TWSTFT report in NTSC

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The current situation of NTSC TWSTFT link

The TWSTFT link between NTSC (National Time Service Center, the Chinese Academy of Sciences) and NICT (National Institute of Information and Communications Technology) via satellite JSAT was established in October 1998. In 2003 March, NICT has set the new modem at NICT and NTSC link, The new modem Cosmo Research can simultaneously carry out time transfer with maximum 7 stations(There are 8 RX unit, one is for calibration and 7 for data transmission).

We have built another one TWSTFT stations in 2005 March. That will be used for new TWSTFT link with Europe. Our system as following.

Fig.1   1.8 meters ellipse antenna

Fig 2.　NICT Modem

Fig.3Two earth stations for TWSTFT

Fig.4　　Two sets of converters

Fig.5   TWSTFT Lab in NTSC

We have two earth stations and two kind of modem for TWSTFT and we also can get fund support form Chinese Academy of Sciences.   NTSC is very interesting to build TWSTFT link to Europe .

Considering the antenna polarization in Asia must be improved for pas4,NTSC have finished such work in the beginning of this year.

Fig.6   2.4m Antenna for Pas4 and improved polarization

Now, NTSC and OP have discussed in detail and decide to set up OP—NTSC TWSTFT link via satellite PAS4. OP and NTSC have tested TWSTFT link in the middle of July 2007.

In addition, VSL and NTSC TWSTFT link has set up since 2007 May. Now we have regularly observation as experiment. NTSC and VSL have put TWSTFT data in the FPT

