

# KVN Field System: A brief introduction

Do-Young Byun, Min-Gyu Song (KVN)  
EVN TOG 2016 @ St. Petersburg

# KVN Field System (KVNCS)

- Main features
  - Python (2.x)
  - run on ipython interpreter
  - support multi-threads
  - Object Oriented
- TCP/IP command string based to control Station Programs
  - VSI-S compatible
  - Other syntax ( “set Source -name Orion\_KL -ra 05:xx:xx -dec -10:…” )
- Monitor and Control
  - Antenna, Rx, DAS(Sampler + Digital Filter + Spectrometer), Recorder(Mark5, Mark6), Total Power Detector, DataServer
  - Time Comparator, Weather Station, Round Trip, Cryogenic, …
  - DBBC is not supported. KVN uses different digital backend.

# KVN Field System (KVNCS)

- Single-Dish Modes
  - PS, FIVE, FOCUS, CROSS, SkyDip, Cal ...
  - S/D data are stored into CLASS file
- runs a python script as a thread for
  - Single Dish Observations (Pointing Observation, Gain Curve, S/D Monitoring Obs. , S/D Survey, S/D Polarization, ...)
  - VLBI
    - KVex module : Vex Parser, Container
    - runKVex.py
- wxPython GUI
- Offline Python Tools
  - antab file, uvflg file (for antenna nodding)
  - vex checker
  - S/D data analysis pipeline (pointing model, gain curve, polarization, ..)

# S/D python script : example

```
execfile('config64.py')    # or one can use GUI to configure Rx, DAS
```

```
# read source coordinates from catalog file
```

```
src = cata.get(name = 'Orion_KL', file='POINTING_Q.SOU')
```

```
antenna.set(src)
```

```
obs.setMain().join()
```

```
RunSDip() #
```

```
obs.join()
```

```
for i in range(numpeat):
```

```
    RunPS()
```

```
    obs.join()
```

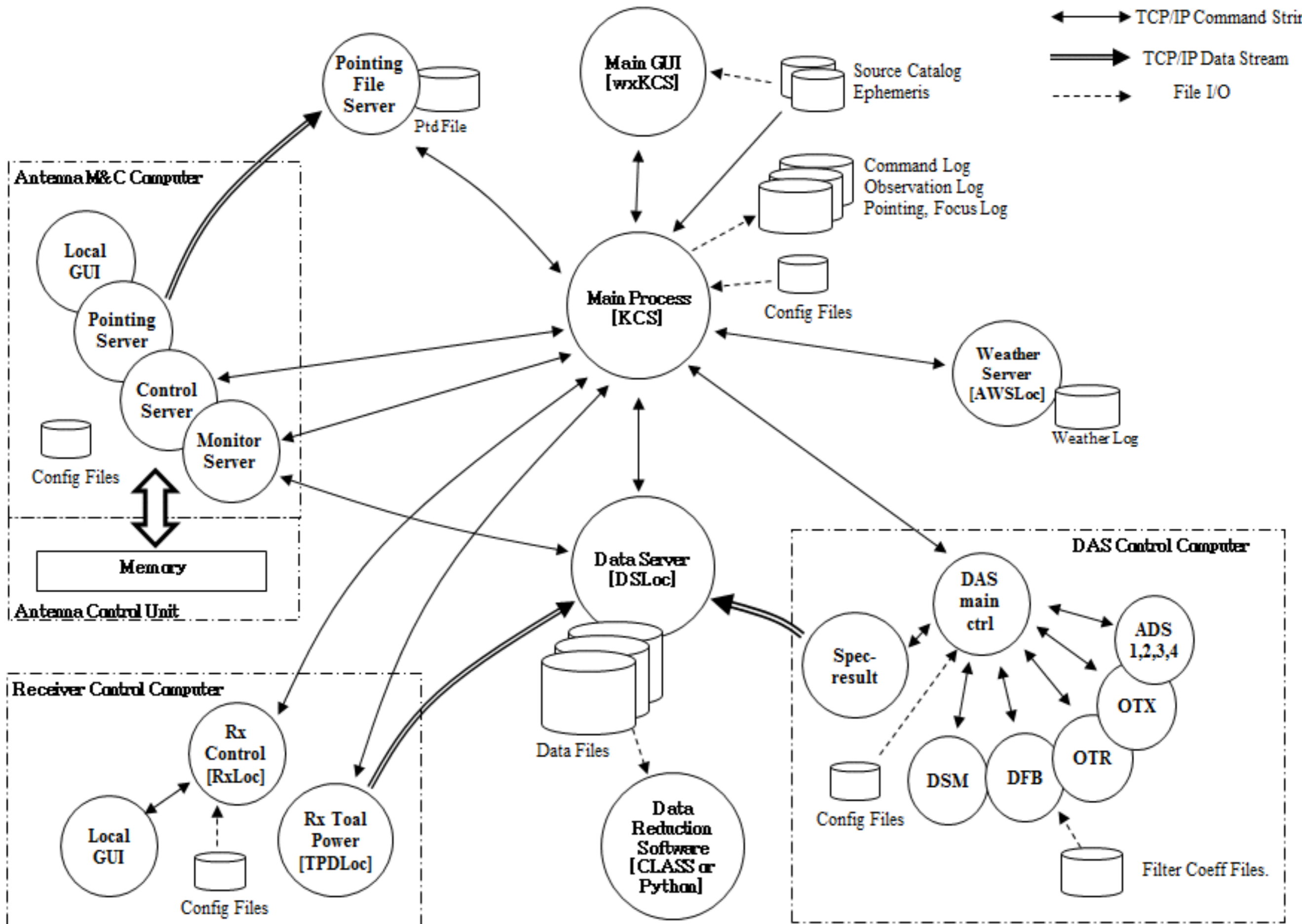
# VLBI script- runKVex.py(simplified)

```
v = KVex.KVex(obs_code)
vlog = StationLog.StationLog(obs_code, station_name)
KVex_ConfigConfig(v, v.scans[0], rx, das) # configure Rx , DAS ( DFB, DSM.. )
vlog.writeLog(...)
for scan in v.scans:
    src = ks.get_source_paramter(v, scan)
    antenna.set(src)
    obs = ks.get_preob_cal(scan) ; Run(obs) ; obs.join()
    scan_starttime, scan_stoptime = ks.get_scantime(scan)
    w_startscan = WaitThread.waitUT(scan_starttime,offset=-0.6)
    w_startscan.start() ; w_startscan.join()
    mk5b.setRecord('on',scan.get_name(),obs_code,station_name) # and write log
    w_startstop = WaitThread.waitUT(scan_stoptime,offset=-0.6)
    w_startscan.start() ; w_stopscan.join()
    mk5b.setRecord('off') # and write log
```

