

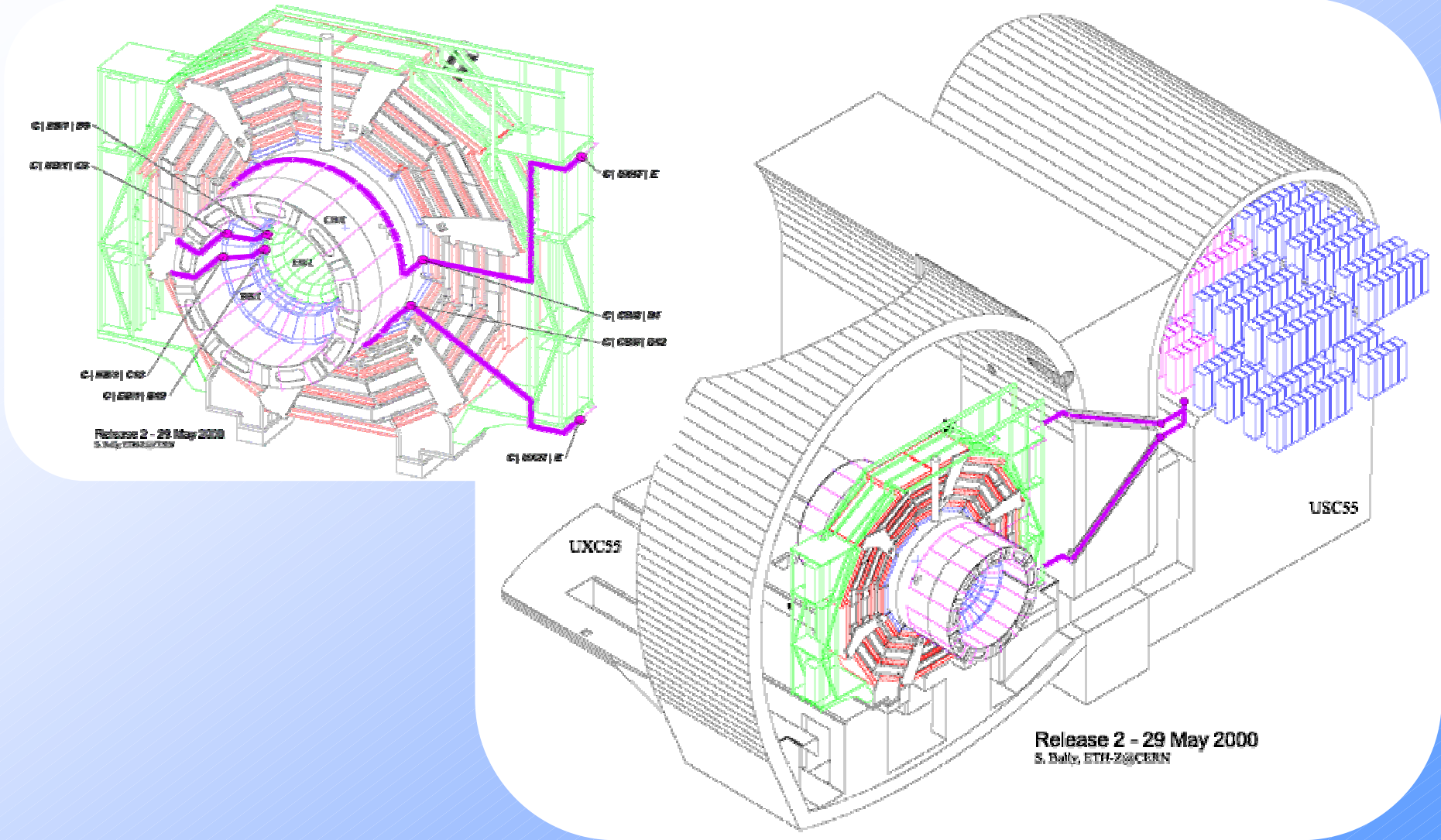
Cabling

Layout and Routing of Optical Fibres for the
CMS Tracker

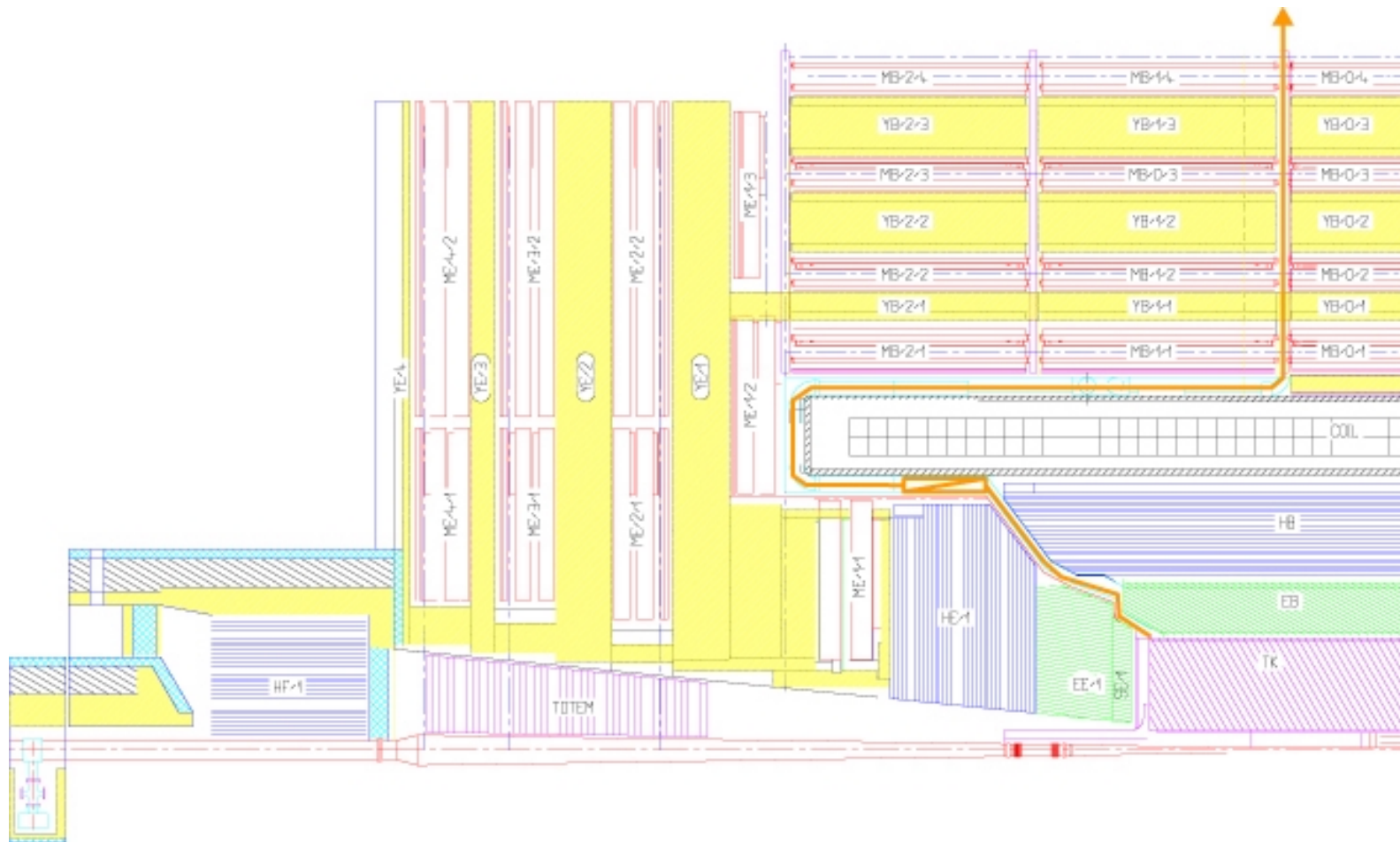
Overview

- Brief description of path through CMS
- Detail of initial study to determine feasibility of connection of front-end to patch panel in HCAL crack

