cTMS

Rogue Research Inc.

For over 15 years, Rogue Research has worked to develop tools that help you advance the boundaries of neuroscience. Brainsight® is the neuronavigator of choice for 500 labs around the world. We continue this tradition of offering the best tool possible with the release of our latest product, **cTMS**. Based on a completely different architecture than traditional TMS, **cTMS** offers more **control** than any TMS device available today.

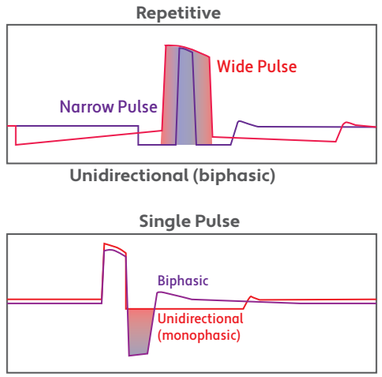
SYMBIOTIC
DEVICES

A Tradition of

Innovation for Research

Features of cTMS

- First new TMS design in years
- Variable pulse shapes
- Integrated EMG
- Integrated output recording
- Multiple general purpose triggers (4 in, 4 out), switch in, TTL out
- External control via network
- Optional current reversal module (~1 msec switching time)



Pulse Waveform Capabilities

- Directionality Control: Controls amplitude of the -ve phase relative to the +ve phase
- Variable pulse widths up to 385 µSec (with optional high inductance coil)
- Monophasic, biphasic, polyphasic, staircase, asymmetric
- Repetition rates up to 1 kHz
- Unidirectional theta burst
- Charging power: 2x1500 Joules per second

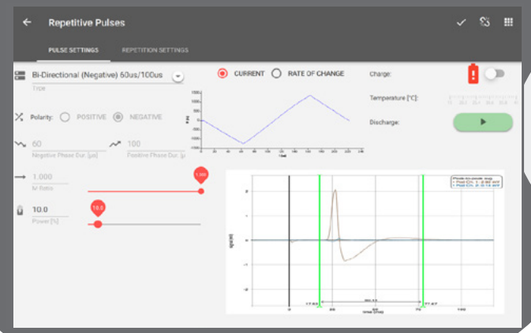
Brainsight TMS Neuronavigation

- Intuitive and flexible project workflow
- Universal TMS compatibility
- Flexible target selection
- Record data with every TMS pulse:
  - Coil location and orientation
  - Stimulator information*
  - MEP/EMG*, EEG* and fNIRS response*

Brainsight® TMS

Modern, intuitive user interface

- Large, capacitive touch screen
- Simple and advanced controls
- Predicted waveform displayed initially and actual measured output overlaid for confirmation of delivered pulse



Thoughtful Coil Designs

- Removable handles to suit every preference
- Different inductances to extend cTMS pulse range
- B-Field 3D mapped for use in E-field modelling research
- Integrated coil tracker mount
- More models to come (cooled coil, 50mm fig-8 etc.)

* Manufacturer dependent

Selected Publications using cTMS

Brain Stimul. 2016 Jan-Feb;9(1):39-47. doi: 10.1016/j.brs.2015.08.013. Epub 2015 Sep 1.
Enhancement of Neuromodulation with Novel Pulse Shapes Generated by Controllable Pulse Parameter Transcranial Magnetic Stimulation.
Goetz SM1, Luber B2, Lisanby SH2, Murphy DL1, Kozyrkov IC1, Grill WM3, Peterchev AV4.

Clin Neurophysiol, 127(1), 675-83 (2015)
Effect of coil orientation on strength-duration time constant and I-wave activation with controllable pulse parameter transcranial magnetic stimulation.
D'Ostilio K, Goetz SM, Hannah R, Ciocca M, Chieffo R, Chen JC, Peterchev AV, Rothwell JC

Clin Neurophysiol. 2016 Jan;127(1):675-83. doi: 10.1016/j.clinph.2015.05.017. Epub 2015 May 30.
Effect of coil orientation on strength-duration time constant and I-wave activation with controllable pulse parameter transcranial magnetic stimulation.
D'Ostilio K1, Goetz SM2, Hannah R3, Ciocca M4, Chieffo R5, Chen JC6, Peterchev AV7, Rothwell JC3.

Clin Neurophysiol 125, S1–S339Peterchev, A.V., D'Ostilio, K., Rothwell, J.C., Murphy, D.L. (2014).
Intermittent theta burst stimulation inhibits human motor cortex when applied with mostly monophasic (anterior-posterior) pulses.
Sommer M, Ciocca M, Hannah R, Hammond P, Neef N, Paulus W, Rothwell JC (2014)

Repetitive cTMS Specifications

Note :The multi- parameter nature of cTMS makes it difficult to describe in a table. Feel free to contact us.

	Pulse Type (+ve pulse width, -ve Pulse width)	M-Ratio	10 Hz	25 Hz	50 Hz	100 Hz	200 Hz	400 Hz	800 Hz	1000 Hz	Max Freq. (Hz) at 100% output	Maximum Output (%)
Unidirectional train	(45µs, 145µs)	0.2	100	100	49	24	11	NA	NA	NA	24	100
	(60µs, 185µs)	0.22	100	82	40	19	9	NA	NA	NA	20	100
	(75µs, 225µs)	0.25	93	55	27	13	6	NA	NA	NA	15	93
Balanced Pulses	(11µs, 54µs)	0.76	100	100	100	100	100	100	65	49	550	100
	(20µs, 78µs)	0.139	100	100	100	100	91	43	19	14	184	100
	(30µs, 105µs)	0.1627	100	100	100	91	44	20	NA	NA	91	100
	(40µs, 131µs)	0.182	100	100	100	54	26	12	NA	NA	55	100
	(50µs, 158µs)	0.1987	100	100	70	34	16	NA	NA	NA	35	100
	(60µs, 185µs)	0.2165	100	97	47	23	10	NA	NA	NA	24	100
	(70µs, 212µs)	0.2365	97	66	32	16	7	NA	NA	NA	17	97
	(80µs, 238µs)	0.2599	78	57	28	13	6	NA	NA	NA	18	85
Bi-Directional	(86µs, 255µs)	0.2756	78	47	23	11	NA	NA	NA	NA	15	78
	+ve (60µs, 100µs)	1	43	43	43	26	13	5	NA	NA	63	43
	-ve (60µs, 100µs)	1	43	43	43	21	10	4	NA	NA	50	43

Higher output possible with possible decay (displayed during planning step)

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