EISCAT 3D

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Skibotn, Norway

Electricity installations done up to transformers
House building started

Karesuvanto, Finland

Groundwork done
House building started

Kaiseniemi, Sweden

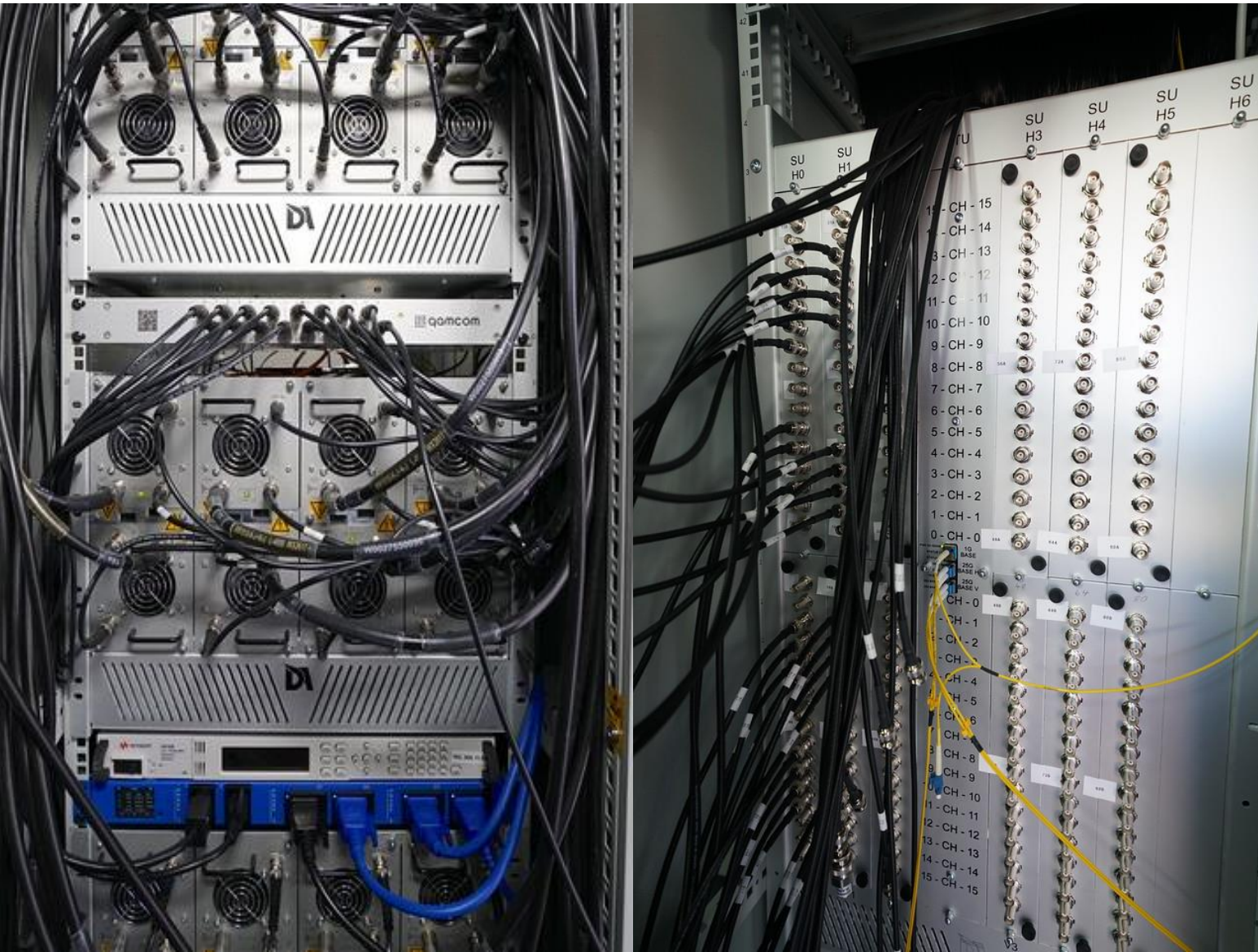## Groundwork started

Photo taken 2021-08-26

Antenna Unit

Test subarray, PET

Four Transmit Units (TU) are installed which can drive 16 antennas with two polarizations.
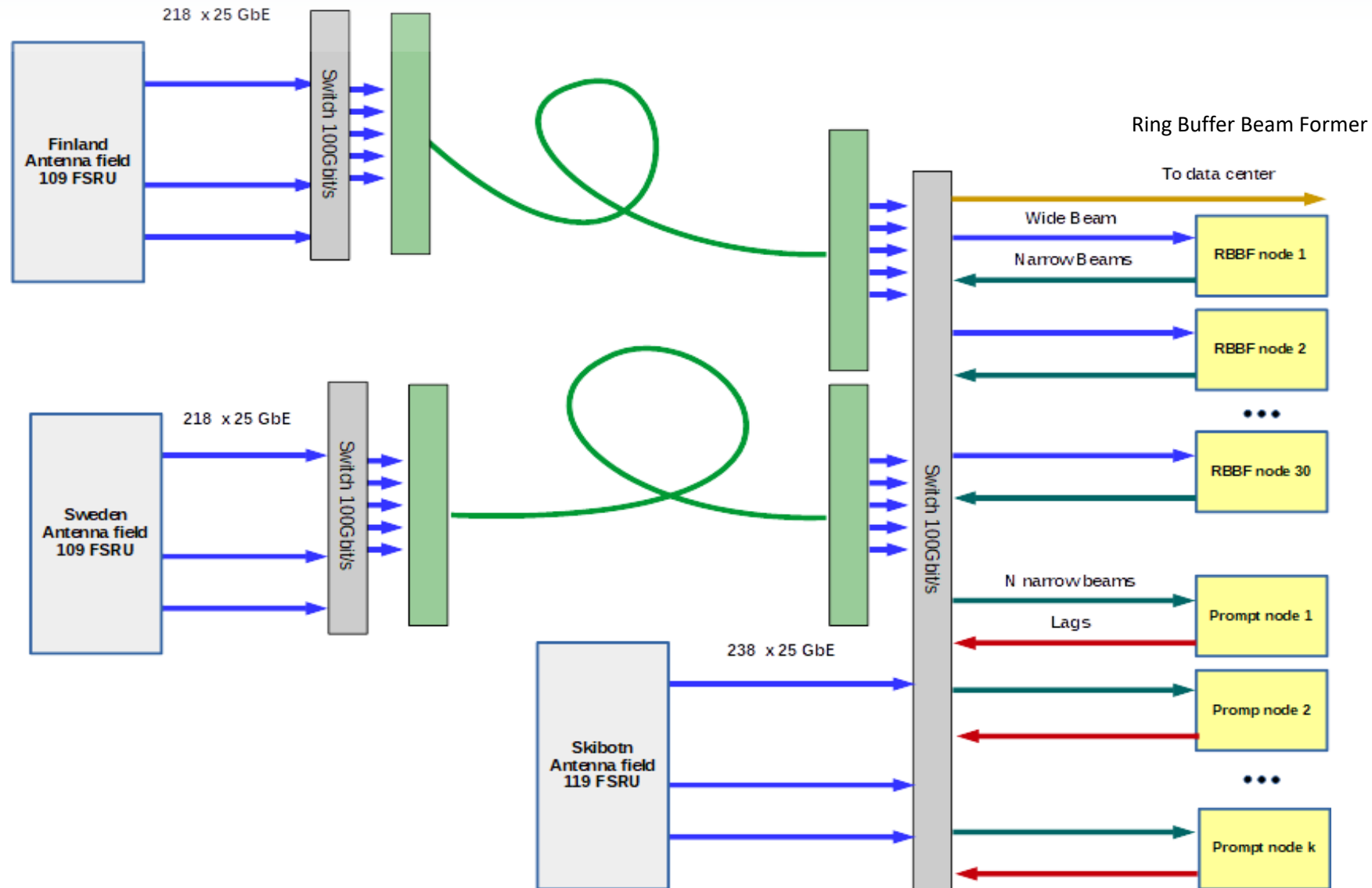
TU includes also TR-switch