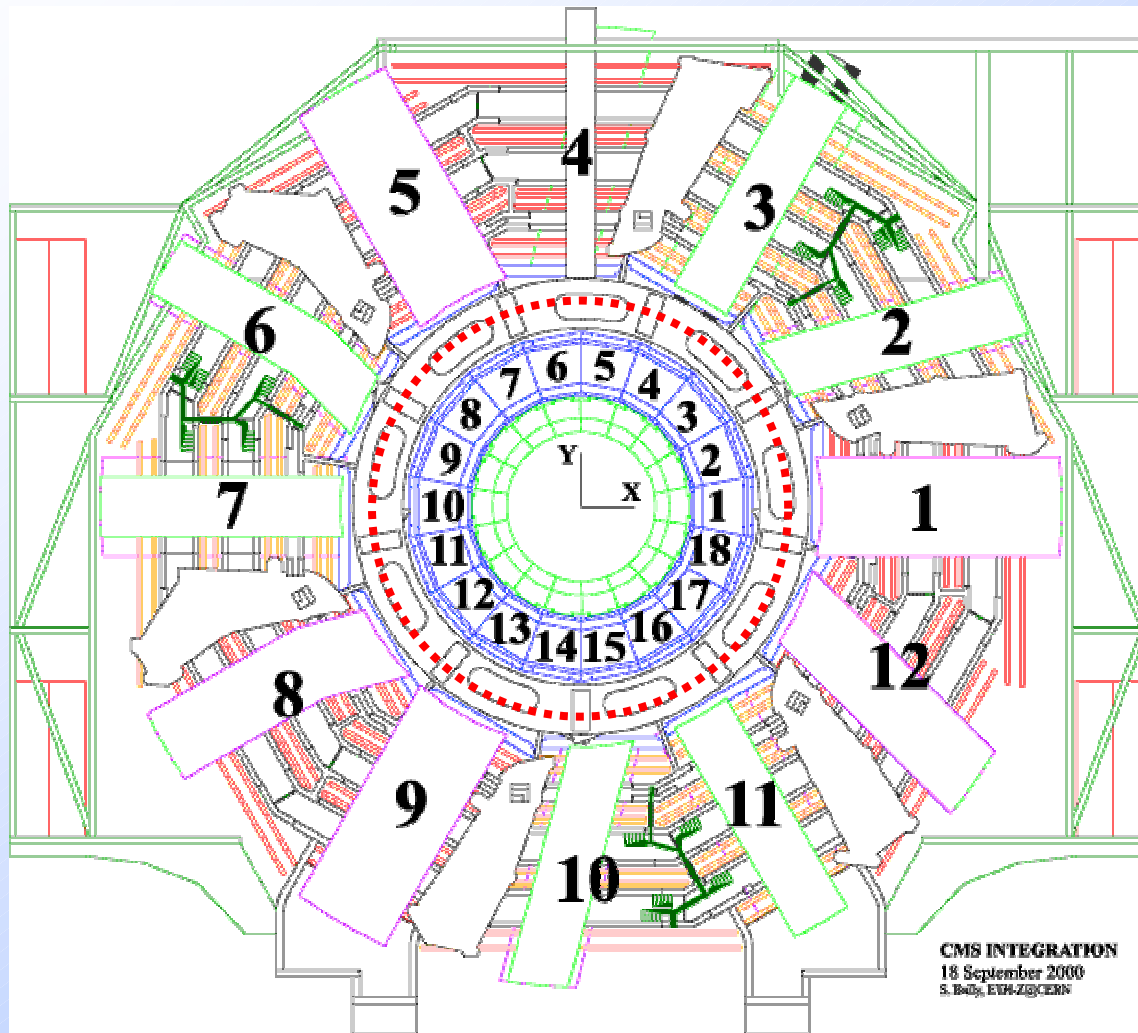
Overall CMS Views



Longitudinal View

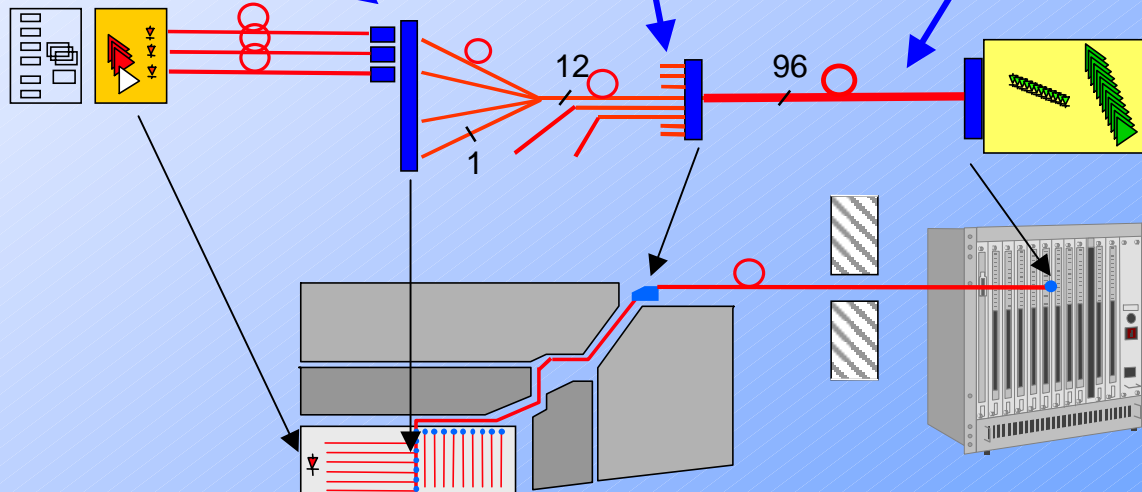
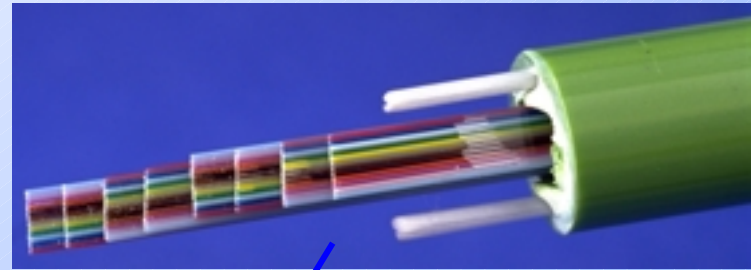
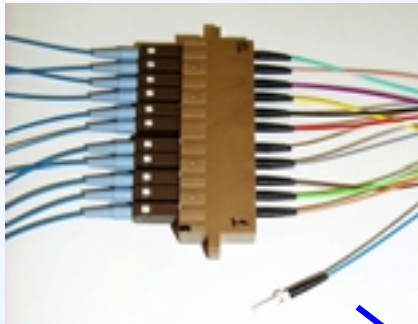


Numbering



- Numbering of Sectors inside Cryostat same as on following slides

Cable Types



Cabling of the Tracker Volume

- Distribution of fibres
 - Linking up actual positions of modules in space
