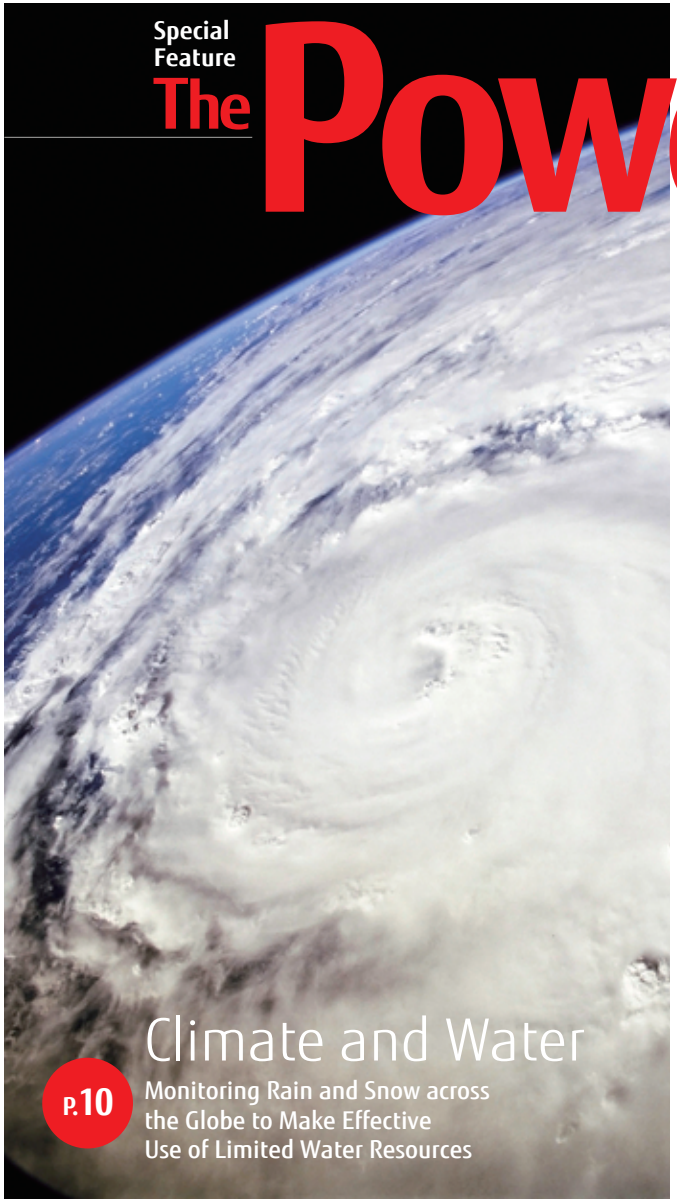
Special Feature

The Power of ICT

Toward the Realization of Sustainable Society

To Help Create Innovation Aimed at Overcoming Global Warming and Other Environmental and Social Issues, the Fujitsu Group Empowers People to Be Innovative through Its Wide-Ranging ICT Solutions.



Climate and Water

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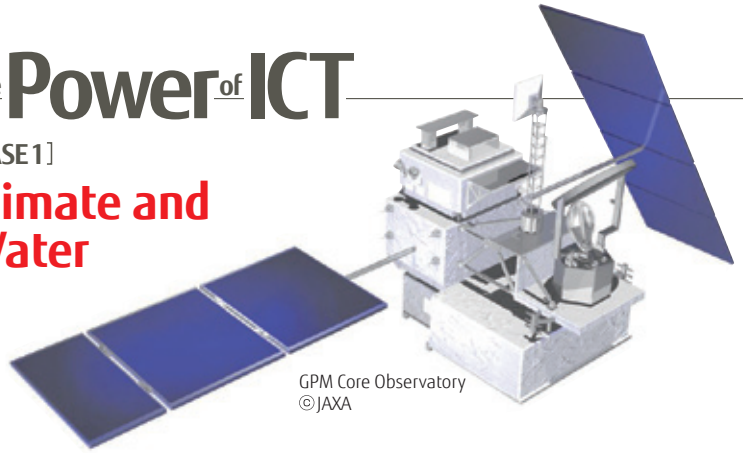
Contributing to an 80% Power Consumption Reduction and an Enhanced Educational Environment by Optimizing a Higher Education Datacenter

The Power of ICT

[CASE 1]

