

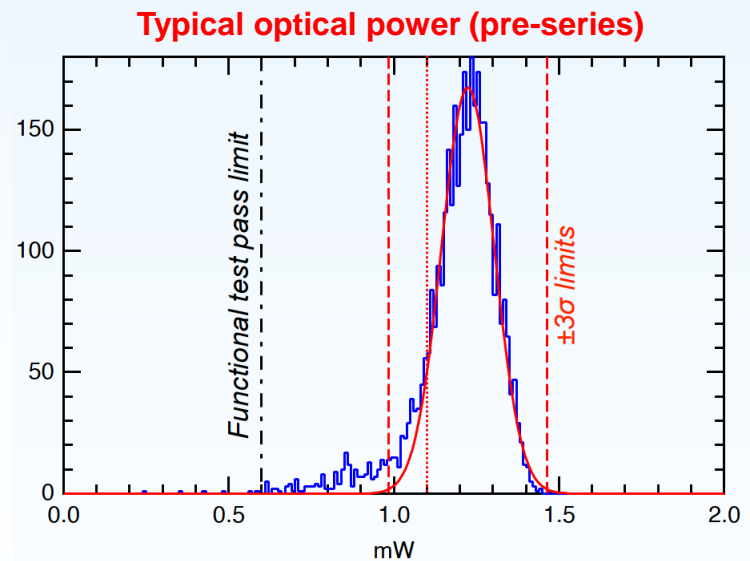
Versatile Link⁺ VTRx⁺ Production Status

Csaba SOOS
EP-ESE-BE

on behalf of the VL⁺ collaboration

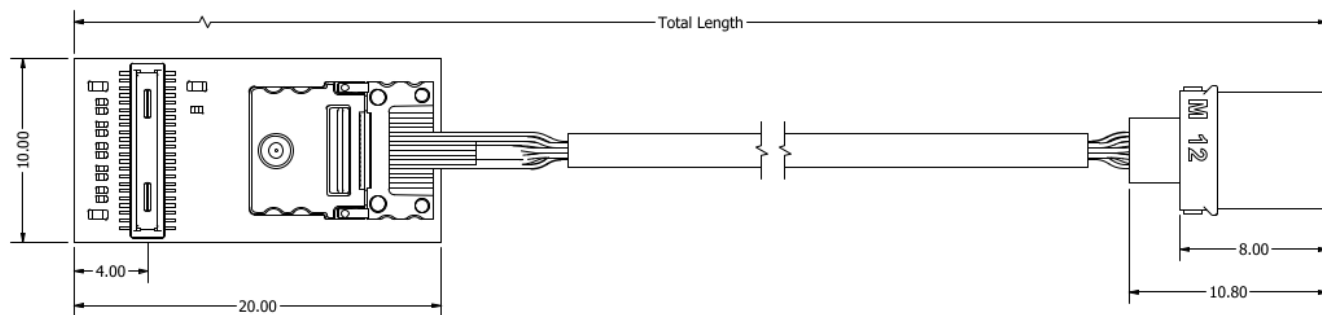
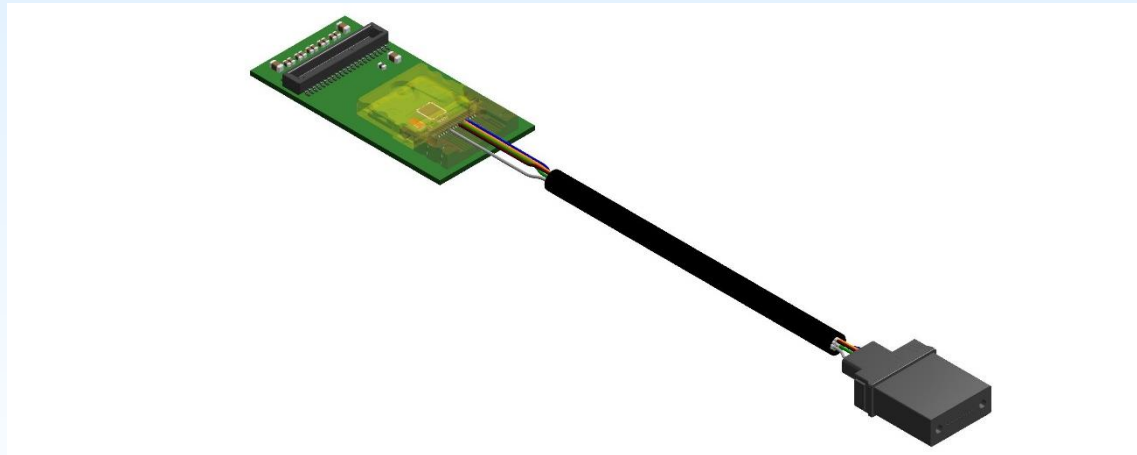
- Prototyping phase
 - Several iterations carried out to find the good optical coupling interface
- Market survey and tendering (2018-2019)
 - Find companies that have the required know-how and can manufacture the transceivers at a competitive cost
- Pre-series production (2020-2021)
 - Industrialisation and process qualification
 - Manufacture modules for early adopters
 - Detailed yield analysis
 - Calculate manufacturing cost
- Contract signature (end of 2021)