- Initial layout done from optical link side
 - Feasibility established for all parts of Tracker
 - See following slides
 - Discussion now open
 - Integration team, Tracker community

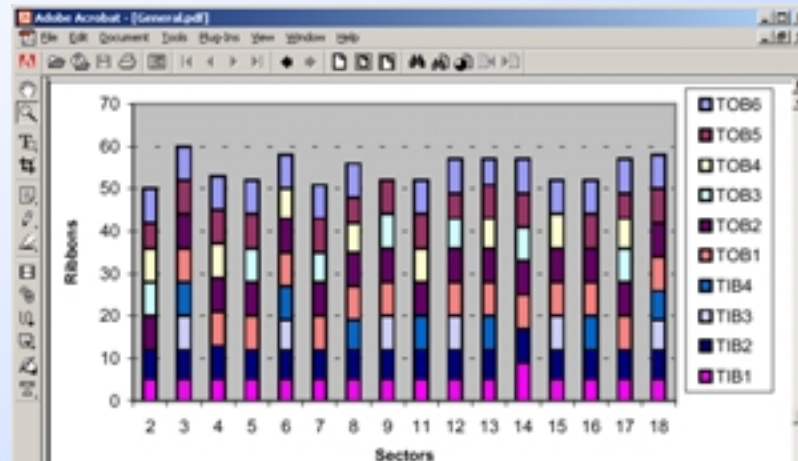
Cabling Feasibility Study

- Overview only – detail in documentation
- Will 'walk through' how to read it
- Organisation
 - For TIB, TOB & TEC
 1. Overview
 2. Routing & mixing of fibres into ribbon fan-ins
 3. Patch Panel use

