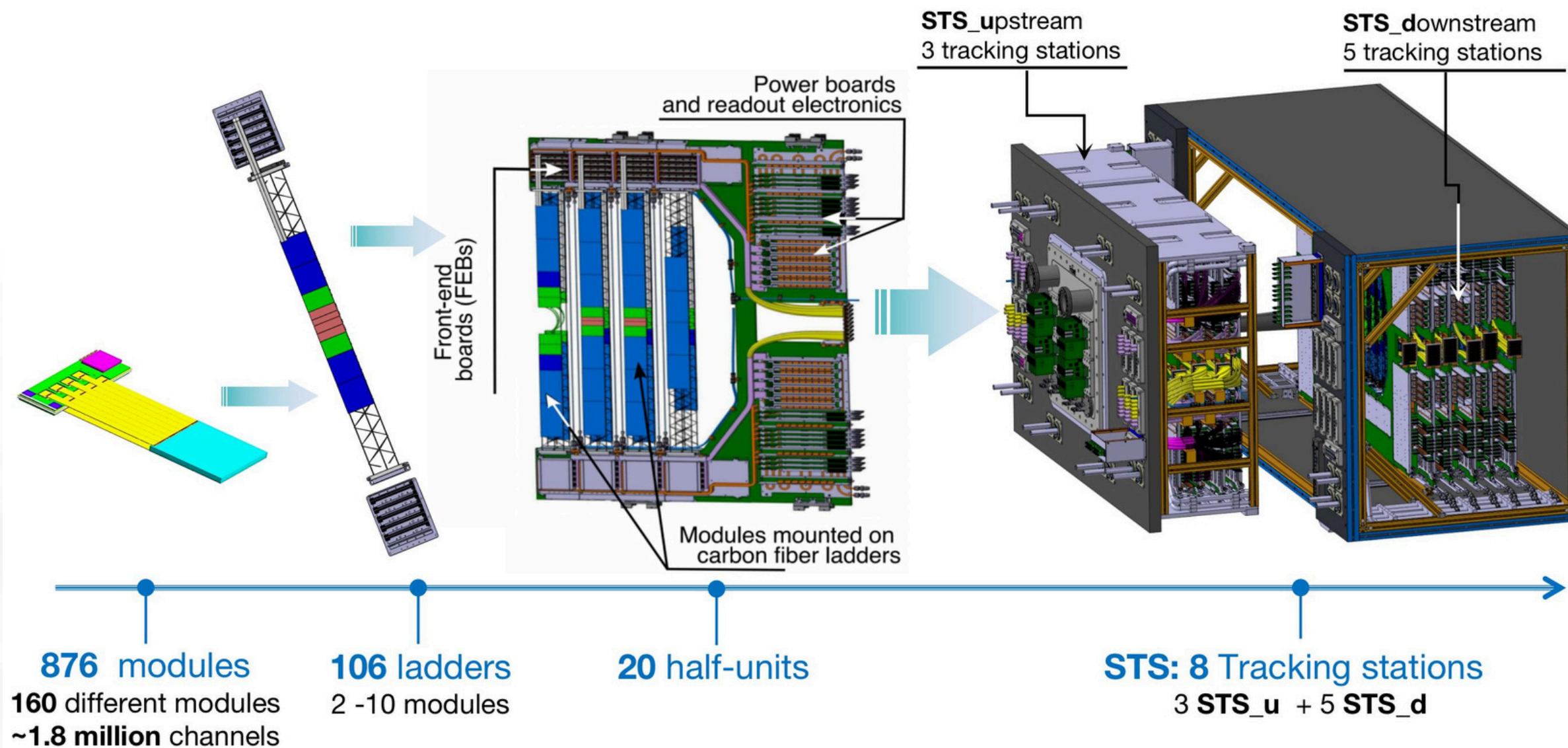


STS needs on Controls

DAVID GUTIERREZ
STS - CBM

The STS Detector



The Silicon Tracker System

- All stages need monitoring & controls
- Depends on external resources
- Requires independence & partitioning
- Radiation Intensive environment
- Strong Magnetic Field (1 Tm)

Systems to monitor & control

LV/HV Power Supplies

Dr. Ulrich Frankenfeld

Box Environment

Dr. Ulrich Frankenfeld

Front End Electronics

Dr. Joerg Lehnert

Cooling Systems

Ilya Elizarov

LV/HV Power Supplies

- **MPOD** crates with **CC24**
- Native **EPICS** support
- **LV:** Wiener Kontron
 - 2160 channels
 - 270 modules
 - 32 crates
- **HV:** ISEG
 - 1872 channels
 - 60 modules
 - 6 to 8 crates

Front End Electronics

Box Environment

Cooling Systems

Front End Electronics

- Uses **control path** of the DAQ
- **Poll**, and **push** to EPICS
- **ROB (576)**: 314 LV channels
 - **GBT-SCA**:
 - **LV** 1.5V/2.5V
 - **Temperature** (3)
 - **Optical** Power/Ready
 - **SEU** counter

LV/HV Power Supplies

Box Environment

Cooling Systems

SCA: Slow Control Adapter
SEU: Single Event Upset

Front End Electronics

- **ROB (576):** 314 LV channels
 - **GBX Master:**
 - **SEU** Correction
 - **Tx lock** loss
 - **RF PLL** lock loss
 - **Tx EPLL** lock loss
 - **Rx EPLL** lock loss
 - **Rx FEC** counter