Climate and Water



GPM Core Observatory
ⓒJAXA

Monitoring Rain and Snow across the Globe to Make Effective Use of Limited Water Resources

——Developing an Operations System to Process Earth Observation Data in the Global Precipitation Measurement (GPM) Mission led by JAXA and NASA

Challenge Preparation for Droughts and Floods

Of the 1.4 billion square kilometers of water on our planet, groundwater and other fresh water usable in our lives accounts for a mere 0.8%. With demand for water expanding under the growth of economies and populations, effective use of the vital resource of fresh water requires that we monitor precipitation conditions over a broad range, and collect and manage data accurately. Currently, however, monitoring data from locations beyond the reach of monitoring networks, such as oceans, remote areas, and developing countries, is insufficient.

At the same time, disasters and economic losses due to extreme precipitation have been increasing worldwide in recent years. To lessen the damage from such disasters, real-time monitoring of precipitation and sharing of data are essential.

Solutions Monitoring of Rain and Snow in Real Time

Satellites are the most effective means of monitoring precipitation over a broad area. However, such monitoring has so far been infrequent, and covering the entire globe required several days. To enable high-frequency, high-precision monitoring of precipitation on a global scale, the Global Precipitation Measurement (GPM) mission, an international joint program led by JAXA and NASA, is now underway.

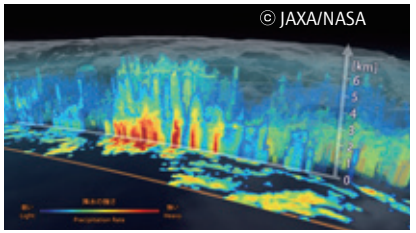
The key to detailed and accurate monitoring of rain and snow in this mission is the Dual-frequency Precipitation Radar (DPR) installed in the GPM Core Observatory. Fujitsu is in charge of the GPM/DPR Mission Operations System that will handle DPR data processing. This system processes and edits the radio waves that reach the satellite after being reflected from rain droplets and snowflakes, combines this with monitoring data from multiple other satellites, creates a precipitation map of the entire globe every hour, and provides the information to NASA and the Japan Meteorological Agency. This sort of data processing is unprecedented anywhere in the world.

The GPM Core Observatory was launched in February 2014, and is currently undergoing initial verification of the DPR.

Benefits Making Effective Use of Monitoring Data in Various Fields

Monitoring by multiple satellites enables the creation of global-scale, 24-hour, 365-day precipitation maps in close to real time. By assessing what degree of precipitation is occurring at any spot on earth, the system is expected to aid the management of water resources, and also to benefit agriculture, logistics, and other industries by improving the precision of weather forecasts. It is also thought that the ongoing accumulation of precipitation data will aid verification and improvement of our understanding of climate change and abnormal weather mechanisms.

Through the provision of ICT, Fujitsu will support adaptation to a changing global environment and will contribute to people's safe and secure lifestyles.



3D distribution image of precipitation observed by GPM's Dual-frequency Precipitation Radar

The Power of ICT

[CASE 2]

Agriculture

Achieve "Robust Agriculture" by ICT that Responds Flexibly to Changes in the Natural Environment

——Accumulating Cultivation Data and Making Production Technology Visible through the "Akisai" Food and Agriculture Cloud

Challenge — Growing Concerns over the Impact of Rising Temperatures on Crops

Over long eras, agriculture has advanced in step with the natural conditions and climates of local regions. With the rise in global average atmospheric temperature in recent years, however, negative impacts such as immature grain, discoloring, growth defects in dehiscent fruit, and insect damage have already begun to appear.* If warming continues to advance, there is a possibility that areas suitable for cultivation will change and the crops that had been grown there will permanently experience poor harvests. This would create problems that cannot be addressed by the experience and expertise of the past.

The field of agriculture must accurately and in real time grasp changes and trends in the cultivation environment, in accordance with hot summers, warm winters, low rainfall, heavy snow, and other perennial changes in temperatures and precipitation volume, and must carry out optimal agricultural work for the conditions.

* FY 2012 Survey Report on the Impact of Global Warming (Ministry of Agriculture, Forestry and Fisheries)

Solutions — Visualizing Farm Environments and Making Tacit Knowledge Explicit

In the cultivation of new crops under global warming, ICT contributes to lessening the risks of insufficient production expertise. Weather sensing devices on farms measure, aggregate, and analyze data including temperature, humidity, and insolation, enabling visualization of the farm environment. In addition to basing work decisions on their own senses, producers are able to use local weather data to optimize the content and timing of work and to engage in highly sustainable farm work and management.