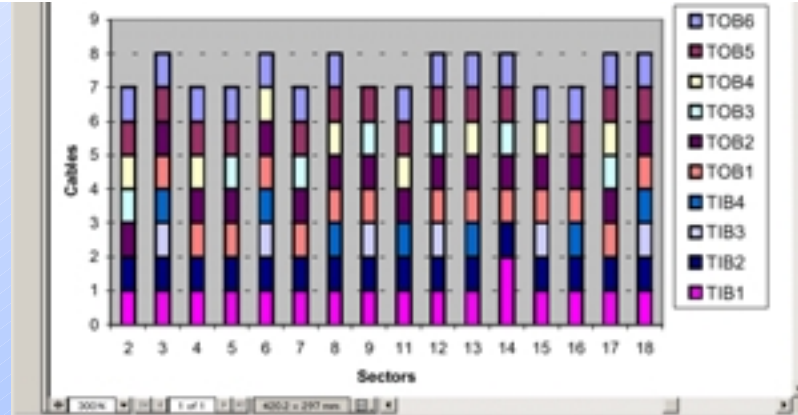
TIB/TOB Overview

	Rods	APVs	Fibres / Rod	Fibres	Ribbons Needed / Layer
TOB6	74	36	18	1332	111
TOB5	66	36	18	1188	99
TOB4	60	48	12	720	60
TOB3	54	24	12	648	54
TOB2	48	60	30	1440	120
TIB1	42	60	30	1260	105
TIB4	54	24	12	648	54
TIB3	46	24	12	552	46
TIB2	38	72	36	1368	114
TIB1	28	72	36	1008	84

