The invention: "The Hydro Jogger™" in its simplest form is a portable personal exercise pool constructed of durable plastic walls to contain a body of water to perform low impact vertical and horizontal resistive exercises. Its variations, accessories and innovations make it a complete aquatic exercise system to serve a wide spectrum of users to include the professional athlete, average exerciser and accommodate or rehabilitate the physically impaired. Some of the attributes include, state of the art automated controls, remote controls, biometric telemetry, machine messaging and equipment management and exercise programs. Real-time data generated from the invention’s components and the exerciser and are monitored and stored locally in the controller. Remote monitoring is available via related technology. The invention and progressive design as well as, the many accessories constitute the complete aquatic exercise system for the home and professional clinic. The invention is appropriately priced and configured for the average person to own, set up, maintain, break down and move.
Hydro Jogger Deflated Pools

- Anchors
- Ceiling Supports For Higher Pools
- Strap Locks With Automated Tension
- Low Wheel Chair Entry

- Elastic PB Cuff & Blood Gas Sensor
- Wireless Or Water Proof Cable Sensing

- Variable Heights

- Ridged Fixed Sleeves Inner and Outer 16-28" High

Fig. 2
Hydro Jogger Electrical System ASIC

This Circuit Design Address Both Structural Modalities However Software Will Vary

System Under Control and Com Ports
COTS or Proprietary Components

- I/O Board & J15/56K Modem
- Heart Rate, B P
- Respiration
- Blood O2
- EKG
- BFM
- Temperature Sensors
- Pressure Sensors
- Arbitrary Sensors
- Pump Motor Starts
- Valve Solenoids
- Water Heater, etc.

Display Processor

- Biometric Sensors
- Equipment Sensors
- Equipment Controls

Local Clock

Wireless Interfaces

- Telephony
- Dedicated Radio
- Frequency
- A/V Video

Memory

Portable Device

Remote Monitoring

- Wireless Gateways
- IP Protocols
- PCS
- Lap Tops
- PDA
- Extended Memory

Water Proof Encasement, Ground Bonded And Plastic Blister Cover On Controls
Hydro Jogger
Telemetry Package

Fig. 7
COMPLETE AND PORTABLE AQUATIC EXERCISE SYSTEM CALLED: "THE HYDRO JOGGER™"

RELATED APPLICATIONS

[0001] This application 121148-122303F claims priority from U.S. Provisional patent application 60/531,970 filed Dec. 24, 2003 which claims priority from U.S. Provisional patent Application from No. 60/503,882 filed Sep. 22, 2003 which claims priority from U.S. patent application Ser. No. 10/693,960 filed Oct. 28, 2003 which claims priority from U.S. Provisional Patent Application 60/363,950 filed Mar. 14, 2002 which claims priority from U.S. Provisional Patent Applications No. 60/325,538 Filed Oct. 1, 2001 which claims priority from U.S. Provisional Patent Application 60/330,088 filed Oct. 19, 2000 which claims priority from U.S. Provisional Patent Application 60/200,872 filed May 1, 2000 which claims priority from U.S. Provisional Patent Application 60/176,818 filed Jan. 19, 2000 which claims priority from U.S. Provisional Patent Application docket No. 60/139,759 filed Jun. 15, 1999 which claims priority from U.S. Provisional Patent Application No. 60/140,029 Jun. 18, 1998 which claims priority from U.S. Provisional Patent Application number Jan. 15, 1998 This application is related to U.S. patent application Ser. No. 08/975,140, filed Nov. 20, 1997, and PCT Application No. PCT/US 97/21516, filed on Nov. 24, 1997, which claims priority to U.S. Provisional Patent Application No. 60/032,217 filed on Dec. 2, 1996, all of which are conditionally incorporated as the above might apply to specific monitoring and remote control claimed for the present invention (The Hydro Jogger™), with all other applications and rights reserved for licensing by Kline & Walker LLC and the PFN/TRAC System of Technologies and development through TRAC Aviation Inc.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] To date aquatic exercise has consisted of resistive accessories attached to an individual so that the exerciser could work out in a fixed pool facility. Aquatic exercising was rarely possible in the home without an expensive home pool. Small whirlpools have existed for years to apply wet heat to muscle and bone tissue to reduce pain and increase flexibility and circulation for the athlete, injured elderly or convalescent. Therapist, trainers and exercise specialist have recognized the advantage of a smaller pool that an individual could workout in and perform gross motor activities as well as, benefit from the therapeutic wet heat in the comfort of their own home. Professional costly equipment has been made in limited amounts for sports teams and hospitals to serve this need but the designs thus far have been prohibitive to the homeowner due to weight, size and costly installation and construction. Additionally, the hardware, plumbing and power considerations have been more commercially based and less suited for private home applications.

[0004] The present invention "The Hydro Jogger™" provides all these attributes and a piece of clinical exercise equipment with remote biometric telemetry in a unique light weight plastic inflatable pool structure. The flexible wall design is structurally light, portable and easily transported to set up in ones own home with little or no special skills in plumbing or electricity. It can be left standing full or partially filled with water, for a short final preparation to the appropriate level. A level that is adjustable to the individual exerciser's height and weight. The pool is sized to accommodate an exercisers complete standing, jogging and resistive stroking activities to include cardiovascular workouts, gross motor activities vertically as well as horizontal stationary swimming (with the appropriate pool configuration, and the appropriate accessories for a complete aquatic exercise.

[0005] Additionally, the invention functions as a home therapeutic device for physical maintenance and recuperative therapies.

[0006] A personalized software training program automatically records and plots individual progress endurance as well as, monitors that person's ratio of body fat to lean muscle tissue in percentages of their gross weight for real-time review for the exerciser and trainer. The design includes a water weight measurement displacement sensor and program that determines adipose tissue for an individual prior and post workout typically done during warm up and cool down. The related technology of (Kline & Walker LLC) includes remote monitoring and management systems. This technology is to be specialty and explicitly licensed for remote telemetry with this invention the "Hydro-jogger" in the form of wireless monitoring accessories. The accessories include biometric telemetry via dedicated long and short range wireless (Telephony and RF) as well as, direct connect (wired) phone line for the delivery of packet data to a PC, server or laptop for display in windows application for remote monitoring and automated record keeping. Additionally, MP3, USB, FDD, CD or DVD disk or Sony memory sticks, or flash memory or any comparable portable memory device in the future can be used via appropriate docking/connections and interfacing with the pool controller/processor or any remote controller. The portable recording medium recording performance data for the equipment program and the exerciser program is then removed from the invention and reconnected to the standard computer via the appropriate standard interfaces (ie USB, Serial FDD Disk, CD, etc) and downloaded. The data is transmitted via the application specific interface (written by code writers using the appropriate developer kits) to recover the data to a windows application for display on a computer monitor.

