

Embol-STATION® 1.2

Emboli Detection and Solid/Gas Classification



Product Packaging and Services

The Embol-STATION can be delivered as:

- **Software alone** (on self-installing CD, with user's manual and hardware key),
- Software delivered with a **Dell™ laptop** (on CD, with user's manual and hardware key),
- Software delivered with a **Dell™ desktop** (on CD, with user's manual and hardware key).

The laptops and desktops can be provided with external or internal drives for playing your data stored on magneto-optical disks (MOD), and can be connected to a Tascam Hi8 (or other) tape recorder through specialized hardware and software. **Ask us for a free analysis of your data transfer needs.**

We also offer services for:

- **Connecting your TCD equipment directly to the Embol-STATION®** through a dedicated cable.
- **Transferring your TCD data** stored on MOD disks or on Hi8 tapes **onto compact disks, DVDs or hard disk drives.**

For ordering information, or for any question you may have, please contact us at:

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Email: info@ABMIntelligence.com

System Requirements

Minimal PC configuration:

- Pentium compatible @ 800 MHz
- Windows® XP
- 256 MB RAM
- 180 MB free disk space for the Embol-STATION software, and additional space for the Doppler data files (user-dependent)
- 16 bit graphic card

Recommended PC configuration:

- Pentium compatible @ above 1 GHz
- Windows® XP
- 512 MB RAM
- 180 MB free disk space for the Embol-STATION software, and additional space for the Doppler data files (user-dependent)
- 16, 24 or 32 bit graphic card

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Welcome to ABMI's Embol-STATION 1.2

Licensed to : Dr. John Smith

Licence number : Eval-T0041-131-DFA060322-N001-C02060612

For technical support, contact us :
- by phone : +41 21 693 91 06
- by email : support@ABMIntelligence.com

1. FILE SELECTION

Path : C:\Documents and Settings\Kacem\Bureau\Embol_station_cvs\EMBOL-STATION 1.1\DATA\commercial

2. FILE INFO

Recording Date: 13.08.199
Patient Name: GAS1-Saline_injection_on_PFO_T20
Patient Date of Birth: 12.08.1976
Number of Windows: 250
Pulse Repetition Frequency: 8000 Hz
Window Length: 0.17667 sec

3. SENSITIVITY SETTINGS

HITS vs Speckles Detection Sensitivity: 0 dB

View Graphs View Histogram

START **EXIT**

Software for quick and efficient emboli detection and solid/gas classification

ABMI Disclaimer:

The material described in this brochure is for informational purposes only. It is subject to change without prior notice, due to the manufacturer's continuous development program.



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ABMI's Embol-STATION® 1.2 : Answering the challenge of providing clinicians with a reliable expert system for HITS detection, artifact rejection, and classification of microembolic signals (MES) as solid or gaseous.

The Embol-STATION® 1.2 is intended as an off-line analysis tool for pre-, post-, and peri-operative investigation of brain embolization. This analysis tool can:

- help the clinician improve his/her review and assessment of TCD records,
- help the clinician improve his/her evaluation of TCD records,
- help be used for research applications to obtain better understanding of pathology.

The system detects, counts, and identifies brain emboli as solid or gaseous, based on advanced signal processing of the raw Doppler signal from MCA blood flow measured with standard single-frequency TCD systems.

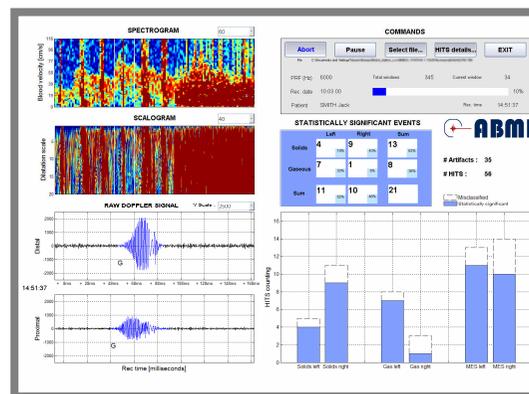
The system is compatible with DWL TCD machines Multi-Dop series X and T (more compatible TCD systems in preparation)

The expert system's algorithms have been trained on a large, peer-reviewed, internationally recognized clinical database of embolic signals.

Monitoring embolic signals using TCD is of interest pre-, post- and per-operatively, e.g. in cases such as:

- arteriosclerotic patients with unstable carotid plaques,
- cardiovascular patients,
- patients undergoing arterial stenting and other endovascular procedures,
- patients with atrial fibrillation (AF) predisposed to stroke,
- detection of patent foramen ovale (PFO) through air/saline injection.

Embol-STATION® 1.2 can also be used in assessing the efficacy of medication, or of arterial filtration devices, in terms of reduction of the brain embolization rate.



A more **robust** and more **powerful** algorithm ensures greater precision for the Embol-STATION® 1.2 in detection, counting and identification of emboli

This version provides a **new, improved presentation of the analysis results**, including statistical correction of the results significance.

