The TWSTFT in NTSC at present

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1.TWSTFT in NTSC at present

The TWSTFT is one of the most precise and accurate methods for time transfer. Some of time institutes in the World, such as Europe, north America and Asia Pacific area, have carried out TWSTFT experiment regularly.

Some TWSTFT links in the world have contributed to construction of TAI. The 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.

The VSAT antenna is 1.8 meters ellipse antenna; transmitter and receiver to combine Up and Down converter together, it is made by SSE Company. The Modem type is Atlanntis (AOA) modem.

The link is used for the TAI computation since January 5,2002(MJD 52279).

Here is the photograph for the system.

See Figure 1 and Figure 2.

Fig.1 1.8 meters ellipse antenna

- Fig.2 Atlanntis (AOA) modem

Because of some trouble with SSE RF transceiver and Low Noise Converter (LNC), the link had to be interrupted many times. The SSE product is too many unit combine together and fix outdoor, it is very easily to be broken by rainy . To repair the RFU is big problem. The best way is to develop new transceiver for NTSC TWSTFT station. The AOA modem only can be used for two stations , it is point to point working mode.

Now some TWSTFT links have used multi-channel modem.

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).

See Fig. 3

Fig 3. NICT Modem and AOA Modem

We parallel use such two modems for TWSTFT more than one year. Since 2005 June in Asia-Pacific Two-way Link has used NICT modem for TWSTFT. We have stopped the AOA modem.

As I have mentioned , in our original earth station we used SSE RFU. In order to improve our system , we have built two new TWSTFT stations in 2005 March. One is main system for NTSC and NICT link, another one is used for sub system. Our new system as following:

Ku Band UP Converter	**UT-4514/D Option-1 Up Converter with IOM Input/Output Module for stand alone Operation (13.75-14.5GHz), step size: 1kHz (0.25dB Attenuator)**	Comtech
Ku Band Down Converter	**DT-4513 Option-1 Down Converter with IOM Input/Output Module for stand alone Operation (10.95-12.75GHz), step size: 1kHz (0.25dB Attenuator**)	Comtech

Ku Band LNA	**LKE12S65-XXXX** **Standard Frequency: 10.95 - 12.75 GHz, 65K noise, 60dB gain**	Vertex
Ku Band SSPA	**XTS-25KL8, Antenna Mount SSPA lower power version, 8W Sat, 6W P1dB, 14.0 to 14.5GHz, Receive/Harmonic filter, Detected RF, Serial Interface**	Xicom

Modem	7 Channel	NICT,Japan
Modem	3 Channel (can extended channel)	Time tech, Germany
Antennas	2.4 Meter 1.8 Meter	China Japan

