Photonics part of LHCb OT 40MHz Upgrade

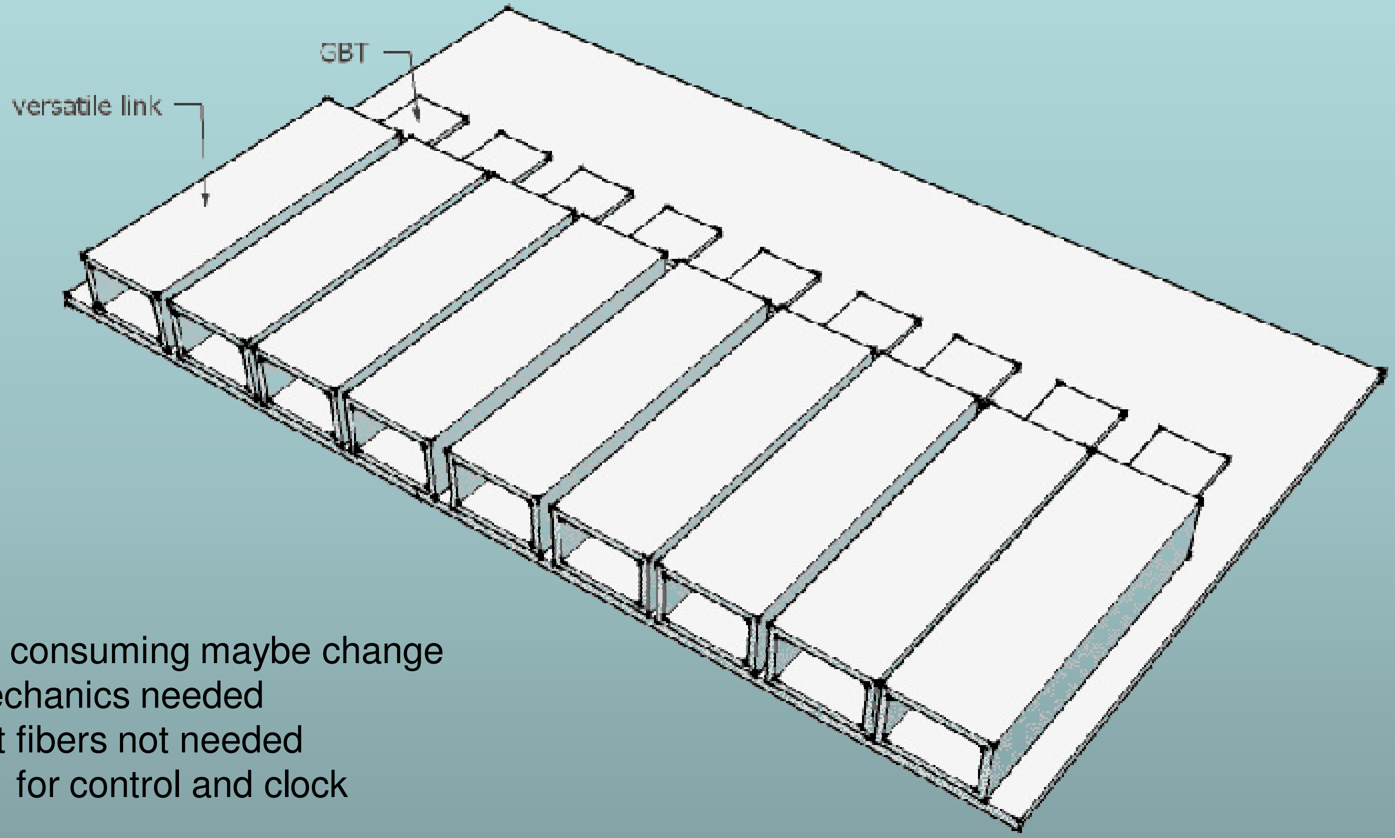
4 Options for Control and data fiber components

1. Standard Versatile Link
2. Double Transmitter Versatile link
3. Commercial Snap12 ribbon transmitter for data
4. Opto block transmitter development with Atlas

We prefer ribbons for installation above separate (dual) fibers

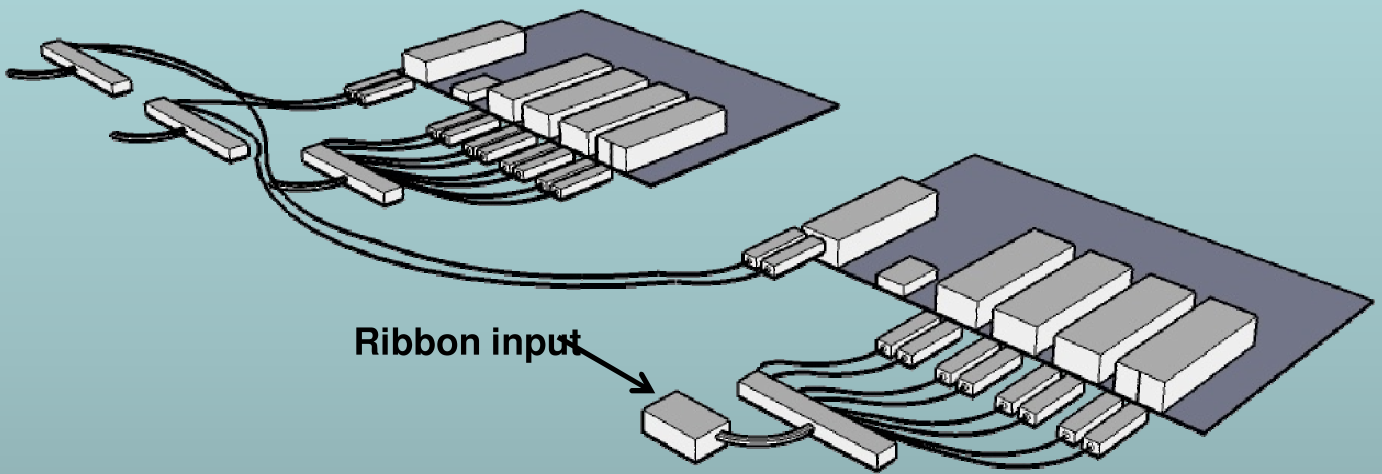
- Robust fiber
- Small size for 12 fiber
- Single Robust connection