[0007] [Specification Note]

[0008] [Any and all additional electronic developments and technology enhancements and or innovations to include the use of other COTS products resulting from this specification or The Hydro Jogger™ invention as described herein are freely inherent as they pertain to the PFN/TRAC technology and or the related filings, and any other application other than the invention and require additional licensing from Kline & Walker LLC. and or TRAC Aviation Inc., and or any other subsidiaries as per the assignment of any specific PFN/TRAC technology by Kline & Walker I.L.C., and are owned by Kline and Walker I.L.C.

[0009] The invention’s accessories include sensor applications that monitor heat, water clarity and filter flow as part of a general maintenance program to include alerts for the user to change the water, filter element, clean the unit and or
add more chemicals bromine and chlorine etc. Cost is the determining factor to what each individual unit will be equipped with and how automated the system will be. All models will have standard water test kit provided to maintain the proper PH and guard against unhealthy microorganisms and pathogens in the water. Even if the system is automated the manual test kit should be used from time to time to check the accuracy of the automated system and functionality of the sensors.

**[0010]** Electrically the invention is fully grounded/bonded and connected to ground fault circuitry in the house or facility as well as, wired and assembled by technicians skilled in the respective arts. Additionally it includes that the individual, commercial company or organization installing the invention be appropriately bonded, licensed and insured to perform any such technical where specific installation requires or is regulated by laws and or insurance regulations in a specific location or municipality. The floor of the invention has a tough resolute or comparable abrasion resistant padding anchored for the exerciser to work out on. The flooring is also designed to support two rigid footplates with a weight sensor array between them. Or strong and rugged enough to support a COTS waterproof electronic scale. This scale or the proprietary sensors must function as a transducer converting weight pressures into electrical signals (analog or digital locally). If used in the invention’s automated application, these signals have to be transmitted by hard wire or wireless to the I/O board or module interface of the controller/processor, where a body fat algorithm factors the signal data along with water displacement data in an exerciser’s program and provides the ratio of fat to lean muscle tissue as figures in a windows display for remote computer monitoring or in the inventions LCD display. Additionally the data can be stored on a portable memory medium for use in computers and PDA at a later date.

**[0011]** Accompanying the invention is an instruction manual explaining the weight factor of a filled “Hydro-Jogger™ and the need for additional floor support in some cases.” With weight weighing 8 lb/gal, the inventions various configurations weigh approximately 800 to a 1200 pounds in a 7 foot circle. Use instructions for the invention include exercises, rehabilitation configurations and accessories, maintenance instructions for the unit, and the body fat measurement process and biometric monitoring and telemetry package. Comfort and relaxation activities are also detailed.

**BEST MODE OF CARRYING OUT THE INVENTION**

**[0012]** The Science and Technology of Aquatic Exercise and the Purpose and Function of the Invention

**[0013]** Aquatic exercise (also known as water aerobics) is increasing in popularity every day. It is a gentle movement environment for people with injuries, arthritis, other joint disorders as well as, a more forgiving exercise environment for seniors, and expectant mothers. More and more, it is incorporated in cross training programs and prescribed as an alternative to land-based exercise by fitness specialists and professional athletics.

**[0014]** Other important aspects of the “Hydro-Jogger™ are presented in this teaching. They include the science of aquatic exercise as it applies to varied physical states and conditions beginning with a medical condition that is well served by the invention’s low impact environment and heated exercise medium.

**[0015]** Arthritis:

**[0016]** Exercise and arthritis do not go hand in hand. It was thought for many years that if you had arthritis you should not exercise because it would damage your joints. Now research has shown that exercise is an essential tool in managing arthritis. Regular exercise helps keep joints moving, restores and preserves flexibility and strength, and protects joints against further damage. It improves coordination, endurance and the ability to perform daily tasks such as walking or writing. Exercise also can enhance mood and give an improved sense of well being to the arthritic individual. Within this specification there is an aquatic therapy and exercise program focused on improving the arthritic participant’s strength, range of motion, flexibility and endurance. It is a combination of materials the inventors have compiled and edited through their own expertise for adaptive physical education and convalescent therapies. This material is part of the invention in that it is unique techniques for use of the equipment to relieve pain, increase range of movement and assist those suffering with the limiting forces of arthritis and pain. The warmth of the water increases blood flow in connective tissue like muscles, tendons and ligaments. This increases flexibility and range of movement and reduces related arthritic pain for this movement with traditional exercise. Additionally, Aquatic exercise is used by physical therapists to reduce gravity’s affects on the body during exercise conserving strength and reducing fatigue related pain. Buoyancy works as an upward pressure within the water in the opposite direction of gravity’s downward pull on the body. For this reason exercise in water is less stressful to body joints because it prevents gravity’s normal compressive pressure on the joints as they move (reducing some arthritic pain from bone on bone movement). The buoyancy principle is also used to prevent pressure on the vertebral column as one walks or performs exercises in water.

**[0017]** Water resistance is twelve times greater than movement against air. For this reason, exercise in water also provides increased muscle strength and toning greater than exercise out of water. For additional resistance water weights may be used as well as a variety of other exercise aids, that take advantage of resistance to movement rather than gravity.

**[0018]** Physical benefits include: Circulatory System through water exercise due to increased muscle contractions and aerobic activity which causes the heart to work more, improving efficiency in the heart muscle. The Cardio-respiratory System also benefits from aquatic exercise due to increased lung capacity through deeper ventilation. Vigorous water exercise increases blood supply to muscle and improves the efficiency of the cardiovascular system. Muscular-skeletal system benefits from aquatic exercise improve flexibility, enhanced aquatic composure, muscle strength and endurance.

**[0019]** Research shows aquatic exercise can help in bone calcium intake, resulting in the ability to help maintain stronger more dense bones. It also provides the best exercise environment not to damage muscle, bone and connective tissues such as ligaments and tendons through impact related
injuries. Water therapy can be used in the rehabilitation and treatment of various conditions: Myofascial Pain Syndrome, Post Stroke Rehabilitation, Fibro-myalgia, Arthritis, Spinal Problems, Total Hip Replacements, Total Shoulder Replacements, Muscle/Joint Pain, Neurological Disorders, and Multiple Other Conditions. Aquatic exercises can be the same rehabilitation exercise prescribed for the land, but performed with aquatic resistive devices that simulate weights. The difference is they do not rely on gravity to provide the exercise work. This is an advantage because the damaged tissue is provided different movement and strengthening work changed from the forces most likely involved in the original injury. This enhances healing and a healthier stronger anatomy faster than more limited activity regimens and rest as a healing method. The advantage is normal calcifications in injured areas and not the formation of myositis ossificans.

