

Basic Patents

(1) SURGERY SUPPORT DEVICE, METHOD, AND PROGRAM

Application No.: Europe 070707789.9 / USA 12/278954 / JAPAN 2006-32605
Publication No. : PCT WO2007091464 / Europe 1982650 / USA not yet published / JAPAN 2007209531

(2) DEVICE FOR DISPLAYING ASSISTANCE INFORMATION FOR SURGICAL OPERATION, METHOD FOR DISPLAYING ASSISTANCE INFORMATION FOR SURGICAL OPERATION, AND PROGRAM FOR DISPLAYING ASSISTANCE INFORMATION FOR SURGICAL OPERATION

Application No.: Europe 080703010.2 / USA 12/525267 / JAPAN 2008-556035
Publication No. : PCT WO2008093517 / Europe 2123232 / USA 20100094085 / JAPAN 2007209531

About Us

This surgical navigator has been developed in collaboration with the following companies/institute and supported by grants from the Japanese Ministry of Economy, Trade and Industry (METI) and from the Japan Science and Technology Agency (JST).

-Nagashima Medical Instruments Co., Ltd. (Manufacture and sale)

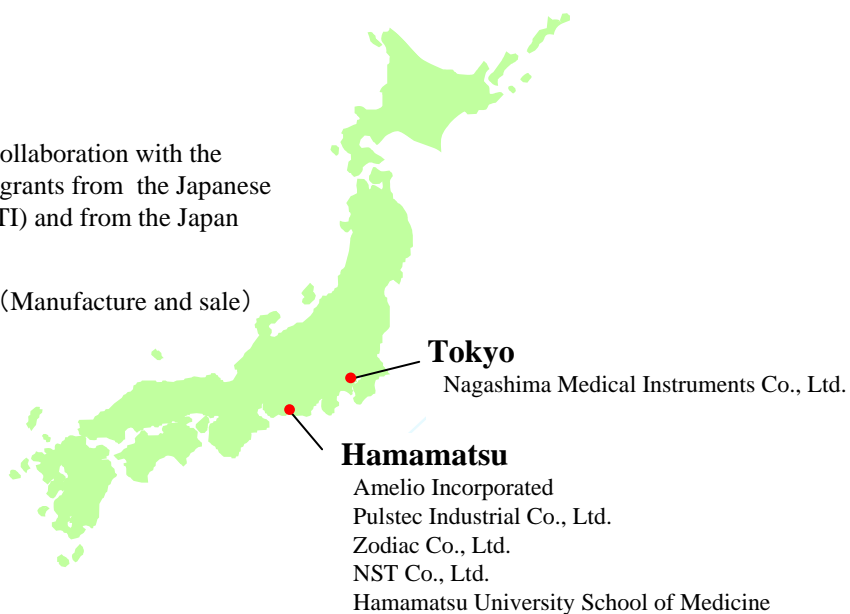
-Amelio Incorporated (3D software)

-Pulstec Industrial Co., Ltd. (3D scanner)

-Zodiac Co., Ltd. (3D data generation)

-NST Co., Ltd. (Controller, Robot Arm)

-Hamamatsu University School of Medicine



We need business partners

In May, 2012, Nagashima Medical Instruments Co., Ltd. will release our surgical navigator for an endoscopic sinus surgery in Japan. For the global sales, we are looking for the companies that:

- manufacture and/or sale of the surgical navigator for ESS outside Japan,
- be licensed our technologies of the surgical navigator except for Japan,
- collaborate on research for developing another surgical navigator.

Contact

■ Manufacture and/or sale of the surgical navigator for ESS

Nagashima Medical Instruments Co., Ltd.
TEL: +81-3-3812-1271, +81-3-3812-6555 (direct), FAX: +81-3-3816-2824
e-mail: info@nagashima-medical.co.jp
Address: 5-24-1 Hongo, Bunkyo-ku, Tokyo, 113-0033, JAPAN

■ Technology license and collaborate research of surgical navigator

Hamamatsu University School of Medicine
Intellectual Property Management Division
TEL: +81-53-435-2677 / 2230, FAX: +81-53-435-2179
e-mail: chizai@hama-med.ac.jp
Address: 1-20-1 Handayama, Higashi-ku, Hamamatsu, Shizuoka, 431-3192, JAPAN

Novel Surgical Navigator

for Endoscopic Surgery



Easy Handling and Great Advantages!

- A completely frameless and markerless system
- Semi-automatic registration without direct contact with patients
- Updated registration and tracking information when patients move
- Navigation indicating the location of the center in an endoscopic view

Surgical Navigator

for endoscopic sinus surgery

We have developed a new surgical navigator based on 3D measurements.