GBT-Aux board with 9 standard versa links



Remarks:
1. Space consuming maybe change FE Mechanics needed
2. 9 input fibers not needed -only 1 for control and clock

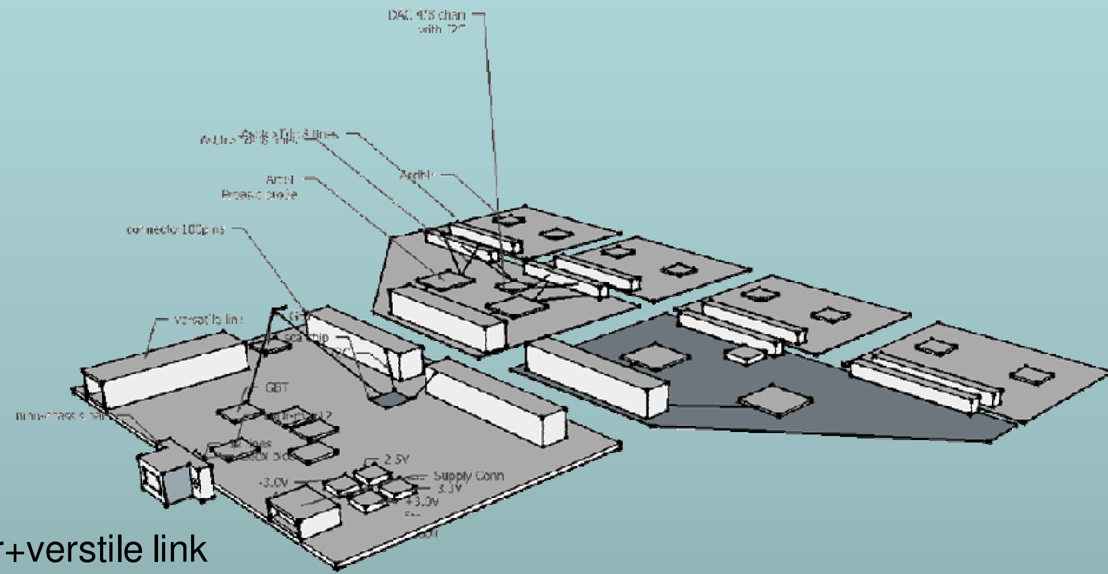
Dual Transmitter Versatile link (8 channels in 4 sfp packages) would fit in size transmitter board



Splitter close to FE
(loose fibers are fragile)

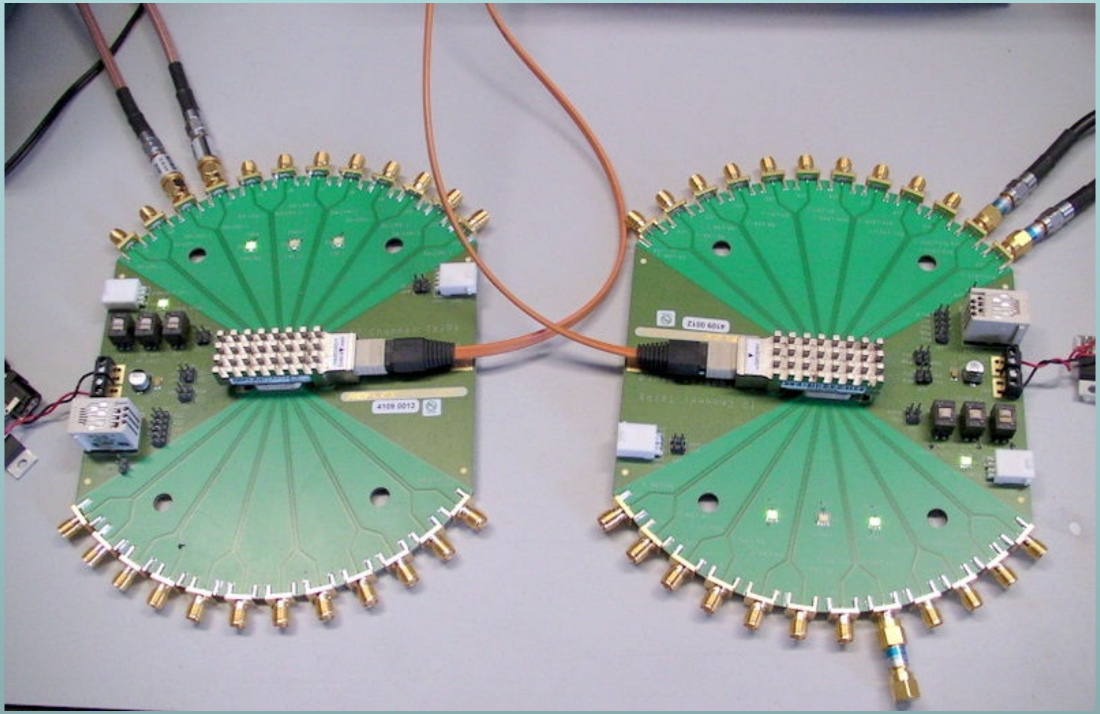
Remarks:
- - Many single fibers and connectors
- +Cern wide supported