[0020] Safety Note:

[0021] All activities for any individual should be reviewed and evaluated by a professional trainer, therapist and medical personnel to make sure that they are safe procedures and activities for each specific individual, exerciser and/or patient, and it is the sole responsibility of the Hydro Jogger owner to control the inventions relative to all safety regulations, responsibilities and law that apply to the invention.

[0022] Beneficial Exercise: Water exercise is more tolerable and even enjoyable for the healthy exerciser. The participant does not experience the hot and sweaty feeling often associated with land exercise and the workout is still as effective. Properly adjusted for each scenario the water helps to keep the body cool and comfortable. Studies have shown that a training VO2 or vascular oxygen saturation can be achieved in deep and shallow water exercise. The invention’s accessory sensor swim suite provides biometric telemetry, so that the participant, instructors/trainers/therapists are assured that the participants are exercising at an intensity to achieve cardiovascular benefits. Armpit sensors provide basil temperature readings so that body temperature can be evaluated as exercise work is increased. The IRDA infrared sensor device wirelessly transmits Blood O2 levels to the monitoring software running on the local PC or Laptop which then delivers the data in real-time to remote instructors if so desired by IP protocols and standard telecommunications. Lower tech monitoring is available and just the pool portion of the invention can be employed to exercise for less expense. Additionally, the MP3 memory device USB Chip or Sony Memory Sticks/Flash memory or FDD Flossy or CD & or DVD disk can be employed to recover biometric data by docking and interfacing with the controller/processor to record sensor data delivered to the processor via flexible waterproof wire connectible to the I/O board in the control panel of the invention. A lower cost data telemetry method provides for these memory modalities to be portable and carried to a PC or MAC platform device or Laptop or PDA where the data is then processed via the above standard data interfaces for computers and displayed in windows format. The programs are written by those skilled in the art via standard developer kits for the sensor components and their machine languages to be translated into the windows application, where such code/command functions may be lacking. The controller serves as a local computer and can process data for a waterproof back lit LCD display, which is connected for local viewing.

[0023] According to the Aquatic Exercise Association’s (AEA) Aquatic Fitness Professional Manual, aquatic heart rates may be lower than heart rates achieved during comparable land exercise. Several theories to explain this are: Temperature: Water cools the body with less effort than air. This reduced effort means less work for the heart, resulting in a lower heart rate. Gravity: Water reduces the effect of gravity on the body. Blood flows from below the heart back up to it with less effort, resulting in a lowered heart rate. Compression: The body is thought to act like a compressor on all body systems, including the vascular system, causing a smaller venous load to the heart than equivalent land exercise. Partial Pressure: A gas enters a liquid more readily under pressure. In water exercise, the gas is oxygen and the liquid is the blood. So, more efficient gas transfer due to water pressure may reduce the workload of the heart. Dive Reflex: This is a primitive reflex associated with a nerve found in the nasal area. When the face is submerged in water, this reflex lowers heart rate and blood pressure. This reflex is stronger in some individuals than in others. Some research suggests that the face doesn’t even need to be in the water for the dive reflex to occur. Some people experience its effect when standing in chest deep water. And that is the depth at which many aqua aerobics participants exercise. The invention is adjustable to the individual to set the water level at chest depth and biometric BP and heart rate sensors flexibly. Many other sensors are available as accessories. The invention’s monitoring system with memory storage evaluate and record the physical responses per individual providing the opportunity to achieve and reproduce the Dive Reflex as well as gather other physiological data to judge and improve training regimens per exerciser or patient. The biometric telemetry will be discussed further throughout the specification. It is important to point out that the invention is a progressive physical exercise tool with greater diversity of use than most exercise systems even dream about. The invention monitors a multitude of applications for safe us from the simple but unique home aquatic exercise system, to a medical guardian application and alert system for a physically compromised individual/patient either at home or in an institution. This capacity is to include providing many warnings to cardiovascular events with local and remote alerts resulting from professional preprogramming to recognize irregular heart rhythms, a fibr, and other cardiac anomalies etc.). When the electronic package is fully developed the invention is to serve as clinical diagnostic tool, recording stress changes and irregularities early for professional evaluation, and then used as a corrective therapy device in hospitals and rehabilitation centers to challenge the patient and monitor them to maintain safe levels of exercise. This close monitoring for safe exercise is also designed to reduce anxiety for the individual rehabilitating as it provides real-time recognition of real health problems being monitored. The technology is no replacement for professional medical evaluation and prescribed therapy, but it is also a great tool when used properly with the appropriate health care professionals. It allows the appropriate exercise regimen to be taught in the institution or hospital and then follow the patient home with continual professional monitoring through real-time monitoring and or passive review as convenient for the medical professional. However, there are alert settings as well, so that patient and professional can be
notified immediately via direct or wireless telephony and IP protocols; which can include an automated 911 communication or advanced life support response, if warranted and preprogrammed into the invention’s controller.

[0024] It is the purpose of the invention to be universal for any participant and their condition from the most compromised state to the best of physical conditioning. However, proper knowledge of the equipment and the participant/patient’s condition is of paramount importance. Obviously, the more compromised the individual is physically the more crucial a physician’s approval and review of the participants activities become. So the level of monitoring electronically and personally will vary with the above in mind.

[0025] Because there is a mix of skill sets from the medical and health care fields, computer code writers and electrical engineers and technicians required to construct, manufacture and use this invention “The Hydro Jogger”; the inventor’s have spent more time discussing use and materials to insure there is adequate cross over understanding by those skilled in the diverse arts as to the demands and requirements needed to both manufacture and safely use the product. Specifications and materials may vary per specific product or model produced but all such variations and material changes fall within the nature and scope of the invention.

[0026] The following describes some basic concept in monitoring aerobics workouts on land and with respect to aquatic environments. It is covered here in the best method of carrying out the invention as an instruction into physical exercise science with respect to the comparative exercises, and the invention’s monitoring technology (developed as a technical coefficient to better relate pertinent exercise data for the invention’s builders, programmers and end users).