To acquire the 3D data for registering patients' images and tracking surgical instruments, we used a white light scanner. Projecting a modulated striped pattern using a xenon lamp, our surface scanner captures the 3D data within 0.6 seconds with high resolution (0.1 mm in the Z-axis and 0.6 mm in the X- and Y-axes) and high accuracy (< 0.3 mm).

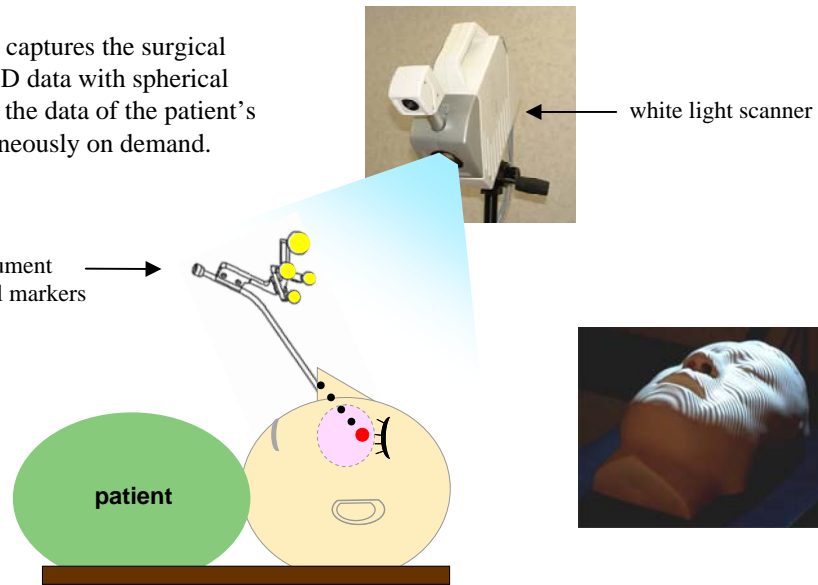
With a special software, semi-automatic registration (average error, < 0.5 mm) is performed, and updated registration and tracking information are achieved without any references such as headgears with markers. The total accuracy of our navigator is < 2 mm.

Schematic Presentation of Navigator

1. Registration: Put the patient position on the coordinates of preoperative CT scan.

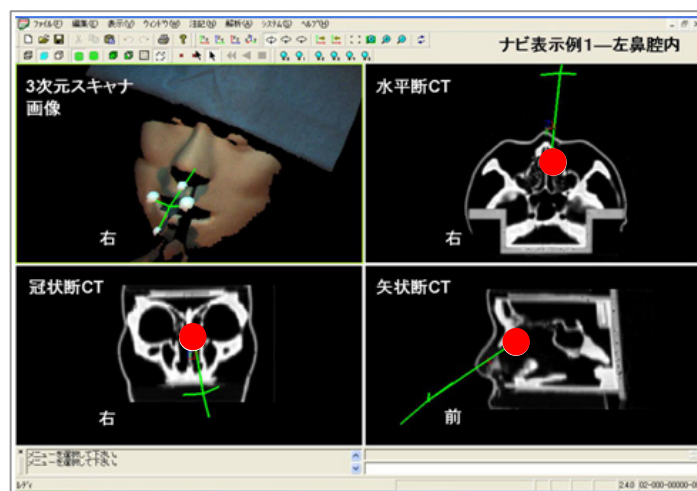
2. The scanner captures the surgical instrument 3D data with spherical markers and the data of the patient's face simultaneously on demand.

surgical instrument with spherical markers



3. The position of the patient is compared with that at the previous measurement, and the registration is updated.

4. The position of the instrument is calculated and presented on the CT images.



✂ **Endoscopic sinus surgery (ESS)** has been widely used for patients with sinusitis, nasal polyps, tumors, and similar problems. While complications are fewer with ESS than with the more invasive traditional surgeries, **some serious complications remain, including blindness, double vision, and massive bleeding.**

Details of Our Surgical Navigator

(Nagashima Medical Instruments Co., Ltd.)

White Light Scanner

(Pulstec Industrial Co., Ltd.)

Our scanner can capture the surface 3D data, projecting a modulated striped pattern using a xenon lamp within **0.6 seconds**.

