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

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In GAMMA 10/PDX, base data acquisition is normally performed by using a CAMAC system. These data are 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, such as fast cameras, electrostatic probes, gold neutral beam probe, and spectroscope systems. We constructed the Linux (CentOS) data collection server system with 24TB RAID, in order to collect total collection data in GAMMA 10/PDX, such as CAMAC collection data. We 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 this fund year, new three diagnostics are added to the CAMAC collection system, such as a multi-channel end divertor microwave interferometer, a electrostatic probe, and a secondary electron detector. Moreover, we changed the Thomson scattering data of Thomson-osc7 from Thomson-osc1. We sent the GAMMA 10 total collection data from the GAMMA 10 data collection server to the NIFS LABCOM/X system. The total shot number of GAMMA 10/PDX plasma was 3265 and the experiment days are 60 days in FY 2015. In Table 1, we show the total transfer data names and sizes. Total file size of transfer data is about 0.7 TB/year.

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

In addition to share the already acquired data, remote DAQ nodes were installed at GAMMA10/PDX to measure eight channels of end plate potential measurements, eight channels of microwave interferometer signals and four channels of reflectometer signals in the central cell, and the eight channels of end divertor probe signals in end region. We measured the end plate potential #1, #2, central cell, west anchor cell, and west barrier cell microwave interferometer signals, simultaneously, for fluctuation study.

Diagnostics	data name	Size [k B]
GNBP	bp-epv	6,002,599
	bp-ssv	398,567
	bpcc	1,124,150
	bpcc2	0
SX	elx-mcpcc	3,381,032
	elx-xsdcc	1,434,934
ICRF	rf-eprobe	16,804,805
	rf-m2probe	2,160,288
	rf-mach2probe	4,930,956
	rf-machprobe	11,239,387
	rf-mprobe	175,084,344
	rf-other	1,149,373
	rf-probe	58,647,921
	rf-ref	77,663,439
	rf-ref2	6,351,103
Thomson	Thomson-osc1	0
	Thomson-osc2	4,293,438
	Thomson-osc3	4,293,491
	Thomson-osc4	4,293,491
	Thomson-osc5	4,293,384
	Thomson-osc6	4,293,438
	Thomson-osc7	4,293,384
Spectroscopy	sp-ct100c	12,125,633
	sp-usb1	118,660
	sp-usb2	137,710
	sp-usb3	93,329
NBI	nb-cm	3,622
	nb-hs-camera2	31,094,118
	nb-hs-camera3	172,355,537
	nb-usb1	175,927
PRC	g10-camac	75,555,682
	Total size	683,793,742

Table 1. Total transfer files.