Measuring Pulse Count for Aquatic Exercise in the Healthy

Information to be Referred to for Programming and Sensor Specification

[0027] In aerobic workouts on land, exercisers generally take a 10 second pulse count at the radial pulse on the wrist or the carotid artery at the side of the throat. The 10 second count is then multiplied by 6, to calculate the heart rate in beats per minute (BPM). However, AEA recommends that water exercisers take a 6 second heart rate count, and multiply by 10. A 10 second pulse count may not be as accurate due to how fast the water can cool the body. Even using the 6 second pulse count, a 13% or 17 beats per minute deduction should be taken from the exerciser’s land-based minimum and maximum training thresholds, according to AEA, due to the effects of water. This manual pulse taking process in the water is provided for the healthy exerciser purchasing the invention (The Hydro Jogger Pool™) only for exercise. The invention including the invention’s exerciser’s sensory package will sample the real-time pulse rates of the exerciser and a software algorithm in the inventions controller/processor will factor the data/perform the math and give the minute pulse rate whenever the system is queried (per programming). This data will be recorded locally, acted on locally and trigger local alerts if a tracking shepherd or guardian program has been configured (Preprogrammed, an additional product) for a specific exerciser/patient deemed at risk and in need of such monitoring. The program might flag a dangerous elevated or dangerously low heart rate. Or the EKG telemetry program may notify remote monitoring in a hospital or rehab center, and for home applications be programmed to call 911 or lifeline or special NENA numbers and give a specific recorded announcement pertinent to a person’s condition including their location so that EMT personnel can respond appropriately. Additional data could be uploaded for example if there is a resulting heart attack, infarction or v fibrillation condition. And deliver this critical data to the first responders and a receiving hospital by wireless if transport is necessary. Also, the patient at risk could be fitted with an automated IV, intra-muscular or sub dermal mediator that could release life saving drugs via a remote control signal for a doctor monitoring the “Hydro Jogger™ telemetry, prior to EMT arrival. Special support harness and automated rapid drain protocols are to be programmed into the invention and responsive to exerciser condition in the more sophisticated systems and the same commands can be given by remote signal.

[0028] The lower cost starter units will be manual in many respects and should be used only by the healthy and physically able. It is important that purchasers are schooled in the safe use of the “Hydro Jogger™” invention and that it be equipped properly for those using it. This is a responsibility of the owner, the user and the final vendor to appraise the situation the individuals involved and get the right expertise to evaluate them and prescribe use ad equipment.

Setting the Base Line for Aquatic Heart Rates During Exercise

[0029] First accurately calculate land training target rates using Karvonen formula. Using the detachable/portable BP/Pulse rate monitor from the invention Exercisers should sleep while wearing the unit for 3 consecutive nights, and record their resting heart rate upon awakening, (before rising out of bed). An average of the 3 morning measurements are used for the land-based Karvonen calculation.

[0030] Karvonen Formula:

\[
220 - \text{Age} \times \frac{\text{Predicted maximum heart rate} - \text{Resting heart rate} \times (\text{average of 3 mornings})}{\text{Heart Rate Reserve}}
\]

\[
\text{Heart Rate Reserve} = 0.50 \times (\text{Predicted maximum heart rate} - \text{Minimum Training Threshold})
\]

\[
\text{Example:} 220 - 30 \times \frac{190 - (60 + 0.50 \times 65)}{125} = 130 \text{ Heart Rate Reserve (Land)}
\]

[0031] Subtracting 17 For Aquatic Exercise

[0032] The Exerciser then takes the 17 BPM deductions from their land training heart rate target ranges and that is their “aqua target range”. If biometric exertion sensing and telemetry accessories are not purchased the exerciser measures intensity via perceived exertion as the next best choice. The healthy exerciser should feel as if they are working “somewhat hard” to “hard” during any aerobic exercise or training session. This corresponds to ratings of 12 to 16 on Borg’s Rating of Perceived Exertion scale. This is also, AEAS intensity recommendation. Karvonen formula is to be
programmed into the invention’s controller software. Specifically, the exerciser’s software program is to have an algorithm for the individual exerciser to plug in individual personal data. The invention’s sensor arrays will input data from individual exercise periods for automated processing per the software parameters of the program and the individual exerciser or patient. Also, Borg’s perception exertion scale is available for personally editing, and the actual real-time biometrics data is evaluated for cardiovascular performance and endurance levels and compared to these algorithms and earlier reports to provide kinesesthetic feedback and awareness to confirm and evaluate the accuracy of personal feeling and to allow for the augmentation of both to become more accurate and consistent. The inventors desire this to be real physical education experience for the self. It is a process to synchronize one’s mind with one’s body more thoroughly through the inventions technology and one’s own feeling.

Some obvious advantages of the invention is to provide gross motor activity with less wear and tear on weakened portions of an individual’s compromised anatomy, if this is an issue. Whether, it involves internal organs such as a weak heart or structural skeletal tissue like a broken bone, torn cartilage or arthritis, etc. The Hydro Jogger™ can provide a more complete and protected exercise environment with the biometric telemetry to watch for over taxed scenarios to known injuries through being pre-programmed to give warning within safety parameters as well as, report such critical telemetry to trained personnel and medical professionals for their further evaluation, and prescribed therapy changes. It is hoped that the sensing telemetry and exercise evaluation program will identify new weaknesses before they become injuries that require remedial therapies to correct them in a healing process.

Of course the technology will be taught in this application but may be cost prohibitive and quite unnecessary for the everyday healthy exerciser. The market variations and other considerations taught in this specification are techniques on how to use and build the invention as well as, commercialize it for market.

!Warning Note! (Teaching the Technology)

Individuals, manufacturing, marketers, developers and whomever commercializes or uses this technology have the responsibility to investigate the dangers and risks and read and or write the appropriate customer instructions and caution notices in the proper languages as well as legal disclaimers that follow up with informative materials for the safe and legal use of the invention; and the inventors so state this fact here and now in this specification to be repeated as many times as needed within this specification and or any licensing or contractual arrangement made with manufacturers and or those that market the invention, it’s components and or use them.

Gravitational Forces and the Value of an Aquatic Environment

The average person of 130 lbs. puts over 5 million lbs. of pressure onto the feet each day, just from walking. This body-weight stress, along with a land based exercise routine, increases the risk of developing a joint, disc or ligament disorders. The largest United States low back study, conducted by the United States Department of Health and Human services along with the 17,000 member American Academy Of Orthopedic Surgeons, recommend trunk flexing/total body exercise as an important remedy for people with low back disorders. Back pain researchers have found that “Gross motor aquatic exercise increases the blood flow and the movements of synovial fluid, which lubricates spinal disks and helps patients, overcome low back pain”. International researchers on arthritis and joint pain have found that patients had a significant increase in aerobic capacity without the risk of joint damage by taking part in aquatic exercise. As the center of the human body, the abdominal/trunk flexing muscle group is most important since they transfer power and control movement between both upper and lower torso and aid in respiration. Exercising this area appropriately, gently but adequately may prove to be the most important health related activity one may do to maintain total muscular-skeletal and visceral tone and well being.

The Hydro Jogger’s™ soothing water medium naturally cushions and loosens stiff, inelastic muscles, helping enhance range of motion and blood flow, which quickens any healing process without the land based risk of accelerated muscular and skeletal degeneration, sprains, strains and muscle pulls. Keeping the spine neutral, accomplished naturally in water, is understood by most physical therapists as the perfect position during trunk flexing exercise. This means that even the most out of shape/overweight individual along with the handicapped, and even those experiencing major low back/joint pain or in rehabilitation can safely exercise in most cases.