Resolution: **0.1 mm in Z-axis**
0.6 mm in X- and Y-axes
Accuracy: **< 0.3 mm**



Operator's view



Surgeon's view

Size: 68 (W) × 64 (D) × 200 (H) cm

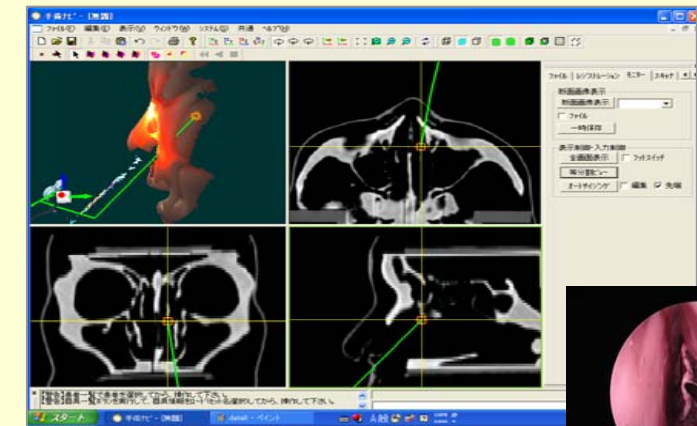
Weight: 185 kg

This navigator with 4 wheels is movable.

Registration

We can register scanned 3D surface data of a patient's face onto the corresponding surface extracted from CT **within 1 second**.

Average error: **< 0.5 mm**



Up-dated Registration and Tracking Information

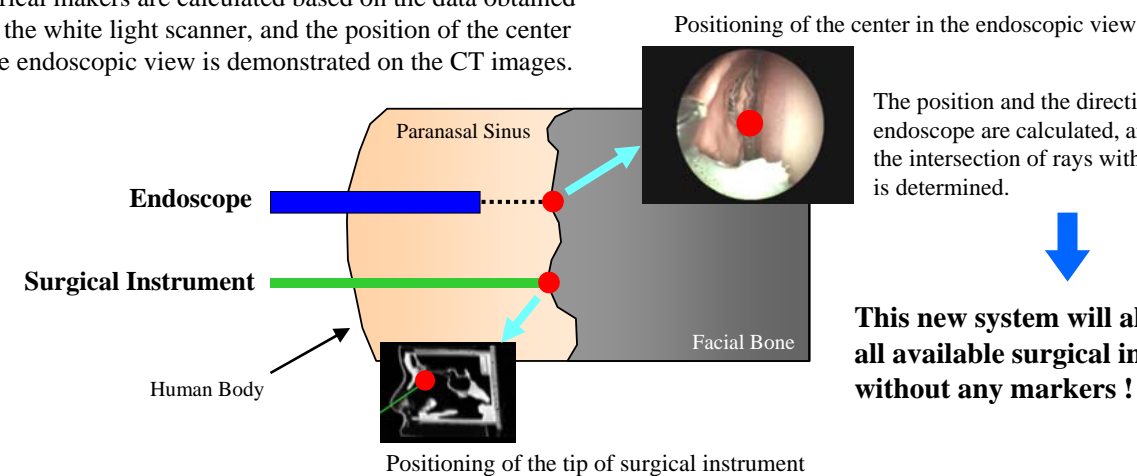
(Amelio Incorporated)

The position of the patient is compared with that at the previous measurement, the registration is updated, and, then, the position of the instrument is calculated and presented on the CT images **within 1 second**.

Accuracy: **< 2 mm**

We have also developed another new system by modifying our above-mentioned navigator.

The position and the direction of rays in an endoscope with spherical markers are calculated based on the data obtained with the white light scanner, and the position of the center in the endoscopic view is demonstrated on the CT images.



The position and the direction of rays in the endoscope are calculated, and the point at the intersection of rays with the sinus wall is determined.

This new system will allow us to use all available surgical instruments without any markers !

Researcher

Seiji YAMAMOTO
Professor, MD, PhD



Medical Photonics Research Center
Hamamatsu University School of Medicine

Specialized Field
Neurosurgery, Neuroscience, Computer Assisted Surgery
Bio Imaging, Cerebral Blood Flow and Metabolism

Profile
2012 Professor, Medical Photonics Research Center, Hamamatsu University School of Medicine
2000 Associate Professor, Photon Medical Research Center, Hamamatsu University School of Medicine
1993 Research Associate, Neurosurgery, Hamamatsu University School of Medicine
1991 Research Fellow, Department of Neurology and Neuroscience, Cornell University Medical College in NY (USA)
1988 Research Associate, Neurosurgery, Hamamatsu University School of Medicine
1985 Chief of Neurosurgery, Yaizu Municipal Hospital, Shizuoka (Japan)