Layout data



Ribbons & Cables Distributed evenly over sectors

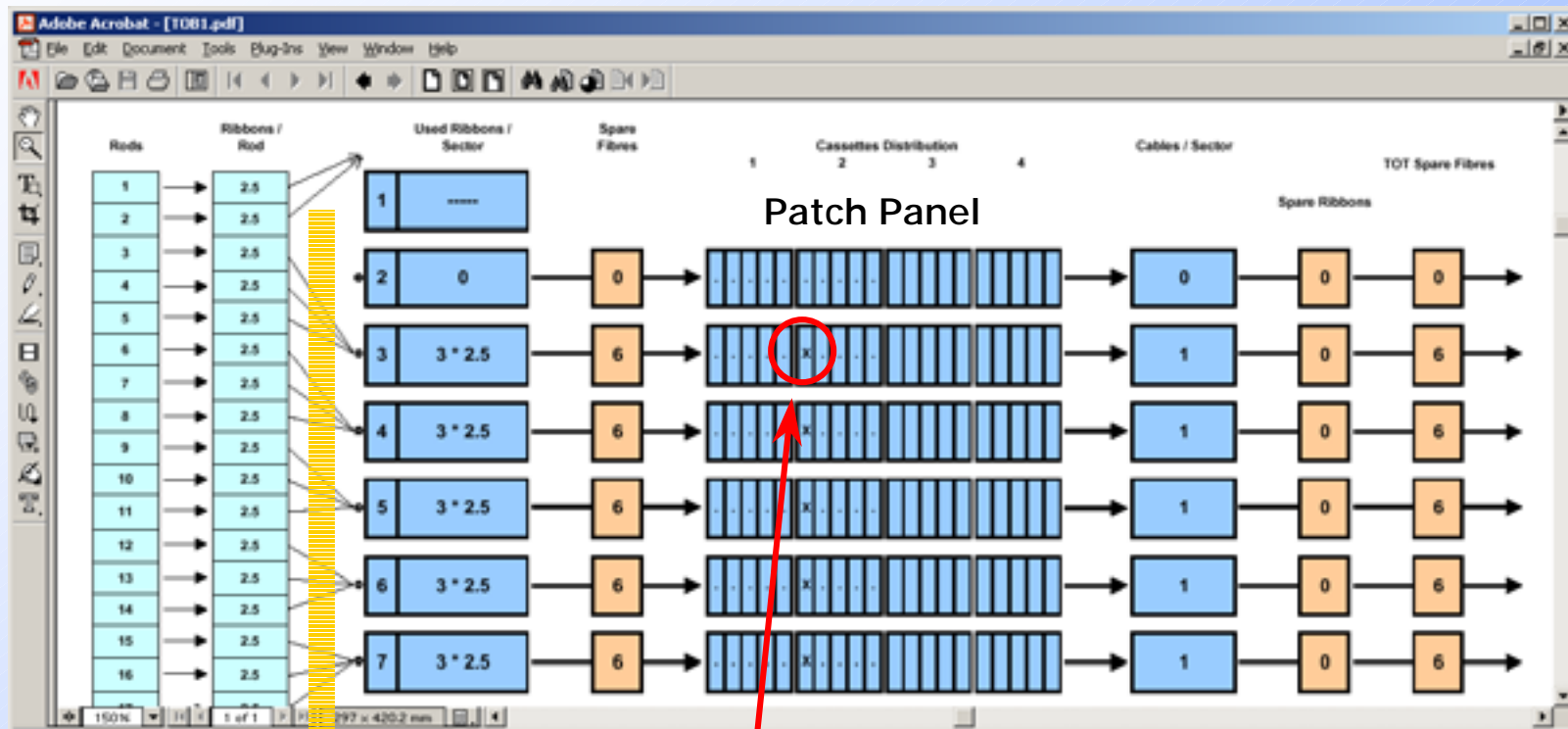


Spare Fibre/Ribbon availability shown in documentation

FED requirements

	Full FED			Non-Full FED		
	#	Ribbons / FED	Spare Fibres	#	Ribbons / FED	Spare Fibres
TOB6	14	8	84	1	6	24
TOB5	10	8	60	4	6	96
TOB4	4	8	0	4	7	48
TOB3	5	8	0	2	7	24
TOB2	16	8	96	0	0	0
TOB1	14	8	84	0	0	0
TIB4	5	8	0	2	7	24
TIB3	4	8	0	2	7	24
TIB2	2	8	0	14	7	168
TIB1	0	8	0	17	2x4 + 15x5	624
	74		324	46		1032

TIB/TOB Routing



Mixing fibres from different RODs occurs here

To obtain Cable modularity of 8 ribbons at Patch Panel

TIB/TOB Patch Panel use

	CABLE DISTRIBUTION / SECTOR / CASSETTE																CABLES	
	Sect 2	Sect 3	Sect 4	Sect 5	Sect 6	Sect 7	Sect 8	Sect 9	Sect 11	Sect 12	Sect 13	Sect 14	Sect 15	Sect 16	Sect 17	Sect 18	TOT	Needed
TOB6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	15