Aquatic exercises include traditional land based movements with unlimited variations of flexion, extension and lateral movement. They include sit-ups, leg raises, stomach crunches, pelvic arches, knee extensions, back-stroke, water cycling, jogging and more. Movements some individuals could never do on land due to either condition or bodyweight can be performed safely in the water without their bodyweight and stress free for their lower back, tailbone, joints and ligaments.

COTS Accessories can be Employed in the Invention as Well

Fortunately there are numerous accessories on the market for aquatic exercise and they cover a myriad of applications for use in the Hydro Jogger™. The following are but a few and they come with their own exercise programs.

!Warning Alert Note! (technology Instruction)

The inventors of The Hydro Jogger™ welcomes the use of proven devices in the pool but caution the user and health care professionals to evaluate their recommended use with the inventions operating manual and safety alerts, and manufacturers and marketing has to provide the appropriate materials and disclaimers.

A Couple Exemplary Suppliers

Hydro-Tone Fitness Systems, Inc.
16691 Gothard Street, Suite M
Huntington Beach, Calif. 92647
(800) 622-TONE
Hydro-Tone Fitness Systems, Inc. is a supplier of specially designed and patented aquatic exercise and therapy equipment that amplifies the natural resistance of water to enhance exercise and therapy programs. “Hydro-Tone’s Equipment” is used by colleges and a wide variety of training programs, physical therapists, and professional athletes for water aerobics and resistive aquatic training, and rehabilitation. They are by no means the only manufacturer of appropriate equipment and are named here only as an example of the regular types of aquatic exercise equipment that can be used synergistically in the inventions aquatic environment. It is always important to have professionals evaluate the equipment and how the exerciser and or patient will use them.

![Image](https://via.placeholder.com/150)

**Warning Note! (Technology Safety Instruction)**

Additionally, before manufacturing or marketing the “Hydro Jogger” any licensed manufacturer is to evaluate there product design and actual product performance with all named devices for compatible use with the Hydro Jogger and provide the appropriate instructions and warnings for that safe use, with the same consideration and action extended to any newly considered accessory device.

Another Exemplary Product Being Evaluated to Address Mid Body Flexing

Flex-A-Back™ Bathtub Exerciser for use in your bathtub, Jacuzzi, etc., fits any 5’ tub. Constructed of the best water resistant materials. One size fits all. Comes complete with instruction manual and bathtub wall hanger. Flex-A-Back™ Bathtub Exerciser helps reduce workout time by combining the bathing pattern with exercise and focuses workouts on the all important trunk flexing muscle group.

Flex-A-Back™ Pool/Spa Exerciser for use in a pool, spa, etc. Custom sized according to height; small 5’ to 5’5”, medium 5’6” to 11”, large 8’ to 6’ 5”. Requires a minimum of 24” of water depth. Constructed of the finest water resistant materials, including coast guard approved floatation material. Over 17 total body aerobic exercises, focusing on the trunk flexing muscle group, can be performed while the user is in a seated, horizontal or vertical position. Floatation is adjustable, allowing increased resistance without increasing speed of movement. Comes complete with instruction manual and video.

Flex-A-Back™ Rehabilitation Exerciser if the product will be utilized in a pool, spa, etc., by hospitals, rehabilitation, sports medicine centers and the handicapped/disabled. Three sizes according to height are available, and the invention can be used in a lower or deflated state for those with physical limitations and need of assistance and spotting during an exercise session. The minimum requirement is a water depth of 24”. Constructed of the finest water resistant materials, including coast guard approved floatation material. Includes a strapping system and lumbar sacral support pad, and removable/adjustable stability pontoons. Floatation is adjustable, allowing increased resistance without increasing speed of movement. Comes complete with instruction manual and video.

Therapeutic Systems, Inc.

742 Sandy Ridge Road, #2
Doylestown, Pa. 18901

Phone: 800-777-1870/215-340-1155
Fax: (215) 340-1138

This company has a patented tethering system as well that could be useful in the "Hydro Jogger™" for some patients or physically challenged exercisers. The invention can be configured to utilize these devices with smaller individuals and those physically challenged, however this requires further pre-market research by any licensed manufacturer for each product development.

Sprint Aquatics is another water exercise equipment supplier. They provide a lot of hand and foot resistive exercise equipment. The list goes on and on and will be added to as the invention is manufactured and marketed.

**SUMMARY OF INVENTION**

The invention: "The Hydro Jogger™" in its simplest form is a portable personal exercise pool constructed of durable plastic walls to contain a body of water to perform low impact resistive exercise. Its various accessories, versions and innovations include: different shapes and sizes, automated controls, remote control, biometric telemetry, machine messaging, and equipment operational management. Different power configurations are possible with house current, commercial current and emergency power packs for interrupted power scenarios. Also plumbing variations accommodate numerous water supplies and augment filtering and heating of the water as well as, produce special currents to support stationary swimming and to massage the body.

The inventors sought to incorporate as many existing exercise and therapeutic products for those already engaged in aquatic exercise or therapy for health and fitness regimens. The invention’s concept design and construction incorporates materials and techniques to make affordable a personal pool system for those who to date had to go to a public pools or therapy facilities for year round activity. Additionally versions of “The Hydro Jogger” are designed for the highest level of professional use in hospitals, physical therapy facilities, nursing homes and professional athletics for far less than existing hydro therapy systems or pool designs.
For this reason a deliberate effort was made to be as universal and compatible with existing aquatic and therapeutic exercise equipment and accessories and to first accommodate those accessories and devices approved by Medicare/Medicaid and the insurance industry as well as, those approved by the major interdisciplinary medical fields like, the American Board of Orthopedics the AMA, The National Physical Therapy Association, Approved Professional trainers Organization (Cramer) and specific approved organizations for the treatment of Chronic Pain, Neuro-Muscular Therapy, The Arthritis Foundation, and heated hydrotherapy for mental health applications. Throughout the patent COTS products are named as devices, technology and products that can be used or employed to construct the invention or used in conjunction with the invention to maximize the use of the invention.

The highly versatile compact therapy and exercise system is designed to meet and exceed the requirements for a wide variety of applications. From professional physical therapy facilities/hospitals and nursing homes to athletic training and home use. There is a configuration ideally suited for any job. Individuals can experience a weightless, non-impact environment allowing for a wide variety of exercise therapy varying in both intensity and range of motion according to a person’s abilities and or rehabilitation goals.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 The Routing & Recovery process
FIG. 2 Plant Configuration
FIG. 3 Basic Recovery Center Architecture
FIG. 4 Window’s Plant Depiction
FIG. 5 Graphic for Equipment Location
FIG. 6 Clamp Machine in Plant
FIG. 7 Window Display of Clamp Machine

DETAILED DRAWING DESCRIPTIONS

The “Hydro Jogger™” is an Inflatable pool that can be ready to fill with water in less than 5 minutes and filled with water in less than 30 minutes. It comes complete with special ladder, air pump, water pump, a minimum 7 sq ft. plastic containment, filter and cover. The invention has an easy-setup, just inflate and add water. There is no special site preparation; it can be installed on virtually any solid level surface. It is a one-piece construction and easy to take down and store. Or leave up with a thermal cover between exercise periods, either filled or partially filled. The basic unit can be purchased absent the operational water pump and filter system for the least expense if a warm water source already exists and if water cost reasonable with adequate quantity and flow.