Desired GBT-Aux board with
1 opto block and 1 versatile link



2 Options
1. Commercial Snap12 ribbon transmitter+verstile link
   only low level of radiation allowed
2. Opto block +versatile link (for control and clock)
   under development with Atlas
   Vcsel block , with GBT chipset, MPO

Commercial Snap12 test setup

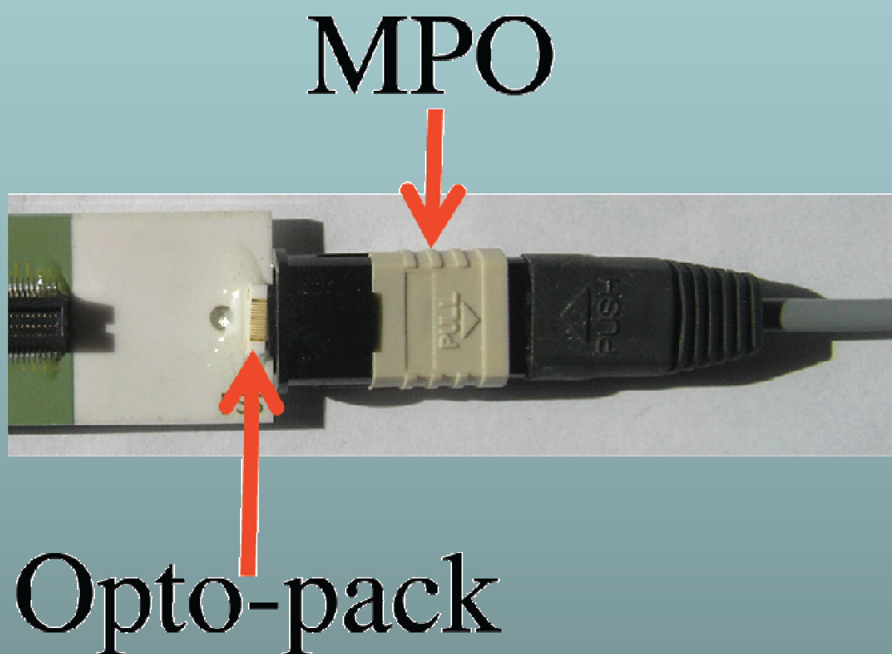


The transmitter board (Left) Receiver board on the right
Can later be used for radiation test of commercial unit

Radiation hard version of Transceiver study

(in cooperation with Atlas SCT/PIX)

-Electronics of commercial transceiver not so radiation tolerant
-A combi of VCSEL and 12 GBT's is very rad tol.
VCSEL Multiplexor under development