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* TWNTSC54.290
* FORMAT    01
* LAB       NTSC
* REV DATE  2007-04-18
* ES NTSC01 LA: N  34 22 07.300      LO: E 109 13 17.400   HT: +0464.00 m
* REF-FRAME WFS-84
* LINK   01 SAT: PAS-4              NLO: E 072 00 00.000   XPNDR: +9999.999 ns
*          SAT-NTX: 12678.250 MHz    SAT-NRX: 14265.000 MHz
* CAL    043 TYPE: 999999999999      MJD: 99999  EST. UNCERT.: 0005.000 ns (VSL)
* CAL    999 TYPE: BIPM Circ. T      MJD: 99999  EST. UNCERT.: 0005.000 ns (NTSC)
* LOC-MON   NO
* MODEM     SATRE-TWSTFT-3Ch, S/N : 361
* COMMENTS:
*
* EARTH-STAT  LI  MJD   STTIME NTL       TW        DRMS SMP ATL    REFDELAY     RSIG  CI S    CALR       ESDVAR     ESIG TMP HUM PRES
* LOC    REM            hhmmss  s         s         ns       s       s          ns          ns         ns         ns degC  %  mbar
NTSC01 VSL01 01 54290 014600 119 +0.264854127683 0.581 120 119 +0.000000812597 0.080 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 014300 119 +0.264855160540 0.467 120 119 +0.000000812617 0.079 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 014000 119 +0.264856196378 0.515 120 119 +0.000000812604 0.074 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 034600 119 +0.264816896640 0.459 120 119 +0.000000812317 0.083 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 034300 119 +0.264817690541 0.487 120 119 +0.000000812327 0.083 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 034000 119 +0.264818493147 0.484 120 119 +0.000000812329 0.076 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 054600 119 +0.264793087020 0.509 120 119 +0.000000812008 0.080 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 054300 119 +0.264793478632 0.462 120 119 +0.000000812029 0.070 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 054000 119 +0.264793884898 0.455 120 119 +0.000000812029 0.081 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 074600 119 +0.264786452616 0.420 120 119 +0.000000811866 0.090 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 074300 119 +0.264786404590 0.428 120 119 +0.000000811865 0.090 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 074000 119 +0.264786367196 0.455 120 119 +0.000000811883 0.084 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 114600 119 +0.264821825683 0.493 120 119 +0.000000811587 0.089 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 114300 119 +0.264821058756 0.599 120 119 +0.000000811565 0.091 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 114000 119 +0.264820297973 0.507 120 119 +0.000000811539 0.085 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 134600 119 +0.264856455729 0.457 120 119 +0.000000811740 0.086 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 134300 119 +0.264855525606 0.498 120 119 +0.000000811756 0.087 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
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NTSC01 VSL01 01 54290 154600 119 +0.264893454727 0.439 120 119 +0.000000811810 0.086 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 154300 119 +0.264892572753 0.490 120 119 +0.000000811805 0.100 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
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NTSC01 VSL01 01 54290 174600 119 +0.264923595033 0.433 120 119 +0.000000812038 0.086 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 174300 119 +0.264923003417 0.524 120 119 +0.000000812058 0.090 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 174000 119 +0.264922401219 0.568 120 119 +0.000000812082 0.087 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 194600 119 +0.264937513512 0.430 120 119 +0.000000812016 0.087 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 194300 119 +0.264937424588 0.425 120 119 +0.000000812035 0.092 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 194000 119 +0.264937321084 0.402 120 119 +0.000000812020 0.083 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 214600 119 +0.264929003725 0.533 120 119 +0.000000812165 0.090 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 214300 119 +0.264929501733 0.498 120 119 +0.000000812154 0.091 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 214000 119 +0.264929985286 0.458 120 119 +0.000000812165 0.087 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 234600 119 +0.264898858450 0.443 120 119 +0.000000812105 0.084 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 234300 119 +0.264899816372 0.639 120 119 +0.000000812158 0.078 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
NTSC01 VSL01 01 54290 234000 119 +0.264900766213 0.570 120 119 +0.000000812163 0.080 999 9 +9999.999 +9999.999 9.999 99  999 9999.00
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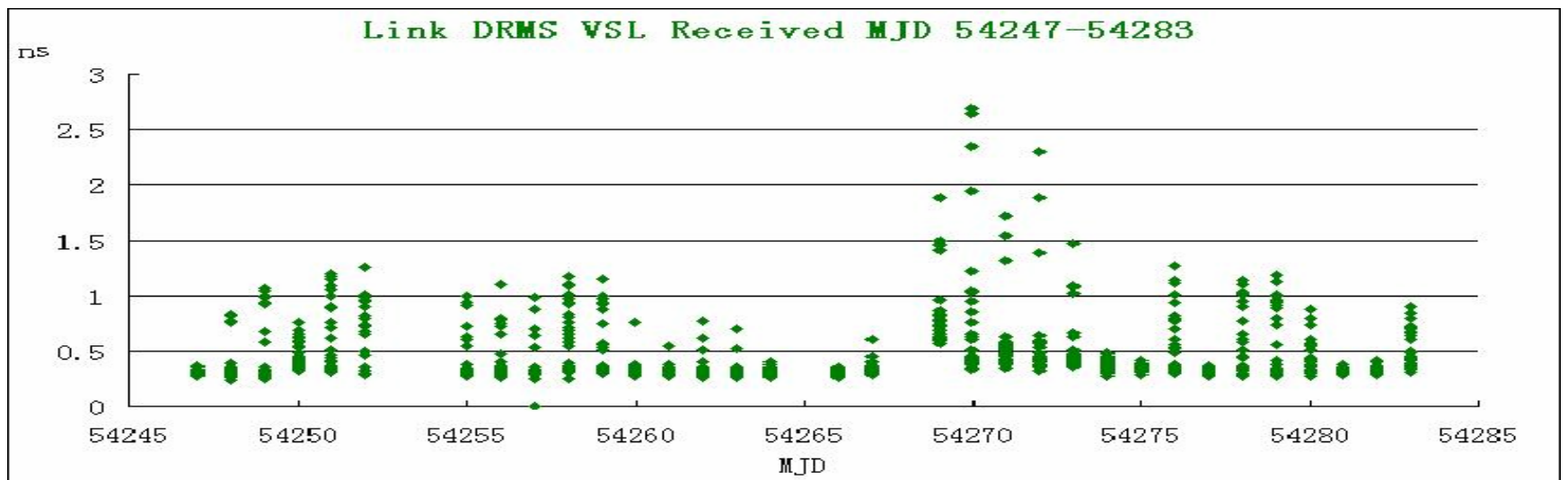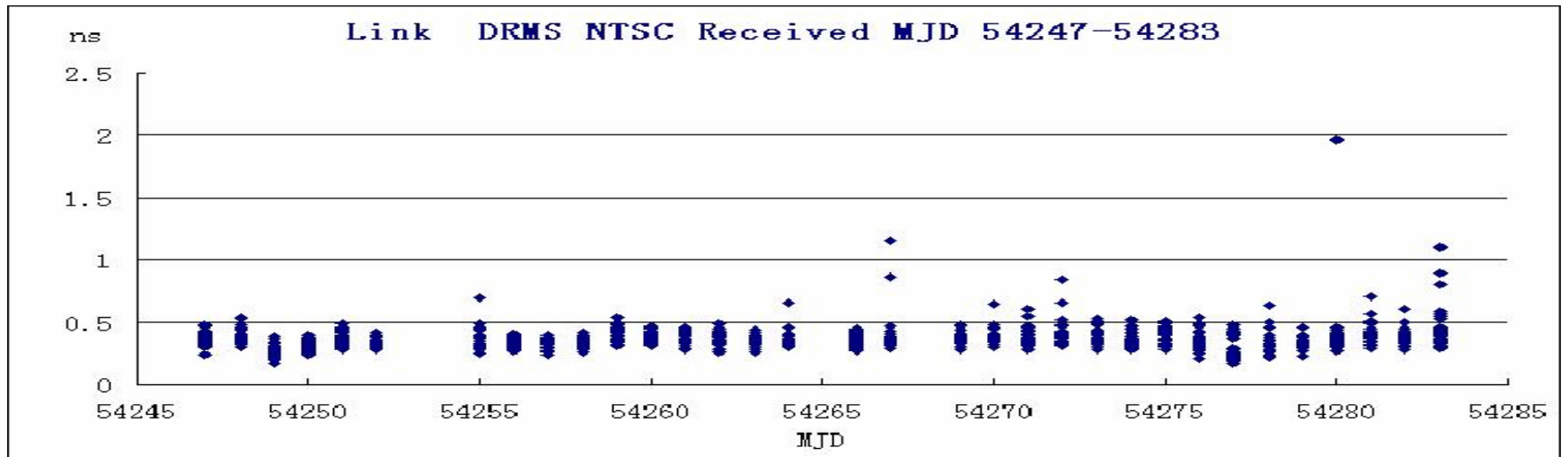
Fig.7 A sample in NTSC TWSTFT FTP

Fig.8 Observation DRMS

- VSL is using the Mitrex moden and NTSC is using Satre modem.
  After the first results we see some strange diurnal of 24hr of a few 100ns.
  We are analyzing the reason.

- We also have Asian link with NICT. The two links use same source. 1pps and 10 MHz come from UTC NTSC Clock. The U/D converters and High power Amplifiers also same type. There are only antenna and Modem different. I will try to change new Modem for the link late.

Planning

- NTSC have 3 channel Stare Modem made by Time Tech. If necessary, we could extend it to more channel.

- We have developed automatic observation program.

- We hope make OP-NTSC link after this meeting.

- If possible, we hope built PTB-NTSC TWSTFT link .

- NTSC will join the payment for Pas4.

Thank you

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