32 channels from the Receiver (FSRU) is connect to TR-switch

More channels can not be connected as the mutual coupling breaks receivers LNA during transmitting
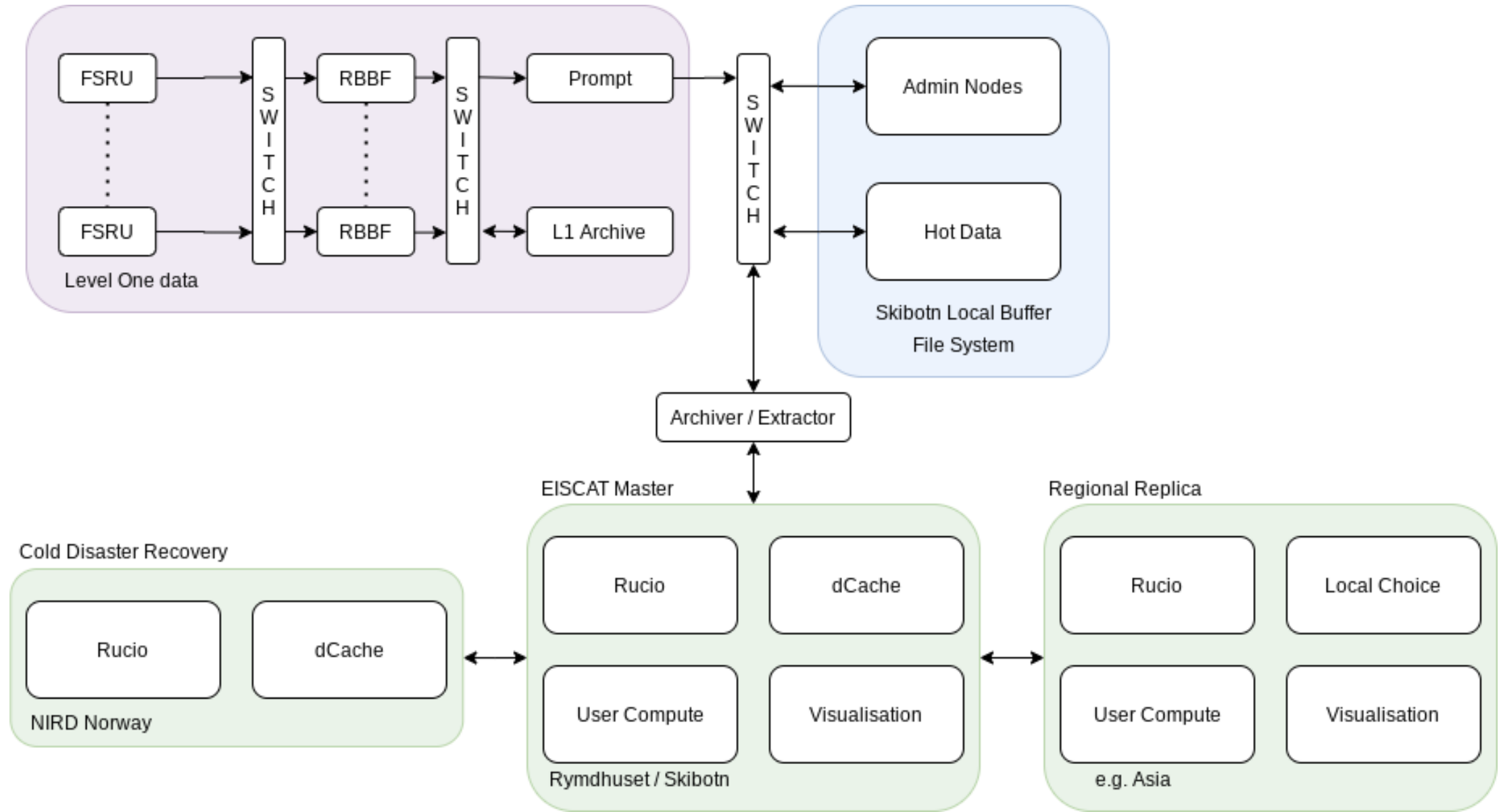
We may get full subarray of transmitters and TR switches in October

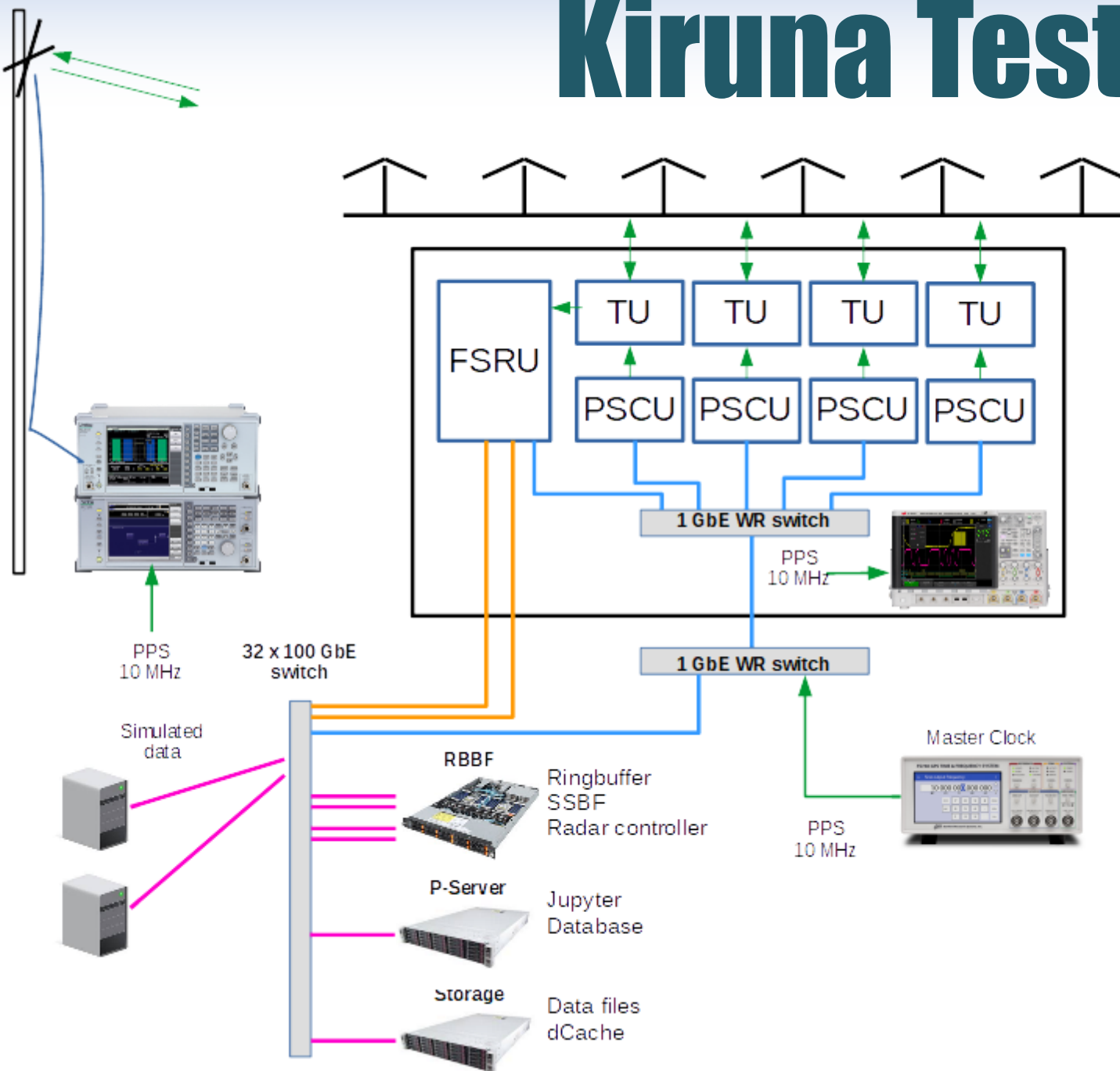Two Exciters (PSCU) are connected to TU input to produces waveforms