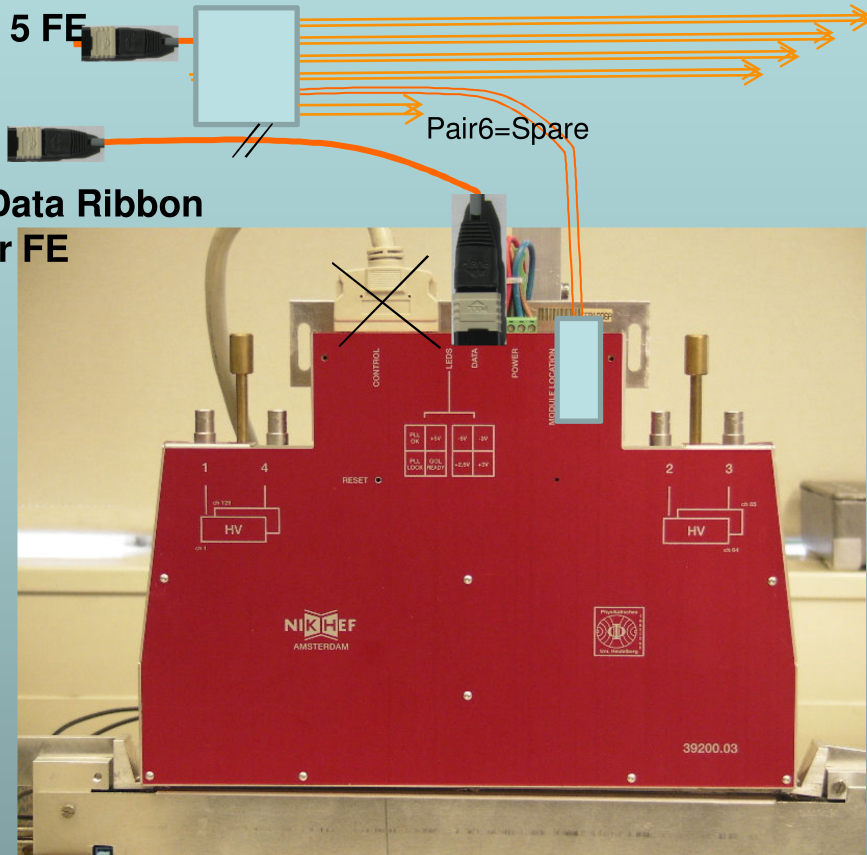


Opto pack under development by Atlas

Photo from talk K.K. Gan

How to connect the Front Ends

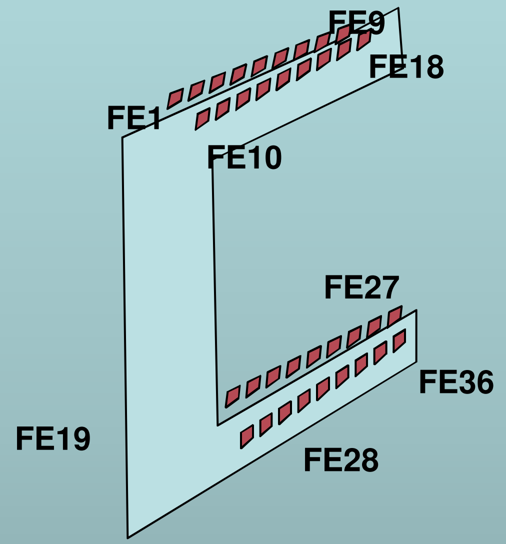
1 Versatile Link ribbon for 5 FE

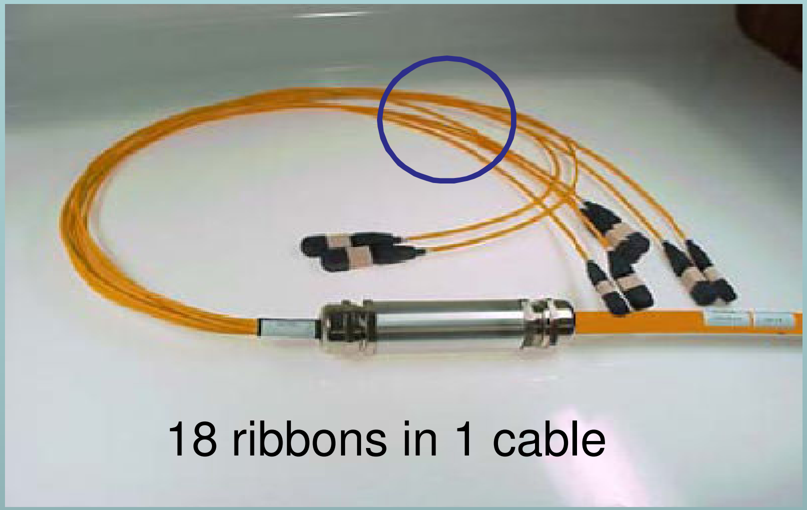


1 Data Ribbon per FE

New 1 ribbon and
1 versatile link duplex fiber

We need 432 Data Ribbons for Outer Tracker + 72 for TFC/ECS= 504 (ex spares)