Figure one is an overview of the entire invention. The invention is constructed of a tough flexible plastic or vinyl like material impermeable to air or water and forms of a sealed watertight containment when inflated. Other materials that are flexible and waterproof are contemplated and therefore fall within the nature and scope of the invention if employed to construct a containment pool. Inflated, the exercise pool/hydrotherapy tank AKA “The Hydro Jogger™” erects into a vertical cylinder or column of water around an individual in a short period of time (Non-pump and reserve systems or facet fill versions take longer to fill than 20 minutes).

To fill the structure, air is electrically pumped into the walls of the containment until the appropriate pressure is reached—Pounds/Square Inch PSI provides a rigid circular support wall (once again other shapes are possible and within the nature and scope of the invention). The base of the containment can be constructed to be between 14" to 20" high, (custom) with a firm plastic endoskeleton molded/waterproofed inside the flexible water/air tight bag (It is a cover/liner containment). These optional lower walls are illustrated as solid black lines in the lower section of the invention. Larger structures may utilize cylinder sleeves or tubes of the appropriate diameter or connected walls in the appropriate shape to encase the inflated bag portion to add support if necessary. The simplest air inflated containment with structural strength to support a column of water chest high is the desired result and any material engineering to support and accomplish this falls within the nature and scope of the invention.

A special abrasion resistant floor protects the liner, provides friction for movement and absorbs the exerciser’s impact. It also houses a weight sensor suite for automated data sampling to perform body fat analysis, via a software program running in the pool processor. The air pump lower left pressurizes the walls to elevate them from the receiver rim shown in the middle area of the pool. The black dots inside the pool walls are embedded bonded and equally spaced to be support rings or ribs. They are to be harder but still ply-able plastic, cable, rope or appropriate material and drilled or bored and sleeved to allow air to pass through them quickly to fill the wall to its full height. The support ribs maintain the fluid within the base of support and are employed as required. For variable height control the rings or ribs are out fitted with manual levers to the (exterior) and a internal ball valve in the air portals through the rings to stop the air from filling the pool to it’s full height at each ring level if so desired. Screw-in plugs replace the lever ball valve assembly to allow for the straight simple wall fill. In a more automated modality a solenoid or servo-motor is employed and the height control and can be automated and controlled by the invention’s controller/processor sending a signal to a stepper motor circuit.

An exemplary containment of 7 to 9 foot diameter (inside) is used in this teaching of the invention. However, variations in size, structure or shape are possible within the nature and scope of the invention. Figure three for example is a solid structure modality of this same invention The “Hydro-Jogger”.

In figure one at the top left the reader can see another sensor suite of small circles within one little square in the wall of the pool, this is the protected controller (Further detailed in figure five). Additionally, the viewer can see a wireless transceiver unit on the outside of the pool. In this case it is a DSRC RF unit (possibly Blue tooth or 802.11 technology) that transmits wireless data generated from sensors in the equipment system and from the exerciser sensor array. The wireless component transmits this data to a receiving PC via same DSRC wireless, Ethernet, direct
connect or wireless telephony as packet data for interface and processing into a windows application program to display individual and equipment data on a remote PC/monitor or to remote professionals assisting the exerciser/patient. Other data transmitted could be used to analyze and or program pool functions. The communication options are detailed with other electronics if figure five, but it is possible to deliver the same data to different web sites via the remote PC, the inventions control unit on the pool connected directly to a land line via J15 phone connection and 50K modem with dial up software programming and IP protocols, as a hardware data transfer link. Or by longer range wireless telephony and packet data to wireless gateways with IP protocols and preprogrammed electronic addresses (encrypted with PGP if desired). This is invaluable for medical applications. It allows for distant medical professionals to view critical physical stress data in real-time, analyze it and advise therapist, trainers and patients further during an exercise session. Additionally, audio and video can be connected to the pool controller and digital images of the exerciser can be presented in a windows screen and include data graphic like an EKG graphic (shown in figure seven Split screen). Employing both telemetry data and video on a split screen display that is graphically configured with code written from windows software developer kits by those skilled in the art of programming can be encrypted to meet HIPA regulations. With the use of video it will be necessary to use broadband frequencies. This is true for more data as well. These aspects may determine any specific wireless configuration employed in the invention and for different applications.

[0084] Radio Wave Warning Note! Manufacturer and Marketing Instruction.

[0085] Some Medical conditions and health care environments restrict the use of devices that generate EMF or EMW transmissions, so it will be necessary to factor this in when determining wireless mediums, it may require hard wire applications as much as possible.

[0086] To the right is a conservations water reserve system designed to rapidly fill the exercise pool with heated water allowing the pool unit to be drained rapidly and capped if desired. The arrows show water direction and fill options, which allow the pool to be purchased at a cheaper price with accessories bought and added later. The cost trade off is that the minimal pool purchase cost uses more water use versus buying the more costly reserve system and recycling the water. The pool by itself is a facet filled and slower to fill in the home setting where fill lines are smaller than some commercial water feeds. Figure four details progressive variations to allow the user options in purchasing and customizing the unit for their physical, environmental and financial needs. For example, a small unit with filter, chemicals, manual test kit and facet fill and drain like a home spa may prove ideal for most home exercise desires and should cost less than a $900.00.

[0087] To understand the body fat sensing system (upper left) and software program running in the controller/processor, it is necessary to teach a little of the science and function of hydrostatic weighing so that the programmer can write the appropriate code for the electronic signals generated and delivered to the controller input pins. The programmer is to utilize developer kit instructions to complete the interface task for the sensor and minicomputer and to write a computing algorithm to process that input data to automatically perform the following program.

