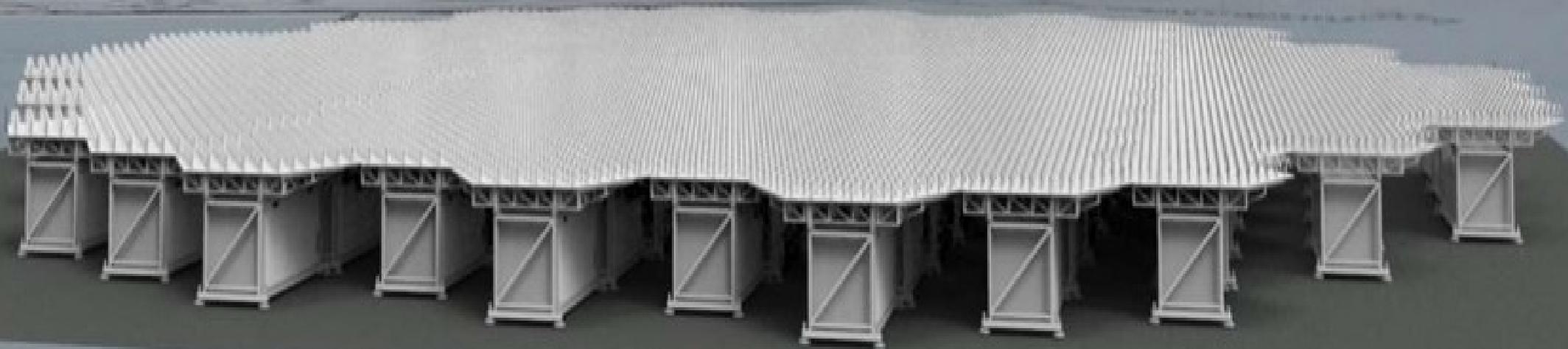


# 3D EISCAT

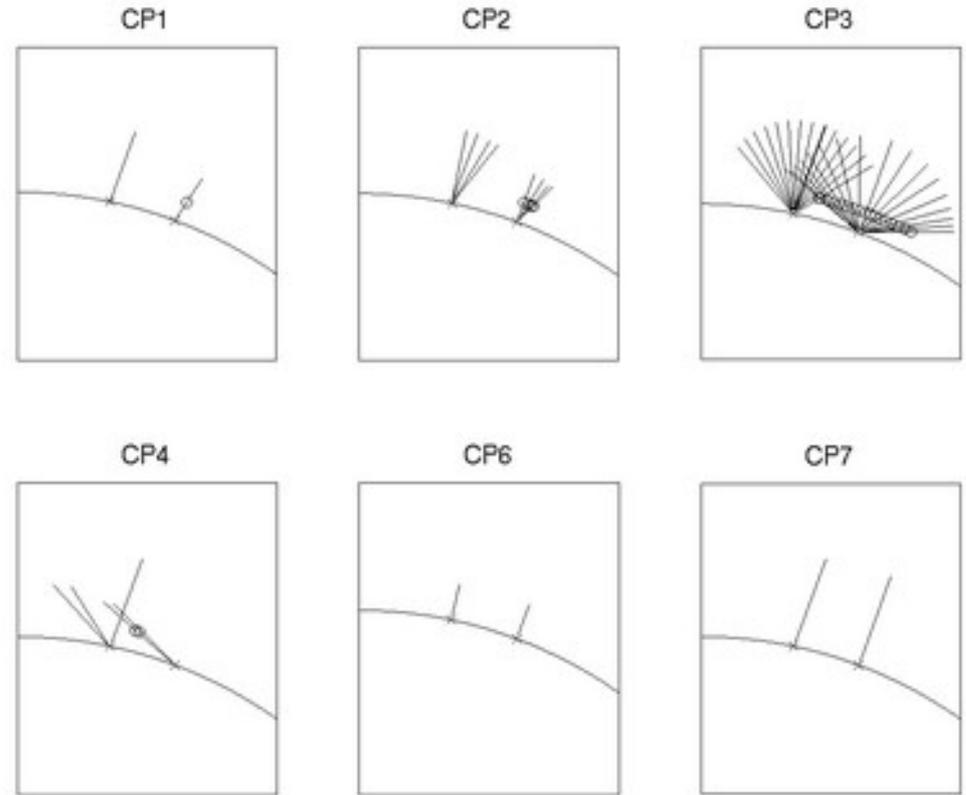


# Common Programmes

- Present CPs
  - Synoptic, run since 1981
  - Need to continue the long term data sets
- New CPs
  - What, why, when
- UPs
  - What, why, when
- LP
  - What, why, when

