§1. Data Transfer and Direct Data Acquisition from GAMMA 10/PDX to LHD Virtual Laboratory via SNET

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We started to exhibit the total collection data in GAMAM10 on Plasma Research Center, University of Tsukuba with the collaboration of LABCOM group since 2008. In GAMMA 10, base data acquisition is performed by using a CAMAC system by using Windows PC. These data is collected on the Soralis10 data server system with 4TB RAID system. In addition, we have many stand alone PC data collection systems for many diagnostics. We constructed the Linux (CentOS) data collection server system with 24TB RAID, in order to collect total collection data in GAMMA 10, such as CAMAC collection data and many other diagnostic data. We have connected the NIFS LABCOM/X system under the new framework of "Fusion Virtual Laboratory" where users can access the data equivalently regardless of their whereabouts. Such the activity is named "SNET", which is based on a closed VPN on Japanese academic internet backbone SINET3 and covers multiple experimental remote devises. In Fig. 1, we show the SNET formation between GAMMA 10 local network and NIFS server segment.

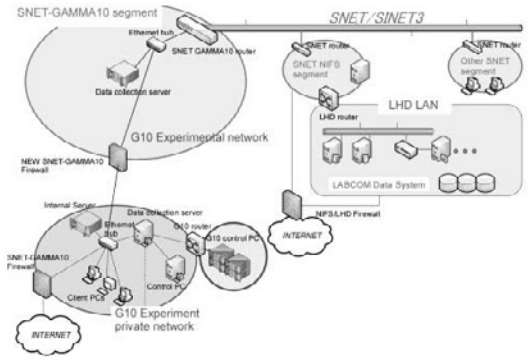

Fig. 1. SNET formation between GAMMA 10 local network and NIFS server segment.

From FY 2010, we started **P**otential control and **D**ivertor simulator e**X**periments (PDX). New diagnostics for divertor experiments are started such as end divertor calorimeter (nb-cm), end divertor spectrometers (nb-usb1 and bp-ssv), and end divertor probe (bp-epv). Moreover, we added the new end divertor probe signals by CAMAC system. We send the GAMMA 10 total collection data from the GAMMA 10 data collection server to the NIFS LABCOM/X system, and succeeded. In Table 1, we show the total transfer data names and sizes. Total file size of transfer data is about 2.3 TB/year.

The essential information of experiment operation, the sequence timings and the shot number, are given by the GAMMA10 experiment control system through the hard wires and the http network communication, respectively.

Diagnostics	data name	Size [kB]
GNBP	bp-epv	1,192,172
	bp-ssv	132,808
	bpcc	10,789,916
	bpcc2	10,895,164
SX	elx-mcpcc	1,087,616
ICRF	rf-eprobe	20,006,648
	rf-m2probe	20,827,196
	rf-mach2probe	357,696
	rf-machprobe	11,516,292
	rf-mprobe	46,758,092
	rf-probe	10,822,596
	rf-ref	70,060,704
NBI	nb-cm	193,064
	nb-hs-camera2	1,769,325,436
	nb-hs-camera3	176,698,208
	nb-usb1	76,680
Thomson	Thomson-osc1	77,396,592
	Thomson-osc2	150,384
	Thomson-osc3	227,272
Spectroscopy	sp-ct100c	12,465,000
	sp-usb1	258,288
	sp-usb2	265,176
PRC	g10-camac	49,440,572
	Total size	2,290,943,572

Table. 1. Total transfer files.

In addition to share the already acquired data, remote DAQ nodes were installed at GAMMA10/PDX to measure eight channels of microwave interferometer signals in the central cell plasma and the 8 channels of end divertor probe signals in end region.