- Extensive qualification process carried out during the pre-series production
- Room-temperature test data showed low-power tail
- Functional tests over temperature show performance loss at ends of the operating temperature range
- Investigation took several months and root cause was identified only in early 2022
 - Placement accuracy issues
- Production launch has been delayed
- Process optimisation has started
- See more details in my session talk



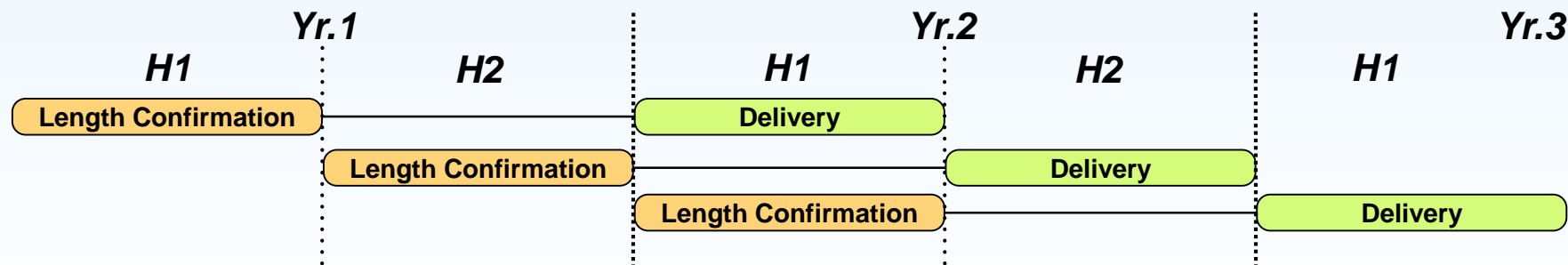
Radiation-hard pigtail

- The VTRx+ transceivers will be distributed to users in pigtailed format
- Users can order the VTRx+ modules with the desired pigtail length selected from a pre-defined length grid (see later)