LV/HV Power Supplies

Box Environment

Cooling Systems

SEU: Single Event Upset
PLL: Phase-Locked Loop
FEC: Forward Error Correction

Front End Electronics

- **ROB (576):** 314 LV channels
 - **GBX Slave:**
 - **SEU** Correction
 - **Tx lock** loss
 - **Tx EPLL** lock loss
- **FEB (1752):**
 - **SMX ASIC (8):**
 - **LV 1.2V**
 - **Temperature**

LV/HV Power Supplies

Box Environment

Cooling Systems

SEU: Single Event Upset
PLL: Phase-Locked Loop

Box Environment

- **6 Points** per C-Frame (120)
- **Temperature** (Temp)
- **Relative Humidity** (RH)
- **Sensors:**
 - **PT100:** Temp
 - **Sniffer:** RH
 - **Optical Fiber:** RH & Temp
 - **Digital sensor:** RH

LV/HV Power Supplies

Front End Electronics

Cooling Systems

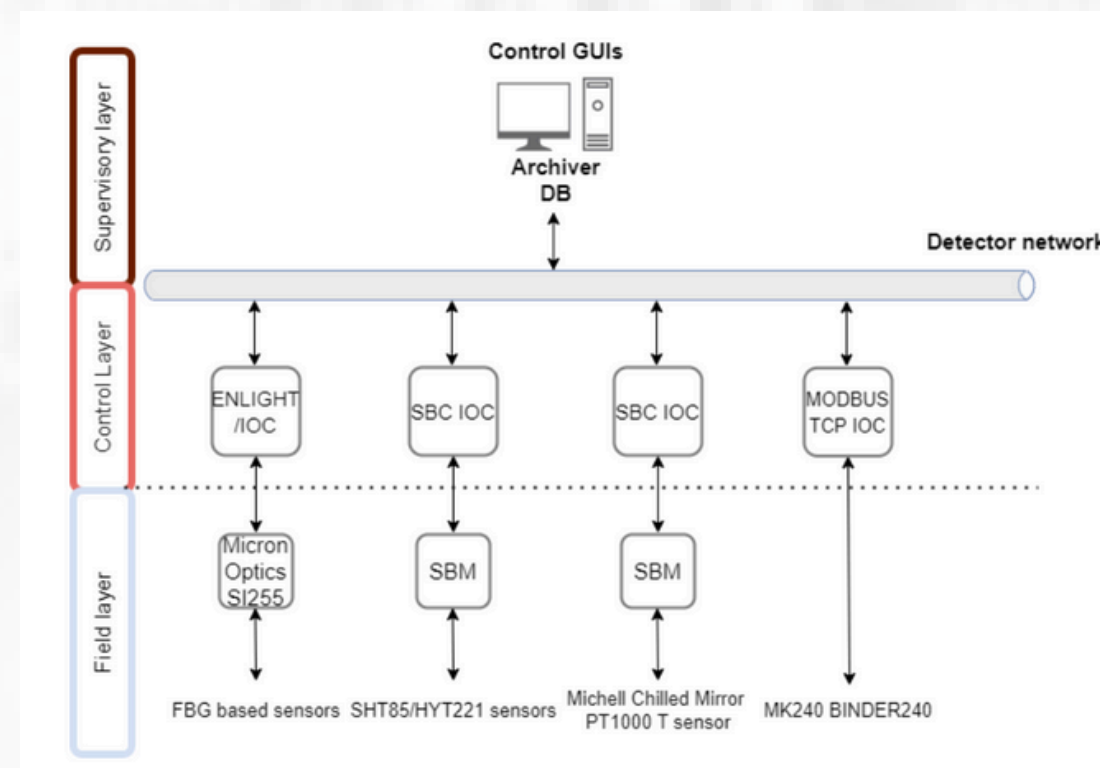
Box Environment

- Readout:
 - Microcontroler
 - Hyperion Interrogator (OF)
- Custom **IOCs** developed

LV/HV Power Supplies

Front End Electronics

Cooling Systems



*Marcel Bajdel

D. Gutierrez

Cooling Systems

- **Air** cooling for sensors
- **Liquid** cooling for FEE
- **External** manufacturer
- **Custom**, non EPICS, controls
- **Interface to DCS:**
 - **Monitoring**
 - **Set Points**

LV/HV Power Supplies

Front End Electronics

Box Environment

Cooling Systems

- **Monitoring:**

- In/Out **Temperature**
- In/Out **Flow Rate**
- **Pressure** in expansion tank
- **Pressure** in supply & return supply
- Air **pressure**
- **Dew point** in the air supply
- **Failure codes**

LV/HV Power Supplies

Front End Electronics

Box Environment

Cooling Systems

- **Set Points:**
 - **Plant:** On/Off
 - **Air cooling:** On/Off
 - **Stand-by:** On/Off
 - Control Mode:
 - **PID** control: Coolant **temp**
 - **2 States: Hysteresis**
 - Air **pressure**

LV/HV Power Supplies

Front End Electronics

Box Environment

PID: Proportional, Integral &
Derivative

Cooling Systems

- **Set Points:**
 - Motor **rotation speed** or **Pressure difference** of the circulation pump
 - **Power** or **temp** of the inlet heater
 - **Power** or **temp** of the balancing heater

LV/HV Power Supplies

Front End Electronics

Box Environment

Systems to monitor & control

LV/HV Power Supplies

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