# wxPython GUI (of Sejong)

The screenshot displays the wxPython GUI for Sejong, a radio astronomy control system. The interface is divided into several panels:

- Antenna Control:** Shows antenna parameters like Azimuth (1500.0) and Elevation (-1000.0).
- VFC-1 and VFC-2:** Two plots showing signal streams. VFC-1 has a value of 0.10285, and VFC-2 has a value of 0.11887. Both plots show a noisy signal over 500 channels.
- STATION\_LOG@KVGCS:** A log window showing system status and timestamps, such as "2015-09-04 02:31:52".
- VEX@KVGCS:** A central control panel for the VEX system, including:
  - File:** VEX Ctrl, VEX Status, TestVector.
  - UT:** 2015-09-04 (247) 02:29:15.
  - Recorder:** MarkSB, 2048.0 Mbps, Sync, Bank B, 10462.2 GB.
  - Table:** A table of observation records with columns: Source, Start, Dur, Stop, Mode, Pre:Mid:F. Row 38 is highlighted.
  - General@KVGCS:** A sub-panel showing UT (2015-09-04(247) 02:29:14), LST (09:50:03), and various parameters like RA, DEC, AZ, EL, and ZDES.
  - Weather:** RAIN (NO RAIN), WIND (2.0 m/s), TEMP (24.8 C), DIRECT (1.5 deg), HUMID (69.2%), PRESS (1044.4 mbar), CLOCK (-5.8 us).
  - RxRoom:** TEMP (290.0 K), HUMID (0.0 %).
  - Table:** A table of receiver parameters with columns: Rx, RF (GHz), Vel, Dplr, PLL, Tau0, Tau, Tsys (K), P\_Sky, P\_Hot, P\_Cold, ADS#, BSD (%). Rows BBC1 and BBC2 are shown.
- MKS@KVGCS:** A panel for the MarkSB recorder, including:
  - Bank:** Bank A, Bank B.
  - VSN:** KVN-3185/24000/1024, KVN-2114/10000/1024.
  - Remaining HDD Space and Time:** Table with columns: Time(min), Space(GB), Percent(%), Rate(Mbps). Values: 681.1, 10462.2, 65.4, 2048.0.
  - Mode:** DataSrc (ext), BitMask (0xffffffff), DecRatio (1), FPD (2).
  - DOT:** 2015y247d02h29m14.8s, SyncErr (0), FHG (OFF), Dt (0.000).
  - Last Scan:** Label (41), s15db01a\_KVGCSJ\_No00037, 600.0s, 2015y247d02h16m00.0000s.



# KVN Data Acquisition System

