Palm Reading

Siemens now offers a palm reading device for biometric access authorization. The new version of Siemens’ ID Center biometric software supports the PalmSecure hand-surface reader produced by Fujitsu, as well as all major fingerprint scanners on the market and, of course, SmartCards, making it a uniquely versatile solution. The system is equipped with an infrared scanner that reads palms within seconds when a person’s hand is held at a distance of a few centimeters. The unit scans the pattern of veins under the skin, after which a computer compares the data with stored palm samples, granting access to restricted areas once an exact match has been made. The palm reading device is generally used in conjunction with a SmartCard. Unlike fingerprint reading techniques, which require the fingerprint to be pressed onto, or dragged across, a special surface, the reliability of the palm reader is not affected by dirt or skin injuries. The system can even “see” through gloves, making it particularly useful for sterile hospital areas, as it does not require hand contact to identify an individual.

Mission with Vision

Since June 2007, the TerraSAR-X satellite has been delivering images with a resolution of up to one meter as it orbits the Earth. During its five-year mission, the German satellite will scan the entire planet with radar from an altitude of 514 kilometers, unaffected by clouds, weather, or lighting conditions. TerraSAR-X will increase the mapping detail of roads, railways, and buildings, providing important information for planning infrastructures. In addition, the satellite will measure changes to the Earth’s ice caps, thus providing data on climate change. Siemens developed key components of the satellite’s mission control center in Oberpfaffenhofen, Germany. The control system, which was originally developed for the European Space Agency (ESA), was adapted and expanded for the TerraSAR-X mission by Siemens. The system controls and monitors a five-meter-long, 1,200-kilogram satellite on its mission. As part of the system’s modification, experts from Siemens IT Solutions and Services PSE in Austria installed a special database solution, which documents the satellite’s entire history and compiles all data concerning the control, propulsion, positioning, and configuration of the satellite. The database, which records every signal sent to or received from the satellite, is set to grow to seven terabytes over the next five years—that’s equivalent to the information contained on about 1,000 DVDs. Even before the TerraSAR-X lifted off in June, a consortium consisting of the German Aerospace Center (DLR) and the space technology company Astrium used the control system to test the satellite.

Higher Resolution CT

Siemens plans to use the new method that allows computer tomography to generate data much more quickly. The process enables an optical transmission unit in the rotating part of a tomograph to transfer the measurement values contained in the rotating section to a stationary optical receiver without making contact. Siemens plans to use the new method for its next generation of CT scanners, which will achieve a data rate of 8.5 gigabits per second, compared to the current rate of five gigabits per second. “This innovation makes it possible to transmit larger amounts of data in the same amount of time, enabling the generation of higher resolution cross-sections and ultimately improving data quality,” says Roke Manor Marketing Director Paul Smith. The Roke Manor research facility was established 50 years ago and has been owned by Siemens for the past 17 years. The center’s highest capacity long-distance direct current power line will transport power 1,400 kilometers to the Pearl River delta in the province of Guangdong, where it will supply Hong Kong, Shenzhen, and Guangzhou—megacities with a total population of about 30 million. The high voltage direct current transmission (HVDC) system that Siemens and its Chinese partners will build will usher in a new era of power transmission. It will be the first system to achieve a capacity of 5,000 megawatts and reach 800 kilovolts. The high voltage makes it possible to transmit more power with lower losses. The HVDC lines that Siemens previously installed operate at 500 kilovolts and deliver up to 3,000 megawatts. As the energy for the HVDC line is generated by hydroelectric plants in the province of Yunnan, no carbon dioxide (CO₂) will be emitted. Without the new line, it would have been necessary to generate the energy using new fossil fuel-fired power plants. And that, according to predictions, would have meant more than 30 million tons of CO₂ emissions every year.

Brainy Solution

A prototype medical scanner from Siemens combines magnetic resonance tomography (MR) and an imaging process from nuclear medicine, providing entirely new insights into the human brain. Experts believe this unique tool will improve the diagnosis of early-stage Alzheimer’s disease and enable physicians to more quickly assess the condition of stroke patients and propose treatments. The device combines MR (top) and positron emission tomography (bottom). MR contributes by displaying images of soft tissue in high resolution and sharp contrast, while PET highlights regions that display increased metabolic activity in very fine detail. Up until now, neurologists using PET could not conclusively differentiate between low-grade cognitive disturbances and the early stages of Alzheimer’s. They have also been unable to simultaneously measure the reduction of brain volume associated with Alzheimer’s. With MR-PET (center), this examination can now be conducted in a single step. Physicians can also use the prototype scanner to better monitor and treat the progress of other neurological disorders, including Parkinson’s disease, epilepsy, depression, and schizophrenia. For a PET examination, a patient is injected with a very small dose of a short-lived radioactive liquid, which accumulates in cells with a high metabolic rate. The radioactive substance emits positrons, which combine with electrons to release positron radiation. When the positrons collide with electrons, they are annihilated, releasing gamma rays, which are detected by a detection device that uses the data to generate a tomographic 3D image. Engineers at Siemens Medical Solutions used extremely fast and sensitive avalanche photo diodes (APD) to serve as a PET detector. These diodes are not affected by the magnetic field generated by the MR system, which operates in tandem with the PET unit at a field strength of three Tesla, enabling rapid data acquisition of approximately 0.2 millimeters. The images created by the two systems are then superimposed on one another by a computer to produce images containing an unprecedented level of information.