[0088] Hydrostatic Weighing is a scientific method for determining body composition. It uses Archimedes Principal of water displacement, the difference between body weight measured on land and in a tank of water. To find the composition of a body, the whole of the body measured by the percentage of weight ratio of one part to another or body fat to lean muscle mass, etc., involves understanding the nature of those physical structures and their absent value in water. Fat is filled with triglycerides, fatty acids and glycerol and lean tissue composed mainly of muscle is the body weight minus body fat. Body fat patterning is the deposition of fat in specific areas of the human body, such as the stomach, thighs, or hips. But most important it is deposited in the upper abdominal lower torso area around the heart and lungs. Often this type of body fat deposit goes undetected because a person’s general shape or proportions disguise these deposits. Therefore, hydrostatic weighing is the “gold standard” of body fat measurement. Generally only available in university or high end training facilities. Hydrostatic weighing involves complete submersion of your naked body into a large tank of water. You have to expel all of the air from your lungs, and your body fat is then measured on a number of factors including water displacement. Unfortunately, this is very expensive and not readily available to the general public. Nonetheless, it is clearly the most accurate method of measurement and is the standard by which all other methods are compared.

[0089] The invention takes advantage of providing a calculable body of water in the invention to provide the “Gold Standard” to an already unique aquatic exercise system that measures the individual’s body fat automatically via the invention’s processor/controller. The Controller factors data entered automatically by weight and water level sensors and personal data entered on the subject in the invention. The hydrostatic weighing sensor components with application specific programmable processor and software can be made independent of “The Hydro Jogger™ exercise pool for adjustable applications in other aquatic settings where the water volume is stable and can be measured consistently and accurately. However, for the purpose of unity of invention, it is also considered a component of this invention and a part of the entire aquatic exercise system known as “The Hydro Jogger”. The Hydro Jogger provides the best for less by giving the most technology in progressive stages. Here is an exercise system that does so much more to help an individual know there actual physical state as they perform exercise and alert them and professionals of possible physical limitations.

[0090] Body Fat Measurement Process

[0091] The invention uses a set of water level sensors depicted on the left top edge of the pool wall as a vertical series of little round circles (these sensors can be analog or digital—discerning choice for sensors used will be application, cost accuracy and total engineering requirements). The amount of water to trigger this sensor suite is known and calibrated via preprogramming entered into the processor/controller. Which additionally, provides an I/O board for the sensors to connect to, (DSRC wireless transmission to the controller/processor is also another PFN/TRAC communi-
cation option to deliver data to the processor). This data is used in the pool operation program to determine pool fill points and for the body fat algorithm in the individual exercise monitoring and telemetry program.

[0092] The Program cycles without the individual in the invention and records the signal generated by the water sensors at the appropriate level with no scaled weight data. The inventions floor has a water proof foot plate scale containing a sensor suite that weighs the individual upon entry into the pool drained or, at a level inconsequential to a normal land gravity reading. This scale can be impregnated in the pool floor or an accessory to include any appropriate COTS products made for underwater application and capable of generating an electronic signal relative to down pressure on its weighing surface. If proprietary the floor scale will generate it’s signal in RF or have an appropriate water proof cable/connection properly bonded and grounded (or utilize isolated battery) to attach to the processor/controller I/O board or card (stamp computer/PC104 or minicomputer/microprocessor or SOCl Systems On a Chip Technology. Another modality may incorporate any lift system and ceiling support harness with RF or cable connection from a weight tension sensor component connected in the same modalties to the processor (over head wall and exerciser supports are detailed in figure two). After the exerciser’s weight is measured and recorded in the processor and entered into the body fat algorithm the pool is filled to shoulder height—the person then exhales and ducks beneath the surface of the water and their weight and the pool water level is taken.

[0093] Then a body fat software algorithm preprogrammed in the processor factors the data and provides body fat to lean tissue ratios (Completed by the ASIC circuit and processing shown in figure five). The processor and all individual data can be entered via the keypad or remote computer program or via voice recognition program, which queries the individual for personal information. The margin of error is around 2-3% but the accuracy really depends on the amount of air one can expel from their lungs. They must blow it all out or it won’t be as accurate as it could be. However, it is the “Gold Standard” of body fat measurements.

[0094] Physical Capacity Testing

[0095] Any one of a complex of scientific tests used to measure the body’s ability to perform maximum activity: strength tests, cardiac stress tests, flexibility, range of movement tests, lung function tests can be performed and evaluated by the individual and professionals in a complete version of the invention to include video feed back for kinesthetic awareness and professional analysis. The “Hydro Jogger” has numerous advantages: Deep water non impact environment that reduces pain after operations or for those needing back, joint or muscular rehabilitation and exercising. A stable support belt or harness system attached to ceiling straps help the patient maintain vertical stability, while exercising freely. No swimming skills are necessary. Graduated resistive and weight bearing therapy can be accomplished at optional adjustable depths. The warm water therapy relaxes muscles and improves circulation. This can reduce stiff and spastic movement which can cause muscle and tendon damage partly as a result inadequate blood flow. Patient transfers into and out of the water can be achieve by the rapid removal of 2/3s the water and the lowering of the wall during physical therapy sessions. Rapid refill is also another feature for commercial applications through the reserve system.

[0096] As seen in figure two the lowering of the pool wall is used to perform this task. Additionally, the ceiling supports and rigging can be used as a vertical support aid or to remove the patient more rapidly or as a spotting support system during activities. There are COTS patient lift systems in physical therapy labs and nursing homes to handle a patient’s weight in and out of these situations. “The Hydro Jogger” has been designed with ease of function, ease of installation and ease of maintenance. Convenient, comfortable and closer one-on-one patient/clinician interaction on location and or from a remote location are all possible so an interdisciplinary medical team can participate and evaluate progress in real-time from different locations or review a patient’s progress at their leisure. An elevated stair stool accessory along side the pool (normally 24° to 36° above the floor is another accessory for entry into the invention and also serves as a supervision point or assistant’s platform during activities. The stair stool is secured to the invention to eliminate tipping or tilting.

[0097] The inventions modular design allows for easy transport to the site, quick installation with no change to the facility and easy disassembly for future relocation (the area has to be assessed and rated to support the invention’s weight and wall configuration to include ceiling supports if necessary). The pools are engineered to be free standing thereby not requiring oversized pits or structural change for installations. The design allows it to be installed on a second floor with reserve tanks placed in another location like the ground floor or an upper floor. Some of the larger custom pools could require special assembly and structural support analysis application specific to the installation site and pool requirements. The larger custom pools may require structural change (a customer choice unit) Special spotting rigs and anchored cable supports are available for deeper water for weightless exercise regimens, which allow for floating a person in a vertical position to maximize physical therapy to obtain the appropriate levels and angles of resistance for the most optimal workout.

[0098] Warning Note: Engineering, Manufacturing, Construction and Instructions must Insure and Transfer All Liabilities from and Indemnify the Inventors to those Licensed to Manufacture and Sell the Invention!