EED® Technology

Enhanced Emboli Display Technology (EED®) provides researchers with a new, easy-to-interpret display of transcranial blood flow based on wavelet analysis. This new display greatly enhances the contrast between embolic signals and blood flow speckles. This wavelet approach also improves automatic emboli detection (especially for low-power MES) and solid-gas differentiation.

SSR® Technology

Saturated signals often plague TCD recordings of embolic signals (especially for gaseous MES). They appear as vertical streaks in FFT displays, making them difficult to interpret. **Saturated Signal Restoration Technology (SSR®)** restores the original, unclipped signal with good fidelity, providing a more accurate display of the raw Doppler signal, and a more readable blood flow FFT.

In addition, differentiation of solid and gaseous MES is improved when restored rather than saturated signals are used.

[2] Automatic Classification of HITS into Artifacts or Solid or Gaseous Emboli by a Wavelet Representation Combined with Dual-gate TCD. Devuyst G, Darbellay CA, Vestin JM, Komyny V, Ritter M, Droste DW, Molina C, Sorona J, Sztajzel R, Ruchat P, Lucchesi C, Dietler G, Ringelstein EB, Despland PA, Bogousslavsky J. Stroke, 32:2803-2809 (2001)

Clinical Studies

In clinical studies [1,2] MES counts have been correlated with mortality, morbidity and neuropsychological decline.

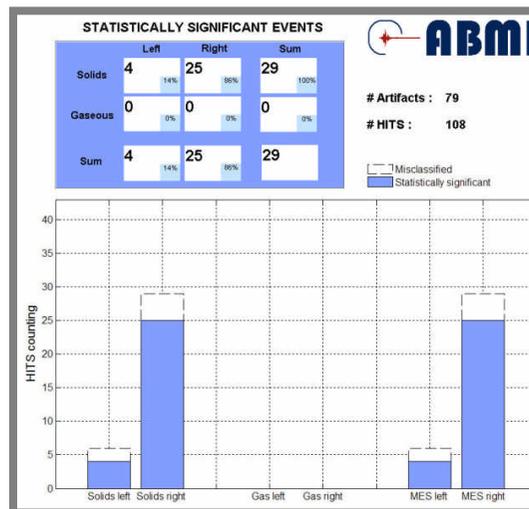
Embol-STATION® 1.2 automatic MES detection, classification and report generation save valuable time in analyzing TCD data for clinical studies on brain embolization.

Embol-STATION®1.2 detail review mode allows clinical researchers to review all HITS and MES individually and to modify the MES classification at will.

Embol-STATION® 1.2 signal processing algorithms provide the TCD community with a **new standard for MES detection and solid/gas classification, thereby allowing different studies to be easily compared and aggregated.**

TCD data collected during past clinical studies can readily be re-analyzed using Embol-STATION® 1.2 powerful new features: reliable, automatic expert system-based classification, EED® and SSR® technologies.

[1] Solid or Gaseous Circulating Brain Emboli: Are They Separable by Transcranial Ultrasound? Darbellay CA, Duff R, Vestin JM, Despland PA, Droste DW, Molina C, Sorona J, Sztajzel R, Ruchat P, Karapanayiotides T, Katangos A, Bogousslavsky J, Ringelstein EB, Devuyst G. J. Cereb. Blood Flow & Metab. 24:860-868 (2004)



FEATURES

- Automatic analysis off line of TCD monitoring files.
- Detects high intensity transient signals (HITS) in blood flow; **detection intensity threshold** can be chosen by the user.
- Reliable **automatic detection of HITS and classification of MES versus artifact** with 95% sensitivity and 95% specificity*.
- Reliable **automatic detection of HITS and classification of MES as solid or gaseous** with 93% sensitivity and 90% specificity*.
- HITS and MES details review mode** allows the user to examine and correct the classification.
- Incorporates **Saturated Signal Restoration technology (SSR®)** to restore saturated Doppler signals to their original amplitudes and shapes.
- Incorporates **Enhanced Emboli Display (EED®)** breakthrough technology for enhanced emboli visualization.
- Doppler signal playback** for distal and proximal channels.
- Adjustable HITS detection threshold.**
- Automated summary report generation.**
- User-friendly presentation of results.**

* Performance obtained using dual-gate HITS from a database comprising 1'446 solid MES, 3'040 gaseous MES, and 4'223 artifacts.

BENEFITS TO THE HEALTHCARE PROVIDER

- Fast, fully automated, time- & cost-saving TCD data analysis and interpretation.
- Automatic HITS and MES listing with artifacts and solid/gas classification.
- New inter-study, TCD community standard for HITS detection, MES separation and solid/gas differentiation.
- Opportunity to publish new clinical studies on embolization just by re-analyzing existing TCD data !
- Rapid decision-making in stroke management.
- Increased clinical knowledge on brain embolization
- Time and costs savings.