Computing network and cluster

Computing network and cluster

Kiruna Test Setup

- Calibration antenna for testing.
- Signal analyzer can be used to measure transmitted waveforms.
- RF generator is used to make fake signals for receiver testing.
- White Rabbit (WR) supported LAN is delivering control and timing info to devices.
- Oscilloscope inside container to measure waveforms and timing signals
- GPS master clock as a timing source
- AMD EPYC server for real-time data flow, RBBF
- Intel server for supportive tasks, P-Server
- Intel server for storage, Storage
- Two AMD Ryzen PC for simulators.

User community

System has been developed from HW up and we are finally coming to phase where we need to think how different type of users are interacting with E3D radar.
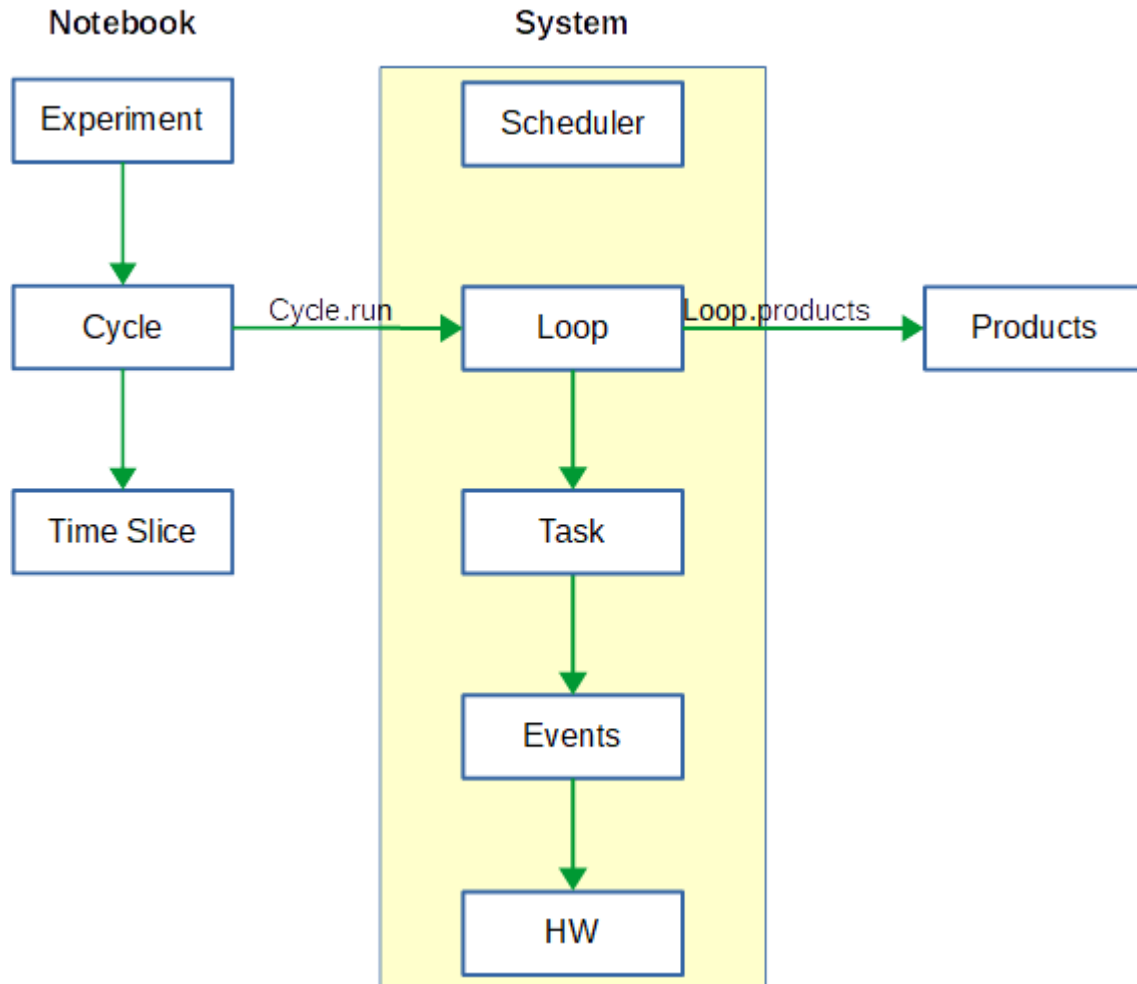
High level user interface should have means to define a volume and functions to calculate best way to scan that.