[0099] Including:

[0100] Obtaining approved standard for all designs and support materials as well as possible human contact points (to include guarding against improper activities by children, and the mentally and physically challenged etc.) Other danger points include proper insulation from contact with any electrical circuits either directly or through being exposed to water/humidity and or chemicals directly or indirectly. All danger points must be identified, covered, insulated and protected properly as well as bonded to ground fault circuits per electrical codes with all work done by professionals where necessary and specified code applies. And all electrical components and or danger points are to be identified by durable permanent (water proof) warning labels or decals placed in appropriate locations as determined by human safety experts and product use engineers to
provide user and or health care professionals any necessary safety information for safe appropriate use of the invention. These labels should and must be multi-lingual as appropriate and or needed. Additionally, ready for market designs and actual manufactured equipment is to be appraised evaluated and approved by any appropriate industry organizations and or appropriate government agency or consumer organizations like Underwriter Laboratories, etc.

[0101] FIG. 2

[0102] Figure two shows the deflated or contracted state of the flexible exercise pools. It can be left filled in place or partially filled and capped to save time in refilling, or it can be completely emptied. In this pool the exerciser is displayed with a blood pressure cuff and IrDA infrared blood gas sensor. Sensors for pulse/heart rate are taken from the brachial/humorous artery along with diastolic and systolic blood pressure data. Blood O2 & CO2 data are generated from sensors imbedded in the elastic but stationary expandable band or arm cuff, and all are processed by a microprocessor and modulated on a Dedicated Short Range Communication signal, which transmits the data to the pool processor and or directly via a wireless Ethernet card, PCMCIA interface or comparable wireless interface to a remote laptop or home PC.

[0103] As with all the other sensor arrays, another data transmission modality provides for the direct connection of the BP and sensor cuff via wire/cable water proof connectables to the pool controller for transmission of the data via the I/O board interface attached to the controller.

[0104] All electrical circuits (ASICS) for the biometrics equipment and remote control described in this filing, to include sensor and sensor applications, processing, and or wireless telemetry or cable connected telemetry are the property of Kline & Walker LLC., and are specially licensed for specific use within this invention “The Hydro Jogger”, all other applications and or use of these electrical circuits designs or technology require additional licensing of the PFN/TRAC System/technology from Kline & Walker LLC.

[0105] A spandex or flexible tight fitting swim suit/leotard is the mount mechanism for the multiple EKG sensors that deliver cardiac and respiratory data to a wireless transmitter connected by a flexible hardwire waterproof cable to the BP transmitter cuff unit to deliver EKG wireless data to a local control unit and or the local PC and or lap top. This elastic band sensor in the torso section of the swimsuit counts the number of respirations. The wireless unit on the controller lower left can be interfaced to a cellular PCMCIA complete card or COTS cellular phone cable and digital interface, or use a J15 land line phone plug to either send data to wireless IP gateway or use a commercial server and personal internet account to deliver the data to professional trainers and medical support personnel at remote computer terminals. These extended and remote users have to have “The Hydro Jogger” application level software to view the data or some other COTS application level software capable of decoding and displaying the data for each COTS sensing component. The invention will use MS developer widow software kits and wireless telephony developer kits to packetize, transmit and recover the data as well as, standard IP protocols to application display level processing (This processes is easily understandable for those skilled in the art of programming and code writing for telecommunications). Additionally, the data will be encrypted with PGP where needed (e.g. for HIPPA laws and personal privacy).

[0106] The brackets on both pools indicate variable heights of the invention. There are no limits in this specification, only physical engineering constraints for any specific design. To the right is a pool with an overhead supports to assist and help stabilize the vertical component of narrower and taller pool configurations. However, the strapping also serves to aid the user into and out of the pool and as support rigging for water activities in the center of the pool (To include COTS tethering attachments and proprietary spotting belt systems). The regular lowered heights of the pool are projected to range from 16 to 28 inches for wheel chair entry, with custom heights and shapes to be within the nature and scope of the invention. The invention is to be flexible in design to meet nursing home, hospital and professional sports applications as well as, be used for home therapeutic and exercise use. The straps and locks in the top rim of the pool can vary in the amount of ceiling attachments and their placement (basically 2 to 4 straps and rim locks). The original plan calls for any appropriate ratchet and lock system for a rope, cable, strap or belt made of metal, plastic or nylon, or comparable non absorbent fabric or fiber or combination of materials to include any commercial Off The Shelf COTS materials/products or systems like the Nelson Straps and ratchet used on board ships, planes or trucks to secure freight. They must be appropriately engineered to perform the required task safely of pool wall and exerciser support. The task is: to elevate the sideward and support the weight of the user. To firmly attach to the pool wall ring or support mount, to be a non-conductor of electricity or insulated properly, to operate with an adjustable tension system and to connect to an appropriate ceiling anchor or fastener.

[0107] Other related tasks and engineering considerations include the proper ceiling support system and flooring. The formula Pi x R squared times the height of the pool is used to determine the cubic footage of the pool and then multiplied by 10 lbs per cubic foot of water to obtain the surface area load factor. The Pi x R (radius) squared figure is multiplied by 12 which gives the area in inches so the total weight in pounds can be divided by the area in inches to determine the pounds per square inch PSI. This format PSI is a standard way to classify a floor’s weight bearing capacity and is a crucial bit of data for the safe installation and use of the invention “The Hydro Jogger”.

[0108] The inventors will teach the invention “The Hydro Jogger” in this application however, the safe setup, use and application to include the construction and placement of the invention are the final responsibility of the manufacturer, the commercial sales staff and company selling licensed product, and the individual buyer/user. With this in mind the invention is to be manufactured to the standards that apply to each of the industry art areas and be completed by those skilled artisans in the respective arts, technology and industry areas, to include installation and professional guidance for the inventions use and application.

[0109] Other Licensing Requirement

[0110] All electrical circuits (ASICS) for biometrics equipment and remote control described in this filing, to include sensor and sensor applications, processing and wire-
less telemetry or cable connected telemetry are the property of Kline and Walker LLC., and are specifically licensed only for use within "The Hydro Jogger" invention; all other biometric applications or electrical circuits require additional licensing of the PFN/TRAC System/technology from Kline & Walker LLC.

[0111] FIG. 3

[0112] Figure three illustrates a second modality to construct the invention using a harder plastic or molded form in a set of ridged concentric cylinder sleeves annealed or polished finish to fit freely, but with close tolerance inside one another slide so to extend up. The inner sleeve is then elevated by the introduction of air or water pressure raising the inner cylinder to a fully extended lock and catch point. Or number of catch points for a varied set of heights. Bleeder valves allow for air to escape on the water application and block water from leaking out, if water displacement pressure is utilized. Another method used to elevate the inner cylinder is a matched set of 24 Ball screws, or strip and rotor gear or chain and sprocket assembly appropriately mounted to stroke inside the wall of the base cylinder to elevate the inner cylinder. This can be energized by electric motors and controlled by a limit switch circuit, or energized by a hand crank manually. A lever and ratchet jack system is another manual modality that could serve to elevate the inner cylinder. