CORE 2.1

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FROM THE COLLECTION

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THE Behemoth

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BEHEMOTH, Big Electronic Human-Energized Machine...Only Too Heavy (1983-1991), L2003.2001, Loaned by Steve Roberts

After speaking at a Museum lecture on Sept 7, 2000, Steve Roberts presented BEHEMOTH to The Computer Museum History Center as a long-term loan

In the early 1980s, feeling trapped in his suburban lifestyle, Steve Roberts began to reevaluate his life. Roberts, a freelance technical writer who had published articles in magazines such as *Byte*, decided to tour the country on a recumbent bicycle of his own design, the Winnebiko. During his trip, Roberts made his living publishing stories and writing a book as he went along, using his on-board Radio Shack TRS-80 Model 100 and a CompuServe account to email his stories to publishers.

After redesigning the bike (as Winnebiko II), Roberts went off in an entirely different direction, devising BEHEMOTH (Big Electronic Human-Energized Machine...Only Too Heavy): a 580pound, 105-speed recumbent bicycle with a four-foot yellow trailer solar panel array that allowed the incorporation of many more technologies than on previous bikes. Roberts envisioned a project where a "computer and communication tools rendered physical location irrelevant." BEHEMOTH sported antennas for communication over various amateur and public radio networks, several networked computers (including an Apple Macintosh and an Intel 386-based laptop), a special keypad on each bicycle handle to allow typing, and a security system that would



alert police if the vehicle were disturbed. The helmet is perhaps the most futuristic-looking part of BEHEMOTH, with its heads-up display, motion sensors for cursor control, lights, fluid heat exchanger to keep the head cool, and audio system. A complete feature list is shown below.

Roberts logged over 17,000 miles on BEHEMOTH and gave hundreds of radio, television, and print interviews over the several years he was on the road. This wide exposure points to BEHEMOTH as an important milestone in the integration of technologies for recreational use, as well as a highly visible artifact of early wireless mobile networking. Roberts retired BEHEMOTH to begin a new project called the Microship.

INTEGRATED EQUIPMENT

- **Console** (forward enclosure under fiberglass hood)
- Macintosh 68K (control GUI and primary workspace)
- Bicycle Control Processor (FORTH 68HC11)
- Ampro 286 DOS platform for CAD system
- Toshiba 1000 repackaged laptop for scrolling FAQ
- · 80 MB hard disk space
- Audapter speech synthesizer
- Speech recognition board
- Trimble GPS satellite navigation receiver
- Audio and serial crosspoint switch networks (homebrew)
- PacComm packet TNC (VHF datacomm)
- · MFJ 1278 for AMTOR (HF datacomm)
- Diagnostic tools (LED matrix, DPM, etc)
- Handlebar keyboard processor
- Ultrasonic head mouse controller
- · Icom 2-meter transceiver
- Radiation monitor
- Cordless phone and answering machine on RJ-11 bus
- · Folding 6-segment aluminum console
- Fiberglass fairing



RUMP — Rear Unit of Many Purposes

- (white enclosure behind seat)
- Stereo System (Blaupunkt speakers, Yamaha 18W amp)
- 10 GHz Microwave motion sensor (security)
- UNGO physical motion sensor (security)
- Rump Control Processor (FORTH 68HC11)
- Audio crosspoint network, bussed to console
- Ampro DOS core module for heads-up display
- · LED taillight controller
- Motorola 9600-baud packet modem for backpack link
- 7-liter helmet-cooling tank and pump
- Personal accessory storage
- Air compressor for pneumatic system
- 15 amp-hour sealed lead-acid battery (1 of 3)

Helmet

- Reflection Technology Private Eye display
- · Ultrasonic head-mouse sensors
- · Helmet lights (2)
- Life Support Systems heat exchanger for head cooling
- Setcom headset with boom microphone

SPARCPACK

- (aluminum case atop RUMP)
- Sun SPARCstation IPC with 12MB RAM and 424 MB disk
- Sharp color active-matrix display
- Motorola 9600-baud packet modem
- 10-watt solar panel

Trailer (WASU — Wheeled Auxiliary Storage Unit)

- 72-watt Solarex photovoltaic array (4.8 Amps at 12V)
- Qualcomm OmniTRACS satellite terminal
- · Ham Radio station:
 - · Icom 725 for HF
 - · Yaesu 290/790 for VHF and UHF
 - AEA Television transceiver
 - Audio filtration and Magic Notch
 - Antenna management and SWR/power meters
 - Automatic CW keyer
 - Outbacker folding dipole antenna on yellow mast
- · Dual-band VHF/UHF antenna
- Telebit CellBlazer high-speed modem
- Oki cellular phone, repackaged and integrated
- Telular Celjack RJ-11 interface
- Credit card verifier for on-the-road sales
- Trailer Control Processor (FORTH 68HC11)
- Audio crosspoint network, bussed to console

- · Bike power management hardware
- Two 15 amp-hour sealed lead-acid batteries
- · Security system pager

(far left) BEHEMOTH, the "Technomadic Adventure

Platform" built by Steve Roberts, traveled more than 17,000 miles before it found a new home at The Computer Museum History Center.

The helmet features a Private Eye display, ultrasonic head-mouse sensor, fluid heat exchanger and

headset with boom microphone.

- · Canon bubble jet printer
- · Fluke digital multimeter
- Mobile R&D lab, tools, parts, etc.
- Makita battery charger (for drill and flashlight)
- Microfiche documentation and CD library
- Camping, video, camera, personal gear
- Fiberglass-over-cardboard composite
 structure
- High-brightness LED taillight clusters

Bike and Frame-Mounted Components

- · Custom recumbent bicycle
- 105-speed transmission (7.9 122 gear inches)
- · Pneumatically-deployed landing gear
- Pneumatic controls, pressure tank, air horn
- Hydraulic disk brake
- Under-seat steering
- · Handlebar chord keyboard
- · CD player

More thorough details, along with information about Roberts' Microship project, may be found on the Nomadic Research Labs website: http://www.microship.com