Libraries should show the scan and feed it into the system.

Analyzing tools are used to define real time calculations and help for data manipulations and visualizations.
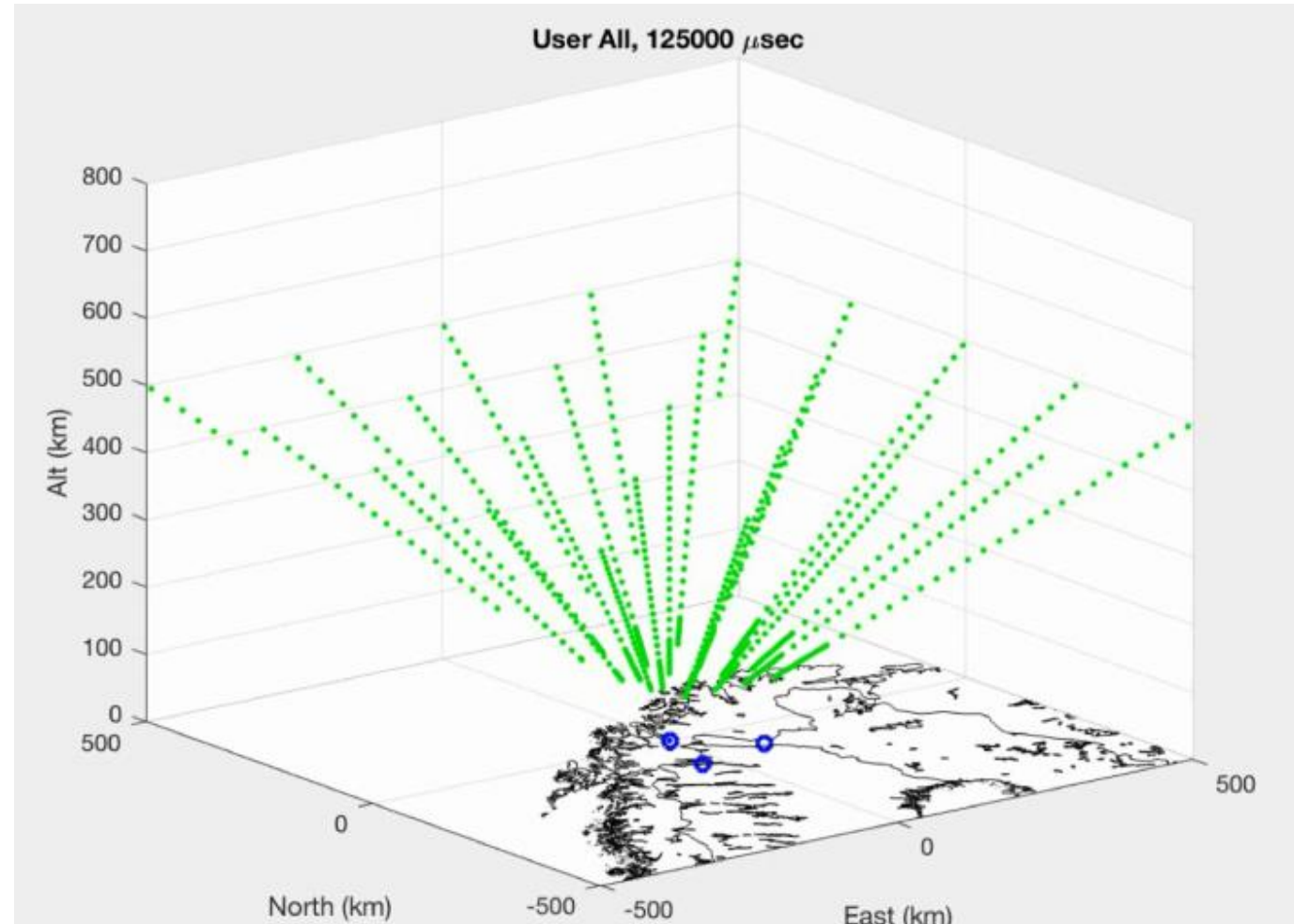
Principle of experiment execution

Experiment:
- Owns by a user
- Calendar time to run

Cycle:
- One radar measurement
- Belongs to an experiment
- Executed and produces data (product)
- Can be repeated