Pigtail length requests

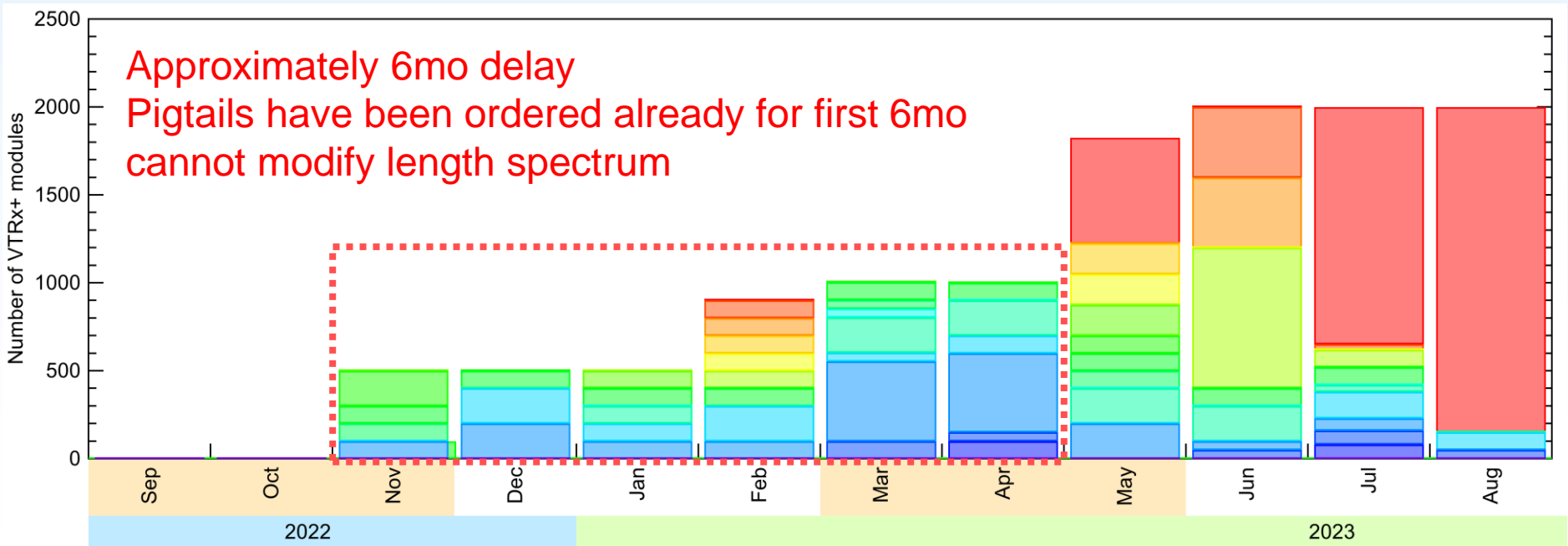
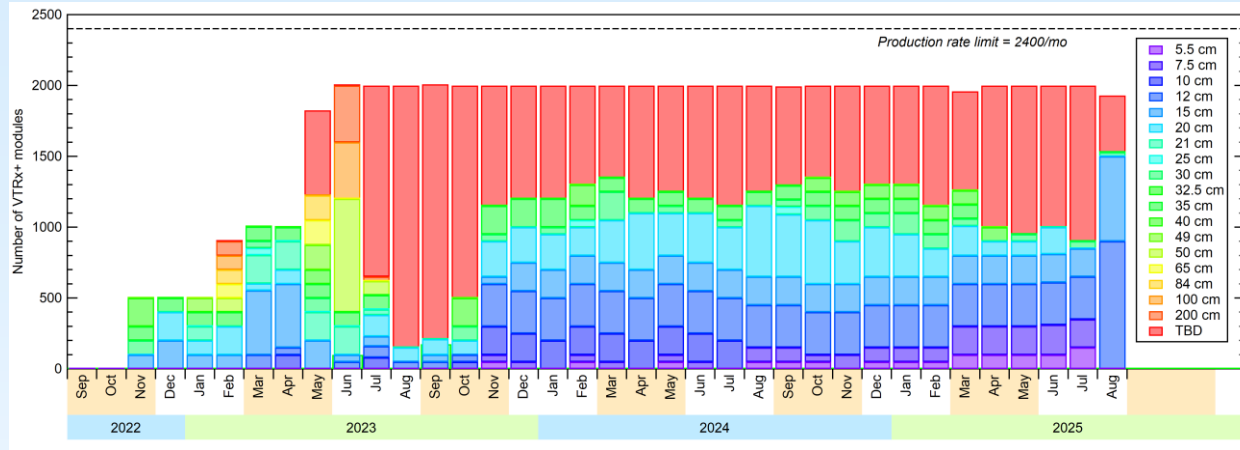
- A survey in 2019 and a pre-order survey in May 2021 used to collect user inputs concerning their pigtail requirements
- Production schedule according to firm user requests
- There will be a sliding window for updating the length distribution planned production
 - Orders in a given six-month period will be delivered 6-12 months after the end of the ordering period



Current plan available for consultation here: [link](#)

Updated production schedule

- First delivery end of 2022
- M1-3: 500 modules/mo
- M4-6: 1000 modules/mo
- M7-34: 2000 modules/mo
- Last delivery end of 2025



CMS deliveries (current plan, not modifiable)

Detector	Length [cm]	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
IT	5.5						
IT	7.5						
RPC, BRIL	10						100
OT	12					100	50
OT	15					30	50
IT, OT, BTL, ETL	20		100	150	50	220	200
	21						
OT	25					30	
OT	30					50	
ME0	32.5				100		
ECAL	35	100	100	100	100	100	100
	40						
ME0	49			100			
DT	50				100		
ME0	65				100		
ME0	84				100		
DT	100				100		
DT	200				70		
HGCAL	TBD						

ATLAS deliveries (current plan, not modifiable)

Detector	Length [cm]	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
	5.5						
	7.5						
Muon	10						
	12						
Muon, BCM	15	100	200	100	100	420	400
ITk Pix, HGTD, PLR	20		100	50	150	30	100
	21						
LUCID ZDC	25					20	
ITk Strip, LAr	30	100					
	32.5						
	35						
ITk Strip, LAr	40	200					
LAr	49						
	50						
	65						
	84						
	100						
BCM	200				30		
	TBD						

Deliveries summary

Length [cm]	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
5.5						
7.5						
10						100
12					100	50
15	100	200	100	100	450	450
20		200	200	200	250	300
21						
25					50	
30	100				50	
32.5				100		
35	100	100	100	100	100	100
40	200					
49			100			
50				100		
65				100		
84				100		
100				100		
200				100		
TBD						

Available transceivers (pre-production grade)

- From pre-series batches
- Tested at room temperature and all of them perform well
- Can be used in test systems, however, they must not be installed in the final system
- Available total lengths
 - 15cm (~80)
 - 18cm (~250)
 - 30cm (~60)
 - 35cm (~80)
 - 40cm (~120)
 - 49cm (~80)