Fig.4 Antennas for TWSTFT in NTSC

Fig.5 Two sets of Up/Down Converters

Fig.6 SSPA for Main and Sub system

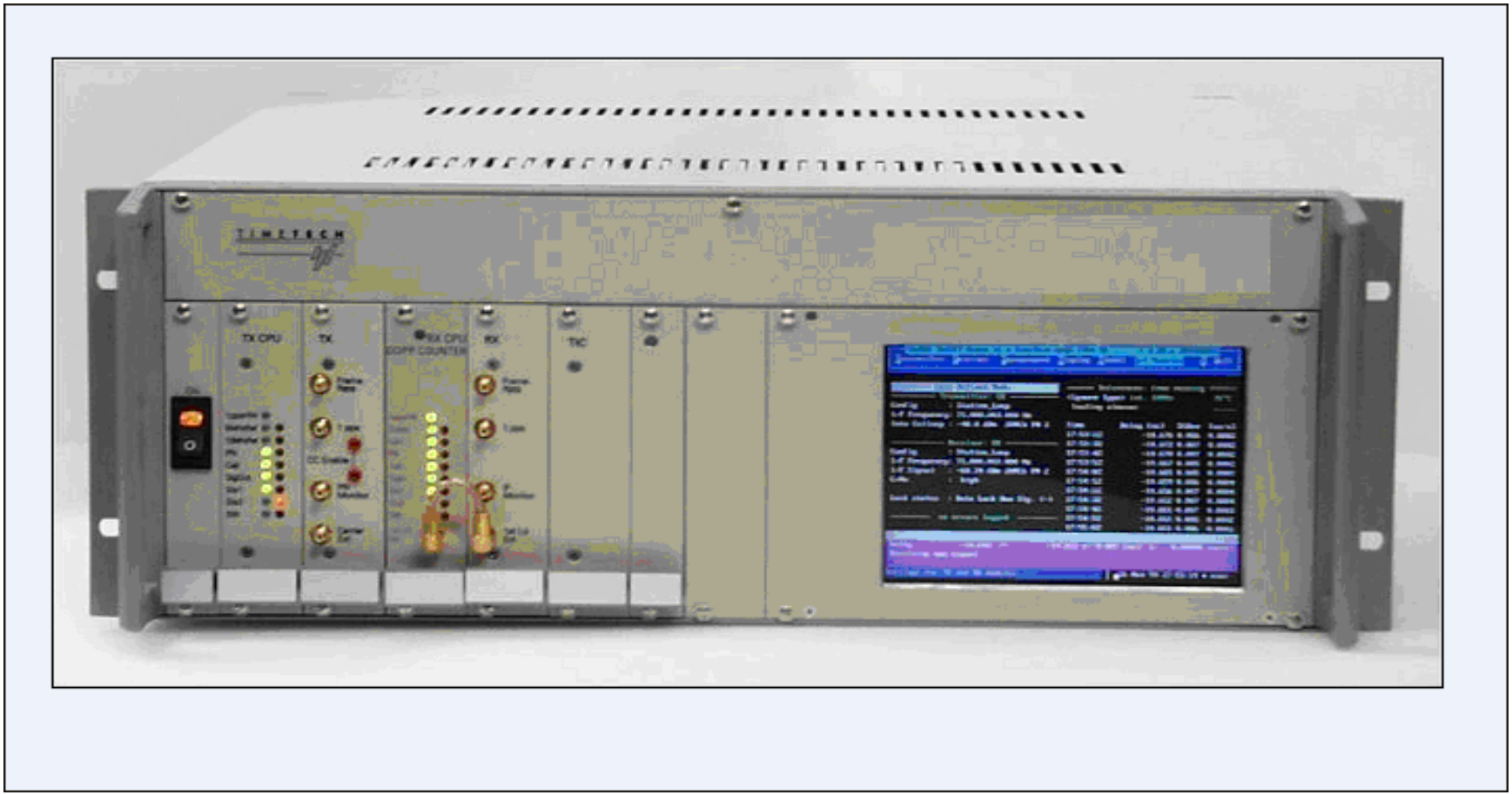

Fig.7 Timetech modem

Fig.8　Two earth stations

2. Suggestion

Now , NTSC have ability to set up a TWSTFT link to Europe. 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 . If we could set up the link between NTSC and some Europe stations, for those geo satellites located E 40 degree to 75 degree, we can obtain very well observation.

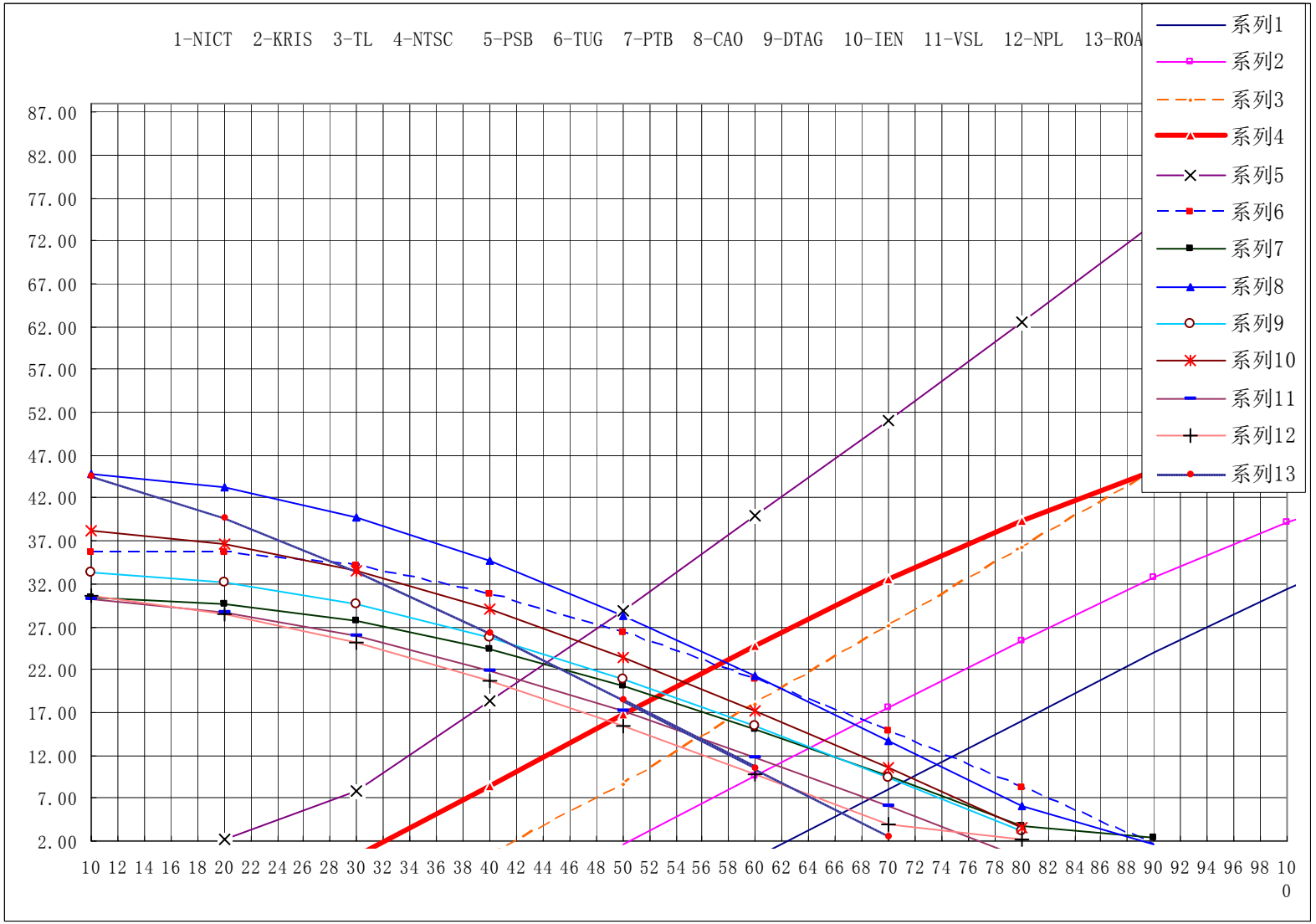

Figure 9 The elevation of satellite for some stations

We are looking forward to establishing a new TWSTFT time link between NTSC and one and more European time labs. I hope the meeting can give us some suggestion.

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Thank You !