Time Slice
- One set of commands
- Scheduler timestamps
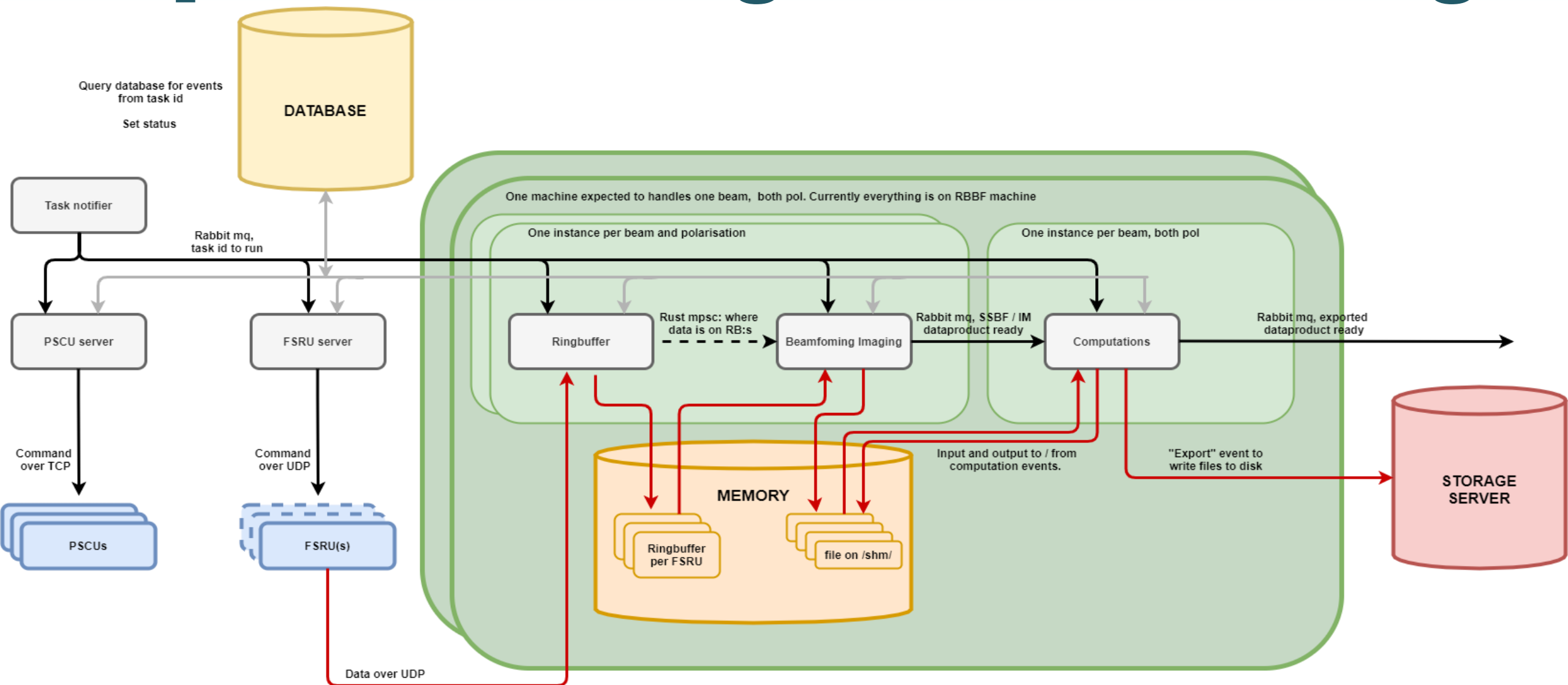- Start time can vary but strict timing inside

Task
- One set of events feed in to HW system
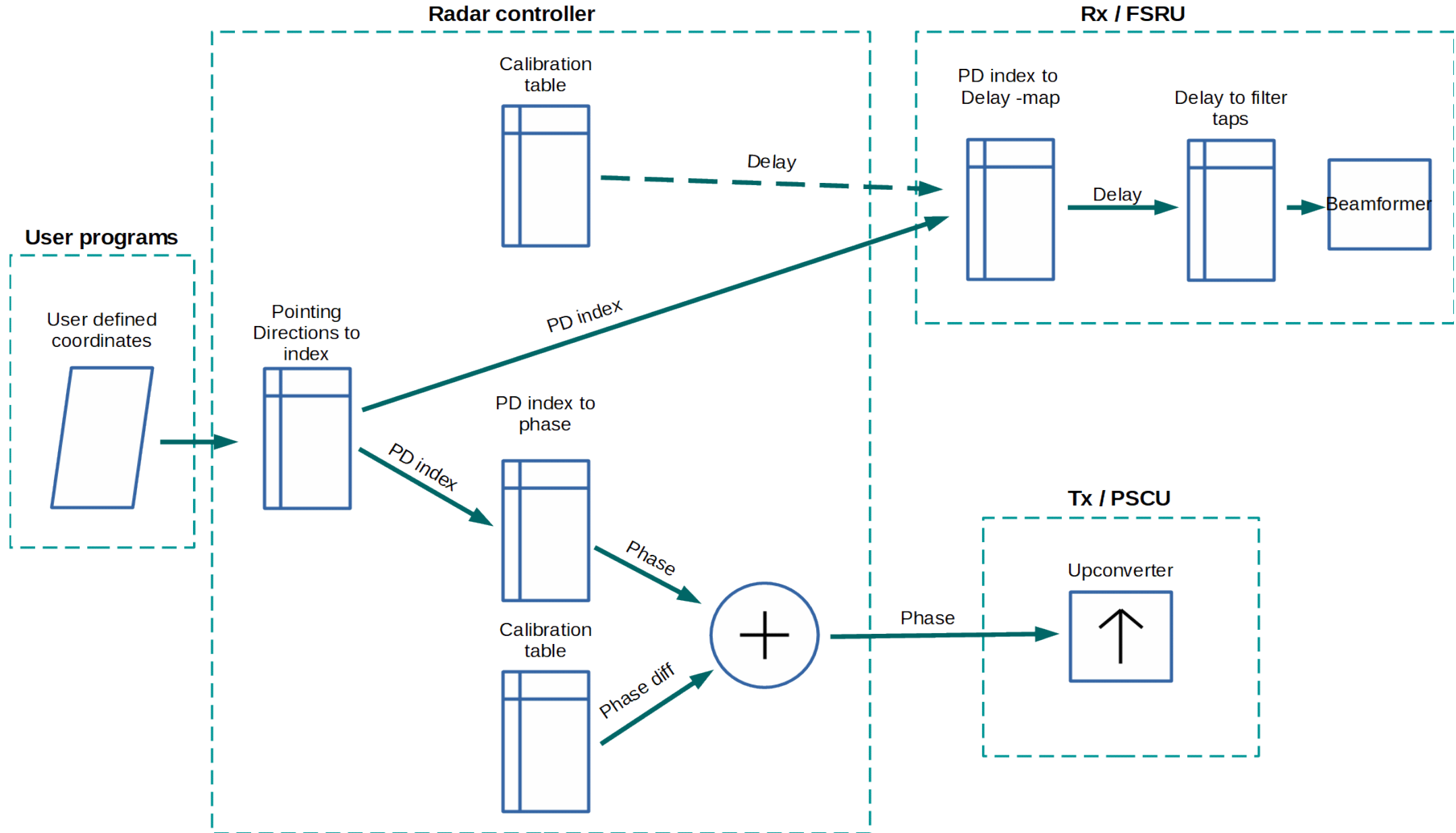- Can't be cancelled once timestamped