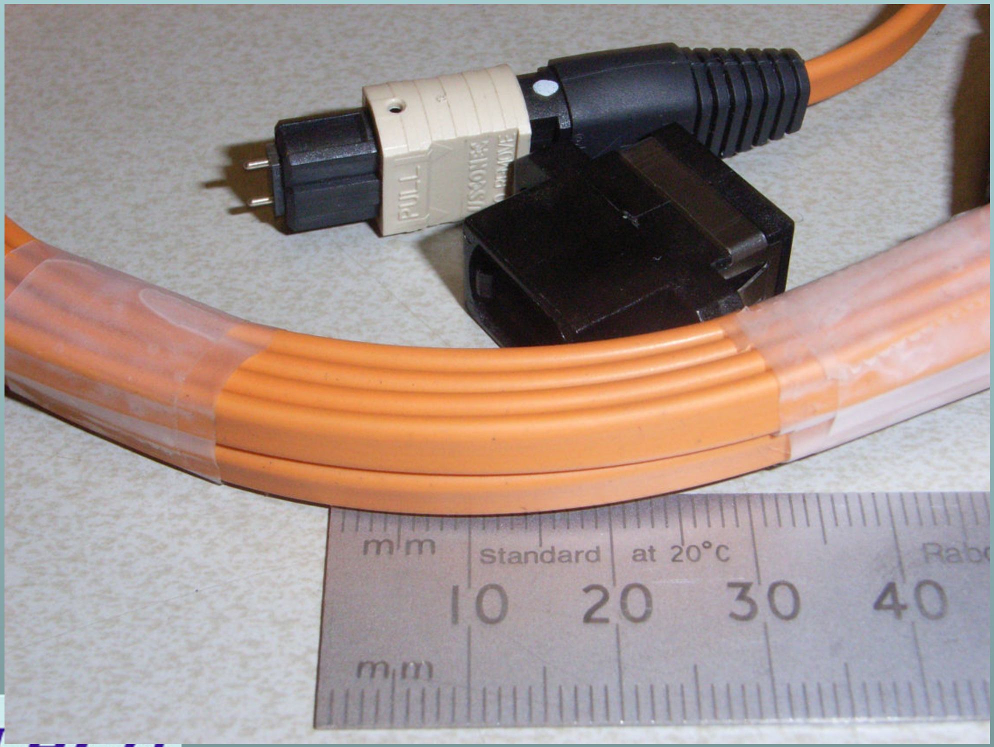




Cframe with 36 Front Ends

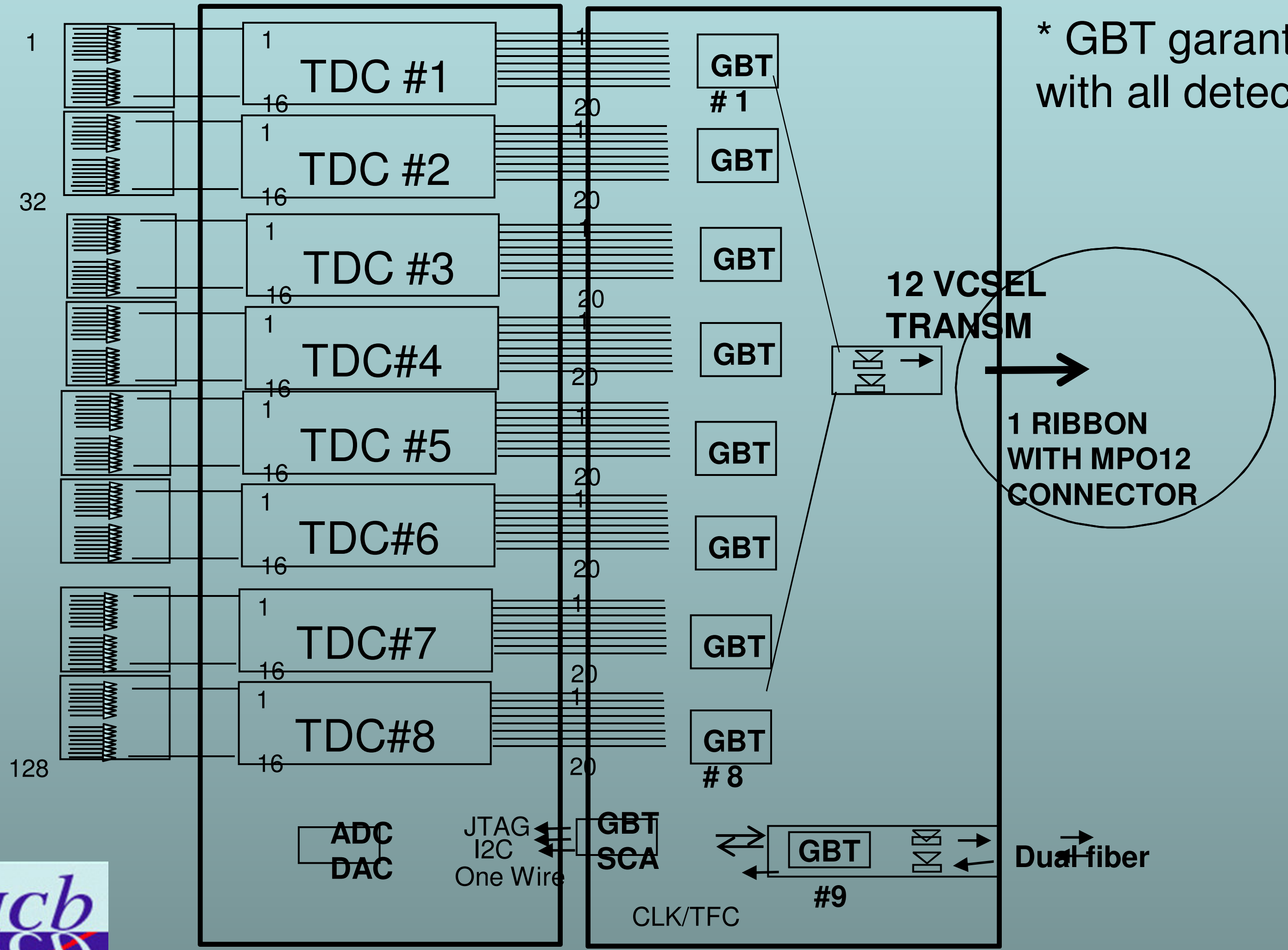
36 RIBBONS NEEDED FOR EACH OF THE 12 C FRAMES IN OUTER TRACKER = 432 EX SPARES

A Ribbon with 12 fibers is very robust a bundle can be small is a good solution for installation