TOB5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	14
TOB4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	8
TOB3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	7
TOB2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16	16
TOB1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	14
TIB4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	7
TIB3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	6
TIB2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16	16
TIB1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17	17

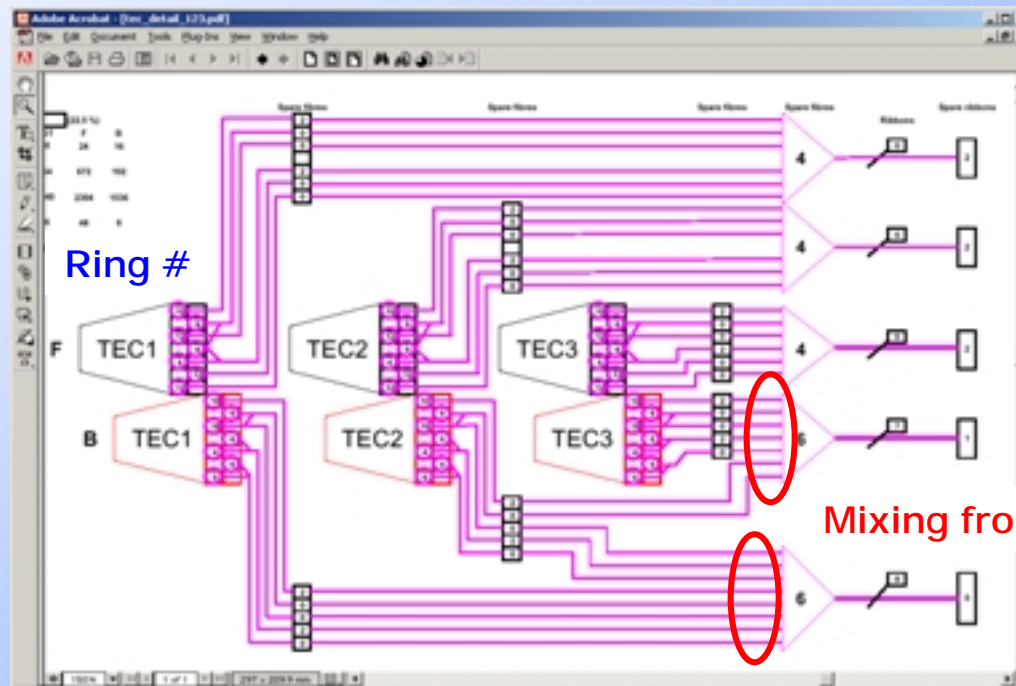
Cassette 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	8	7	7	8	7	8	7	7	8	8	8	7	7	8	8
Cassette 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	8	7	7	8	7	8	7	7	8	8	8	7	7	8	8
TOT Cables	7	8	7	7	8	7	8	7	7	8	8	8	7	7	8	8	7	8	7	7	8	7	8	7	7	8	8	7	7	8	8	
Cables needed	7	8	7	7	8	7	8	7	7	8	8	8	7	7	8	8	7	8	7	7	8	7	8	7	7	8	8	7	7	8	8	