Event
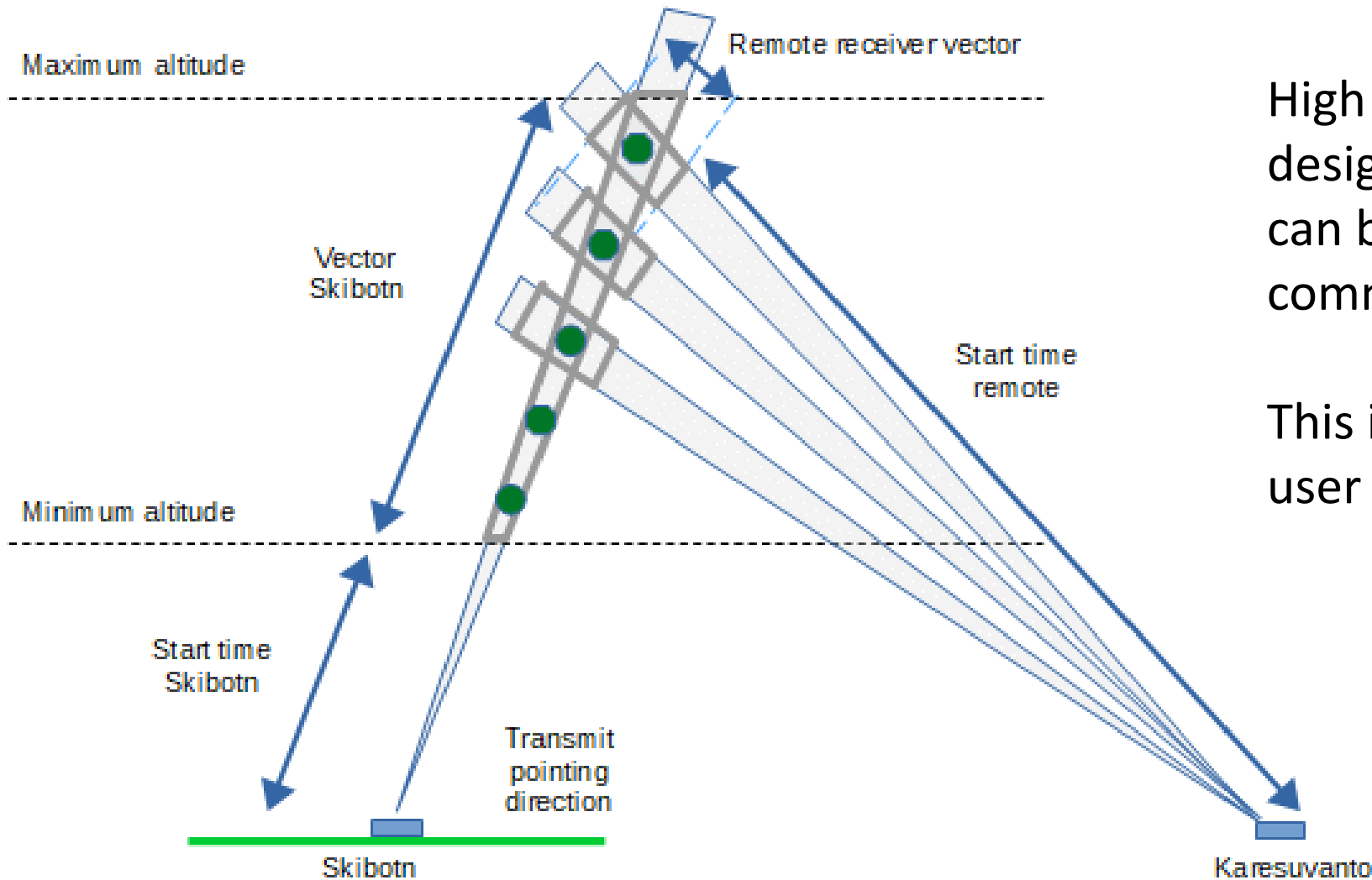- One HW command e.g., send pulse, take datastream