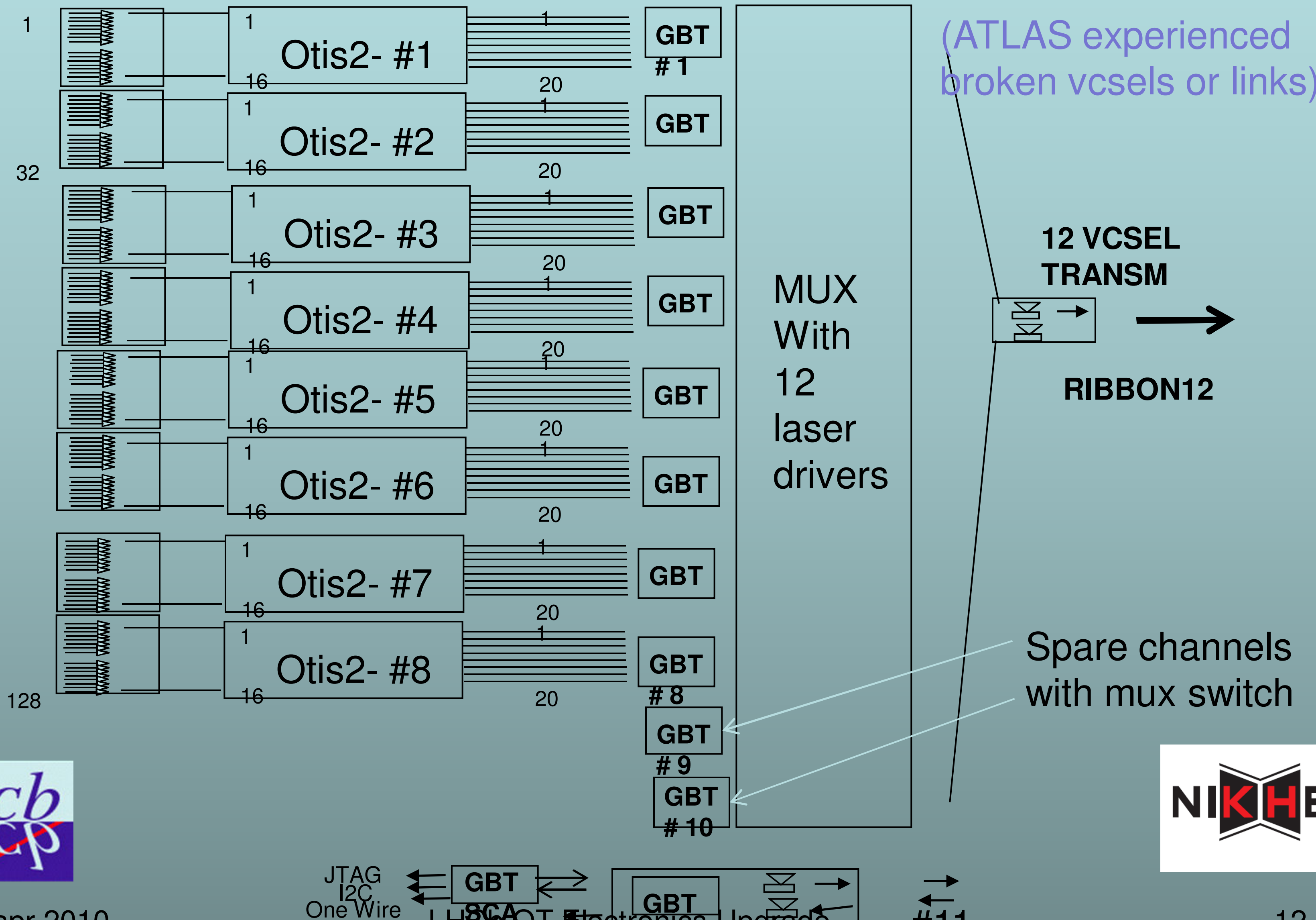
8 Ribbons in a tight bundle =1*1cm square