Full Cables given one slot in Patch Panel

Patch Panel filled with necessary cables

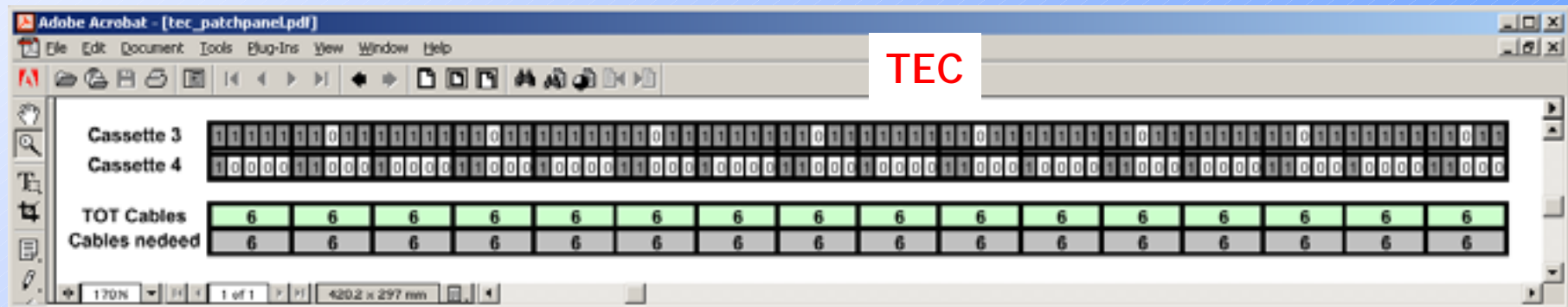
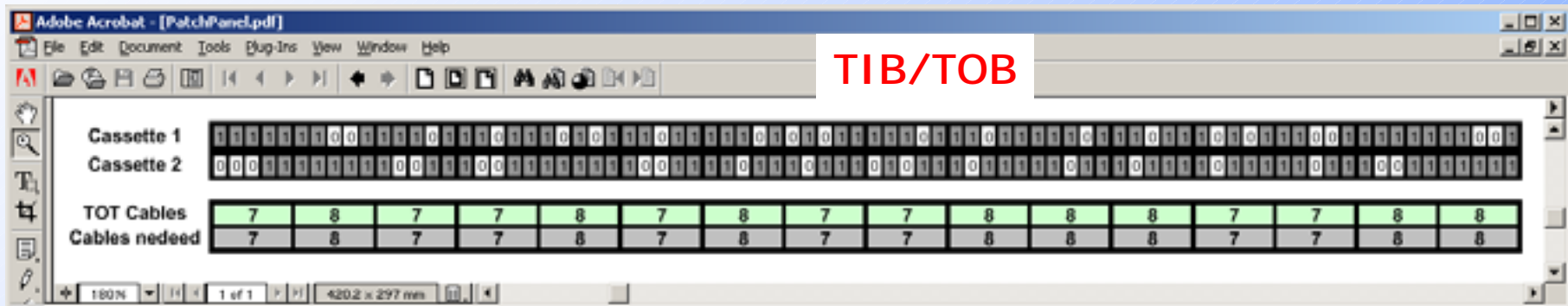
TEC

- Very similar tables for overview and patch panel
 - See documentation
- Fan-in to ribbons slightly different due to Petal geometry



Status at the Patch Panel

- Cassette space in allocated patch panel volume ok
 - Some spares included in case needed



Summary

- Long-standing communication with Integration team
 - Space budgets in place and respected
- Feasibility of layout and grouping of individual fibres from the front-end into ribbons and cables established
- Components in place
 - Fibre/Ribbon/Cable tender closed