# Common Programmes (minimum, based on present system)

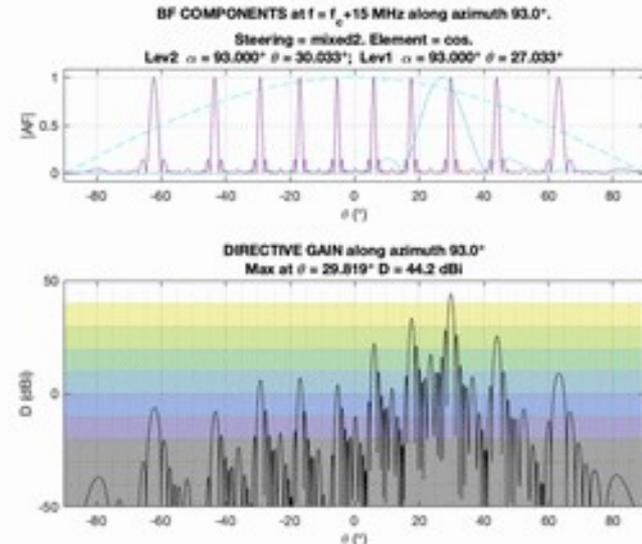
- CP1 along field line
  - **High range resolution**
  - **Plasma lines**
- CP2
  - Velocity vector height profile → same as CP1
- CP3
  - Wide E-field latitude coverage
    - Vectors 180-400km altitude
  - 7 directions
    - 35°N + 70°N + 90° + FA + 70°S + 55°S + 30°S
  - FA, 90° resolution  $\sim \sqrt{7} \cdot \text{CP1}$ , twice at 30°
- CP4
  - 2x30/35°N + FA (like ESR)
- CP6 vertical
  - High range resolution
  - High spectral resolution → **High repetition frequency**
- CP7
  - Long range, low range resolution
  - Along field line



# Common Programme One

- High tx power + large aperture → Wide BW
- 1024bit AC \* 0.75 $\mu$ s → 100m range resolution
- IPP 5ms → 20% tx duty cycle
  - 0-700km
- Skibotn (80% rec DC)
  - Ion line 4MHz (decimation 13)
  - Plasma line 17 MHz (decimation 3)
  - (No NI → Offset beam for calibration, high decimation)
- Remote
  - 30°-80° elevation → 8\*5=40 beams ion line
  - 2\*5=10 beams plasma line
  - (1024\*.75+700/8/.15)/5000 $\approx$ 25% rec DC / beam
  - Will have background period(s) → Offset beam not needed

## RX Beamforming - Mixed Steering: 1st Time, 2nd Phase



# Common Programme Six

- 256bit AC \* 0.75 $\mu$ s  $\rightarrow$  100m range resolution
- IPP 1ms  $\rightarrow$  20% tx duty cycle
  - 0-120km (Skibotn)
  - 0-500km (Remote)
- Skibotn (80% rec DC)
  - Ion line 4MHz (decimation 13)
- Remote
  - 30°-80° elevation  $\rightarrow$  8\*5=40 beams ion line
  - $(256*.75+500/8/.15)/1000 \approx 60\%$  rec DC / beam
- High command rate
  - $109*2*(2*8+1)/10^{-3} = 4*10^6$  receiver commands/data streams per second
  - $109*2*10^{-3} = 200*10^3$  transmitter commands per second
  - Half for E3 first stage (5MW 119+55+54 AUs)

# Low Power mode (minimum, preliminary)

- LPO
  - 90% of the time
  - all CPs into one
  - 1% of comp/store resources
    - ~0.5 MHz BW
    - 3% Tx duty cycle
  - FA
    - Aperiodic ~40 pulses/s
      - 'multipulse' spread
    - ~128\*5 $\mu$ s AC
    - Covers 0-2000km, all freq regions
  - 40°N
    - Interlaced/Separate

# Data Products

- Also used as triggers
  - <10s delay
- Lag profile related
  - Ionosphere (GUISDAP)
    - Ne Te Ti vi coll ...
  - Atmosphere
    - Moments (p,d,w)
  - Spectra, Ion+Plasma lines
    - For further analysis
- Beam + Imaging related
  - Meteors
    - Strength, position, velocity, development
  - Space Debris (whitelisted objects)
    - ID, strength, position, velocity

# New modes

- CP
    - Multipoint mapping
      - 10 / 100 / 1000 directions
        - ~LP0 \*10
      - Pattern
        - Cross, circle, ellipse
      - Allsky
      - Vertical (~CP2)
      - Meridional (~CP3,4)
  - UP (triggers)
    - Aurora (local)
    - SWE (global)
    - Vulcano (atmospheric)
- LP
    - Diurnal
      - LP\_day
      - LP\_dawn/dusk
      - LP\_night
    - Seasonal
      - LP\_winter
      - LP\_equinox
      - LP\_summer
    - Other
      - LP\_SSW