SINGLE RIBBON12 DATA OUTPUT PER FRONT END SEEMS GOOD SOLUTION

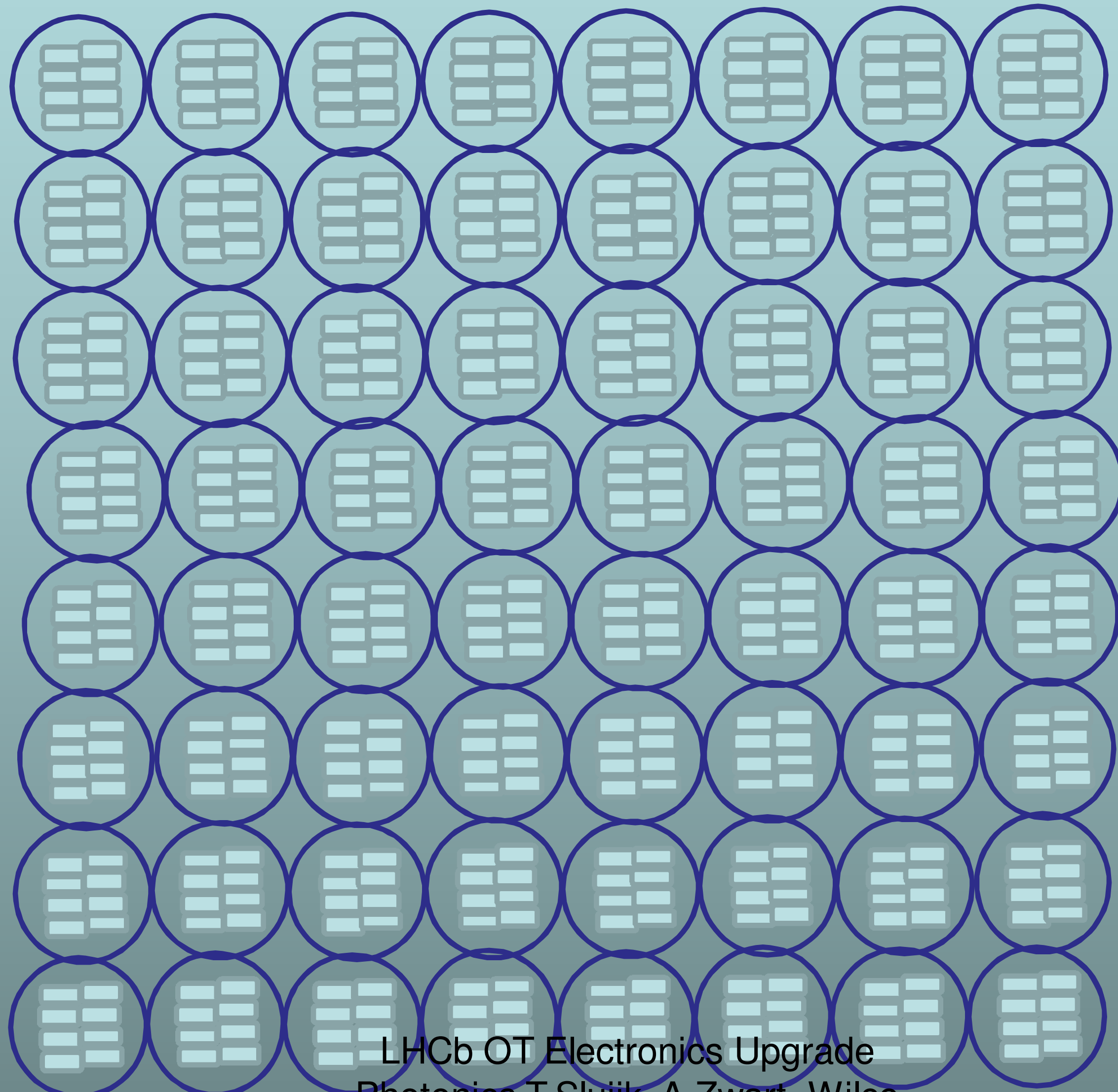


* GBT garanties compatibilty with all detectors

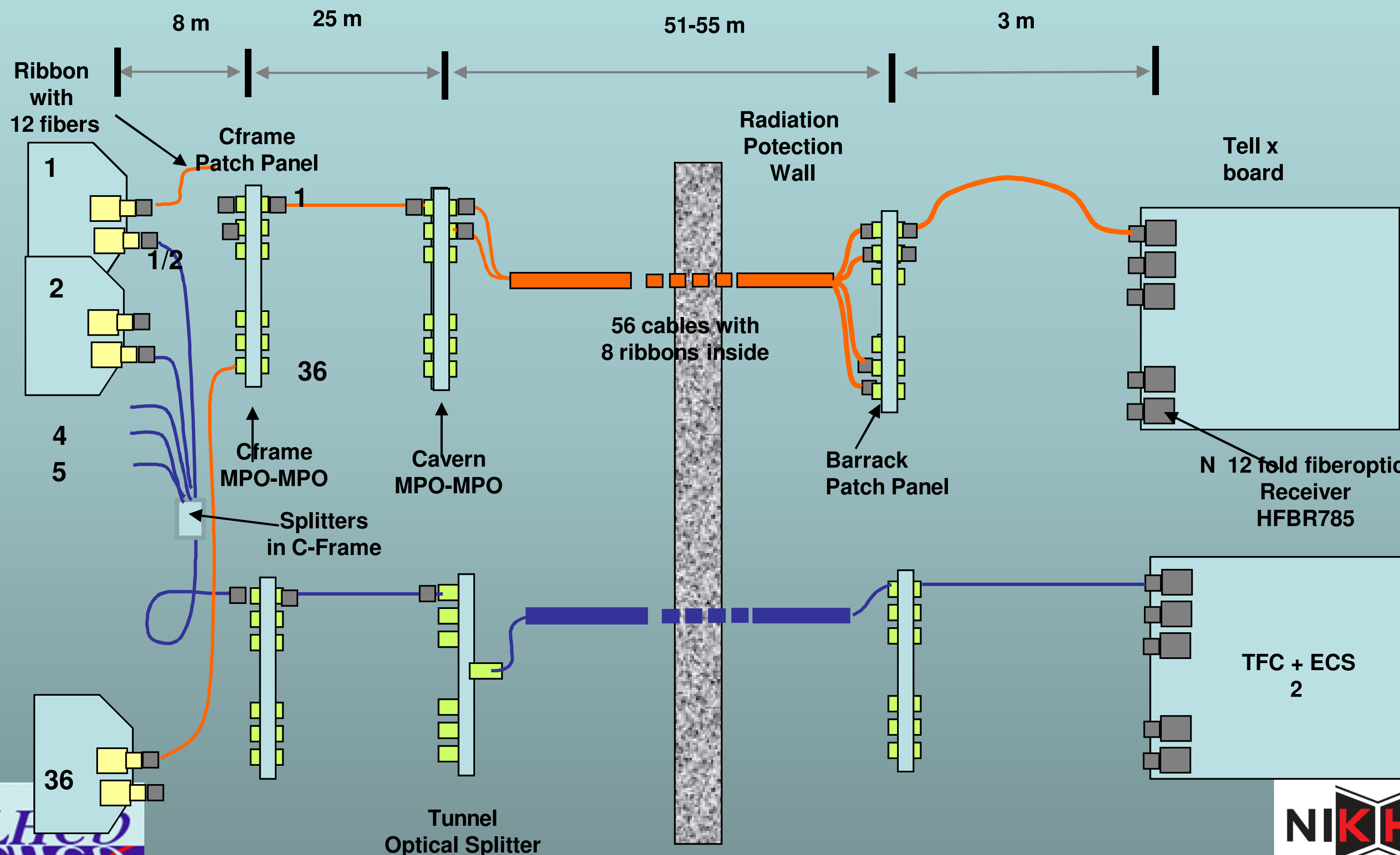
More Bandwidth and Redundancy for a Broken VCSEL or fiber with an added multiplexor in design by atlas-pix