By using work plans, work periods, types of herbicides and fertilizers, and other data aggregated at farmlands with specific cultivation experience, farmers are able to reduce risks.

To make the farming environment and production processes more visible through ICT, Fujitsu has offered the Akisai Food and Agriculture Cloud since 2012. The system's many users include agricultural corporations such as Japan Agricultural Cooperatives (JA).

Benefits — Contributing to the Resolution of Diverse Issues on Farms

The Akisai Farm was established in Numazu Plant to put the Akisai Cloud into practice. There, Fujitsu uses sensors and cloud technology to measure and control the environment, and undertakes year-round greenhouse cultivation of a vegetable (senjusai) that is generally cultivated only in fields in summer.

Moreover, at the Aizuwakamatsu Plant, Fujitsu has built a fully enclosed plant factory using the Akisai Cloud. Through the cultivation and sale of low-potassium chemical-free leaf lettuce, Fujitsu is contributing to the recovery from the Great East Japan Earthquake and to the revitalization of local industry.

In this way, ICT enables stable and efficient farm work not exposed to a natural environment and contributes to the strengthening of agricultural production and management. By aggregating, analyzing, and using diverse data worldwide, Fujitsu is working to resolve the global-scale issue of food shortages. We will continue to support a future for secure, safe, and abundant food through ICT.

The Power of ICT

[CASE 3]

Energy

External view of UCS

Contributing to an 80% Power Consumption Reduction and an Enhanced Educational Environment by Optimizing a Higher Education Datacenter

——University Campus Suffolk set aside storage scalability thanks to virtualization technology

Challenge An ICT strategy to meet critical needs at a higher education institution

Growth in student numbers participating in higher education has led to significant changes in ICT service provision. In the UK, University Campus Suffolk (UCS), as part of its 2020 vision, was planning for rapid expansion in their 4,500 undergraduate student population.

A five year strategic initiative was put in place to service growth in student numbers, which included a campus wide ICT modernization program and new build data center, to replace an older data center with a PUE*1 of over 2.0.

The overall ambition of the project was to eliminate prolonged downtime, due to aging and increasingly unreliable storage and server equipment and fragmented service delivery to staff and students. Flexible storage provision, lower power consumption and consolidation of services were the keystone of the ambitious project plan.

*1 PUE
The PUE (Power Usage Effectiveness) value is an index expressing the ratio of power consumed by the datacenter as a whole to power consumed by the IT equipment inside it, with the goal being to come as close to 1.0 as possible.

Solutions 80% Energy Consumption Reductions from Virtualizing Data Storage

UCS's installation of two FUJITSU Storage ETERNUS DX80 systems, as part of the modernization plan, enabled a twofold increase in storage performance, and the consolidation of their legacy servers into a unified storage environment. This established a stable platform for service modernization.

Virtualization of legacy servers was the next logical step. UCS took nearly 100 physical servers and virtualized them onto five FUJITSU Server PRIMERGY RX300 units. The RX300 servers feature highly energy efficient 80 PLUS *2 certified power supplies, as a key feature of the overall design.

The project vision was achieved, resulting in a reduction of power consumption by up to 80%, floor space utilization by 70%, and a corresponding reduction in operating costs.

*2 80 PLUS®
Power saving standards, formulated mainly by U.S. industry groups, for the power supply units in computers and servers (see Page 18).

Benefits Contributing to an Enhanced Education Environment

With this new, updated SAN and virtualization solution, UCS was able to realize a PUE close to 1.2, which was a significant reduction from the original PUE, of over 2.0.

UCS is deploying additional Fujitsu technologies, across campus, as an expansion of the original strategic vision. For example UCS's Computer Games Design course purchased FUJITSU CELSIUS M370 workstations, to replace gaming PCs. The highly performant CELSIUS workstations gave greater scope for ambitious 3D graphics and gaming projects, enabling Games Design students to realize their ambitions more quickly than ever before, while contributing towards UCS's green campus targets.

Fujitsu is dedicated to providing solutions for the issues facing higher education institutions and, along with supporting the development of a new generation of workers, strives to contribute to reducing energy consumption and efficiently using resources by optimizing ICT environments.