Experiment design and Scheduling
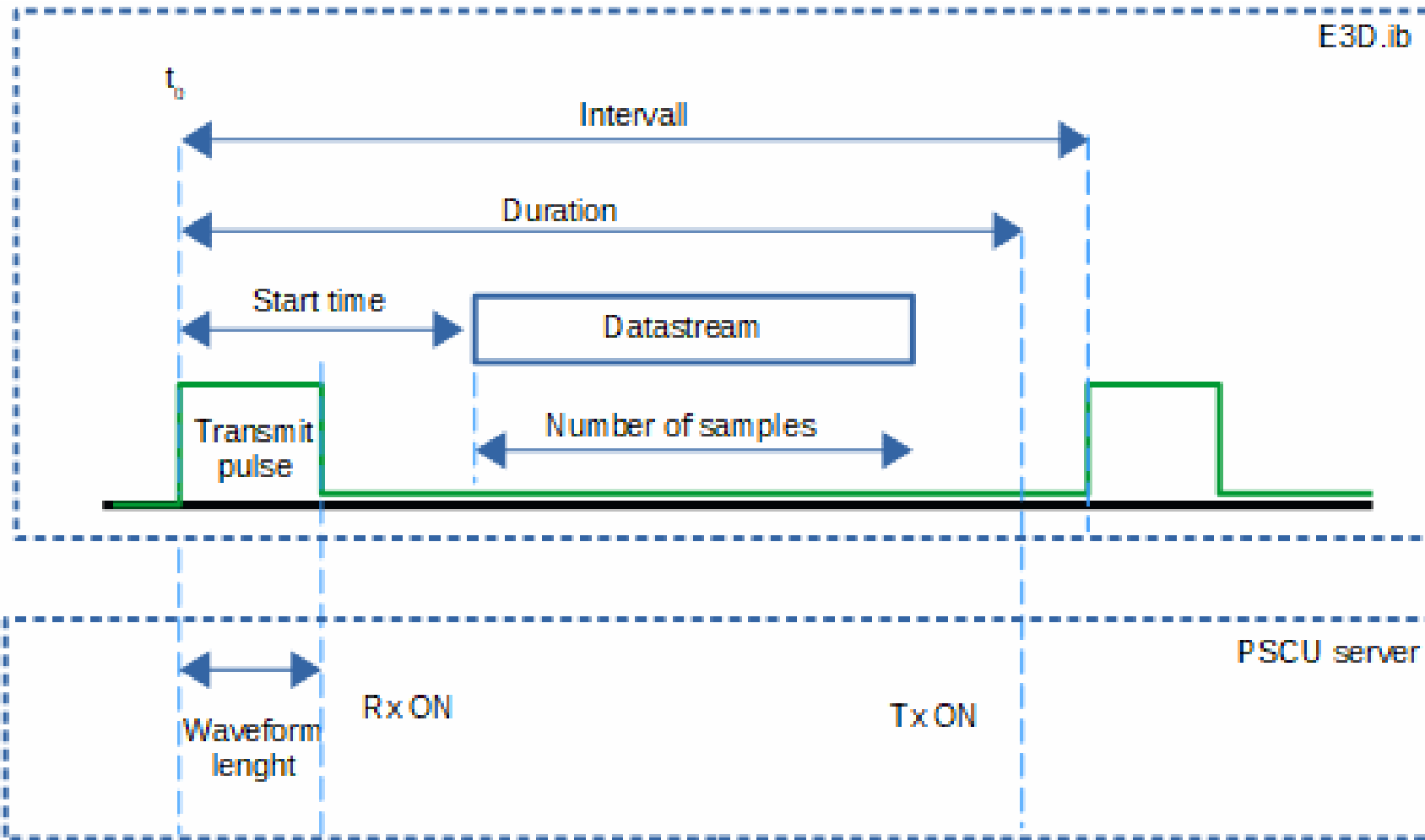
Pointing Direction conversions

Middle Level Interface

High level libraries should break the designed scan to Time Slices which can be then coded to machine commands.

This is also interface for experienced user and for machine development.

Timing inside a Time Slice

Start of the Time Slice is the reference for all events in it.

Phases for
Carrier phase for
upconverter (PSCU) and
down convert is cleared at
the start of each pulse and
datastream.