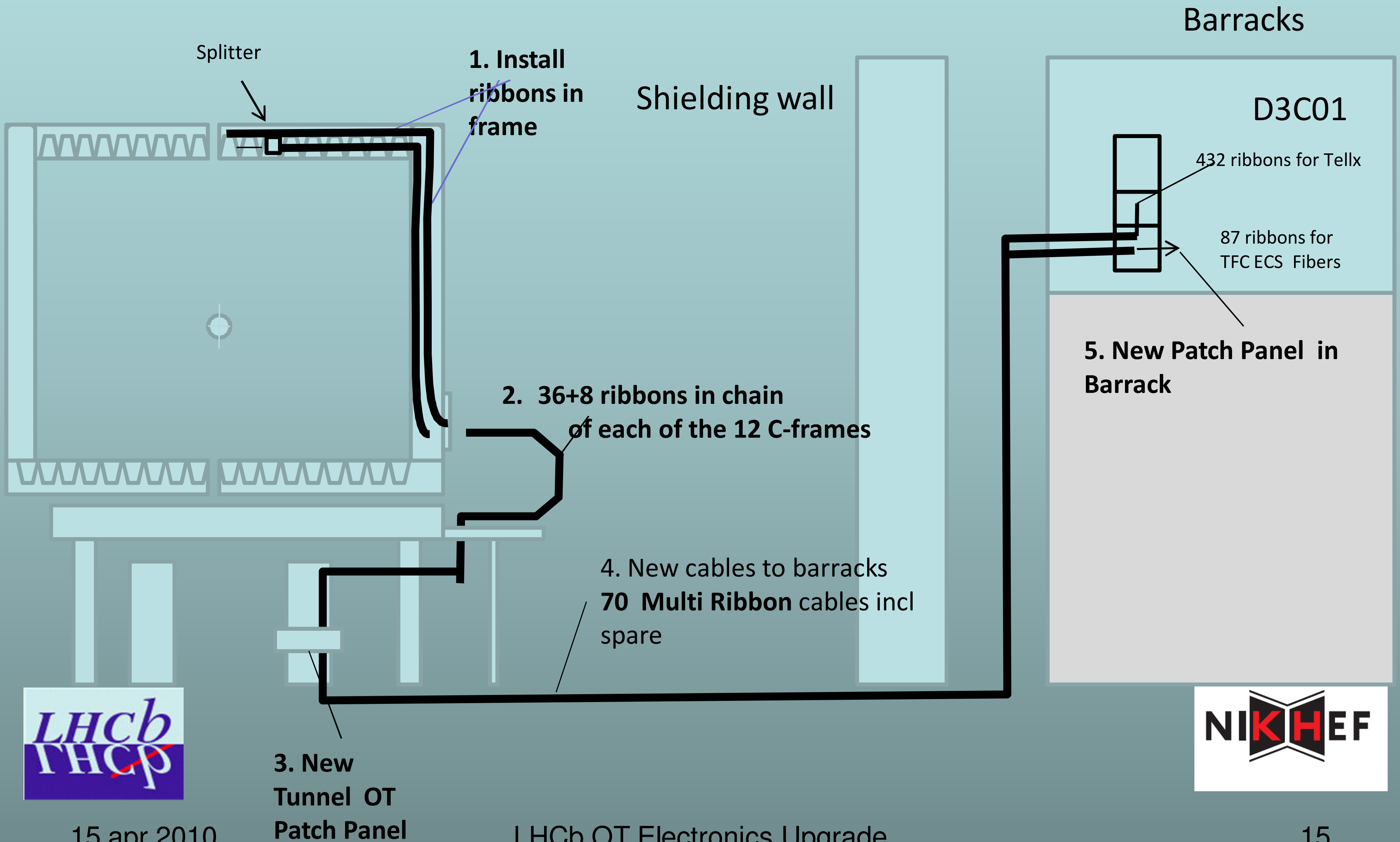
Space used by 70 multi ribbon cables to barracks in tunnel groove, now 6



The “Ribbon +Duo per Front End” Solution -- With Separate TFC and ECS



Photonics installation



Conclusion:

Study of separate components is well underway
Radiation test have to follow for: tdc and transmitters

Installation in 2016 ?