussing power supply to be ordered
4. Modulator exists

- Broad Band klystron specification ready. Invitation for tender will be out in next few weeks (Modulator exists)

TH2170 at Thales before bakeout



Upgrades and modifications

- New modulators using PLC controllers, can eventually be incorporated in existing modulators to replace multiple G64 µP
- Fast interlock cards designed 20 years ago, spare parts no longer available. New dual channel ADC, interlock levels programmable via PLC, faulty waveforms accessible via PLC, is being designed, dual channel prototype ready for assembly and first tests mid November (Pascal Fernier AB/OP)
- Study for controlling low level RF equipment using modulator PLC
- Modification of lead shielding on klystrons, requested by TIS, to reduce risk of personal injury during mounting and dismounting. 2 already done, need to order new pieces for the other 11 tanks

Klystron Situation

- At CERN we have 20 S- Band klystrons
- 4 TH2132 45 MW peak power
- 2 TH2094 35 MW peak power (not renewable)
- 1 TH2100 42 MW peak power
- 6 TH2100 37 MW peak power
- 7 YK1600 35 MW peak power (no manufacturer to repair these tubes)

Klystron Position and Hours

MODULATOR	KLYSTRON	Peak Power	No. Of Hours							
MKS02	TH2132 S.No.17	45 MW	16500							
MKS03	TH2132 S.No.21	45 MW	4820							
MKS05	TH2132 S.No.13	45 MW	8195							
MKS06	TH2132 S.No.22	45 MW	0		**HOT SPARES**					
				Klystron	**Peak Power**	**No. Hours**				
MDK98 (MKS10)				YK1600 S.No.5R	35 MW	16312				
MDK25 (MKS11)				TH2094 S.No.2R	35 MW	13620				
MDK27 (MKS12)				TH2094 S.No.9	35 MW	2843				
MDK29 (MKS13)				YK1600 S.No.12	35 MW	19677				
MDK31 (MKS14)				YK1600 S.No.11	35 MW	22036				
MDK33 (MKS15)				YK1600 S.No.4R	35 MW	41989				
				TH2100 S.No.8	37 MW	1463				
				TH2100 S.No.23	37 MW	28836				
				TH2100 S.No.11	37 MW	200 ?				
					SPARES					
				TH2100 S.No.24	37 MW	6900	Reconditioned at Thales			
				TH2100 S.No.10	37 MW	0				
				TH2100 S.No.7	37 MW	0				
				TH2100 S.No.40	42 MW	0				
				YK1600 S.No.6R	35 MW	0				
				YK1600 S.No.8	35 MW	1000	to be cleaned and retested, focal coil problem			
				YK1600 S.No.7	35 MW	?	RF breakdown on window, will try and clean and retest			
MDK35 (MKL02)	TH2170	20 MW	Delivery 2004							
MKL01	?	750 kW								

Conclusions

- Modulator situation OK, all components in stock
- Urgent – pumping ports, waveguides, loads etc to be defined a.s.a.p and orders to be generated for missing components to allow rest of LINAC to be installed 2004
- Urgent- temperature control for pulse compressors to be defined
- Klystron situation good for moment to be reviewed each year (no orders needed at moment based on estimation of max 2500 hours per year operation)
- Thyratron situation similar to klystron (1 piece per year should be continued)
- L –Band components for RF deflectors to be finalised with INFN, Frascati and ordered, delivery 2004
- SHB requirements in progress
- If a Thales tube needs to be put into Valvo tank, modifications to focal magnets and lead shilding necessary