(4) Basic requirements of the procurement :

1) The product must be composed of two scalar parallel computing systems (A and B), a vector parallel computing system, a measurement integration interface server, and a 3-D visualization server, which are described below.

2) The scalar parallel computing system A of the product is required to have the following performance and functions.

(a) The total capacity of the main memory of the system must be 8 TB or larger.

(b) Main memory of a capacity of 4 TB or larger can be utilized as a shared memory.

(c) A part of the system composed of CPUs sharing the main memory must have an effective operation performance of 3.5 TFLOPS or higher (64-bit floating point operation) by the Linpack's Highly Parallel Computing Benchmark.

(d) The system must be capable of two parallel and simultaneous executions of the operation described in (c).

3) The scalar parallel computing system B of the product is required to have the following performance and functions.

(a) The total capacity of the main memory of the system must be 24 TB or larger.

(b) Main memory of a capacity of 1 TB or larger can be utilized as a shared memory.

(c) A part of the system composed of CPUs sharing the main memory must have an effective operation performance of 1.8 TFLOPS or higher (64-bit floating point operation) by the Linpack's Highly Parallel Computing Benchmark.

(d) The system must be capable of 48 parallel and simultaneous executions of the operation described in (c).

4) The vector parallel computing system of the product is required to have the following performance and functions.

(a) The total capacity of the main memory of the system must be 1 TB or larger.

(b) Shared memory of a capacity of 1 TB or larger can be utilized as a main memory.

(c) A part of the system composed of CPUs sharing the main memory must have an effective operation performance of 1.5 TFLOPS or higher (64-bit floating point operation) by the Linpack's Highly Parallel Computing Benchmark.

5) The measurement integration interface server of the product is required to have the following performance and functions.

(a) The total capacity of the main memory of the system must be 768 GB or larger.

(b) Shared memory of a capacity of 64 GB or larger can be utilized as a main memory.

(c) A part of the system composed of CPUs sharing the main memory must have an effective operation performance of 230 GFLOPS or higher (64-bit floating point operation) by the Linpack's Highly Parallel Computing Benchmark.

(d) The system must be capable of 12 parallel and simultaneous executions of the operation described in (c).

(e) To share data with experimental equipments in the Institute, the server must have an interface device whose data transfer rate is 40 Gbps or higher and by which it is connected with the measurement integration control PCs attached to the experiment equipments.

6) The 3-D visualization server of the product is required to have the following performance and functions.

(a) Main memory of a capacity of 192 GB or larger can be utilized as a shared memory.

(b) Shared memory of a capacity of 24 GB or larger can be utilized as a main memory.

(c) A part of the system composed of CPUs sharing the main memory must have an effective operation performance of 80 GFLOPS or higher (64-bit floating point operation) by the Linpack's Highly Parallel Computing Benchmark.

(d) The system must be capable of eight parallel and simultaneous executions of the operation described in (c).

(e) The server must be equipped with graphics subsystems for parallel image processing to generate multiple stereograph displays based on computed and／or experimentally obtained data.

(f) The server must be equipped with remote and fast graphics subsystems for parallel image processing to visualize computed and／or experimentally obtained data on the terminals which are connected to the network of the Institute.

7) The scalar parallel computing systems A and B must have FORTRAN, C and C++ program development systems with compilers and support tools that have functions of auto-tasking parallelization. Both the OpenMP and the MPI must be supported as an application program interface (API) for parallel processing.

8) The vector parallel computing system must have FORTRAN, C and C++ program development systems with compilers and support tools that have functions of auto-tasking parallelization and vectorization. Both the OpenMP and MPI must be supported as an API for parallel processing.

9) The measurement integration interface server must have FORTRAN, C and C++ program development systems with compilers and support tools that have functions of auto-tasking parallelization. Both the OpenMP and MPI must be supported as an API for parallel processing. A program library and a sample program must be provided for synchronization of data between the server and the measurement integration control PCs.

10) The 3-D visualization server must have FORTRAN, C and C++ program development systems with compilers and support tools that have functions of auto-tasking parallelization. Both the OpenMP and MPI must be supported as an API for parallel processing.

11) Each of the scalar parallel computing systems, the vector parallel computing system, the measurement integration interface server, and the 3-D visualization server must have functions of high-performance communication and interactive operation.

12) The product must include a 3-D display system with two or more screens for the purpose of visualization of computed and／or experimentally obtained data with enhanced realism.

13) A sample program must be provided, which establishes synchronized operations on the measurement integration interface server, the scalar parallel computing systems, and the 3-D visualization server, to transfer data from experimental equipment to the measurement integration interface server ; to perform computation on the scalar parallel computing systems with a method provided by the Institute using the data acquired by the measurement integration interface server ; and to transfer the computed data from the scalar parallel computing systems to the 3-D visualization server as an original data for the 3-D visualization image processing.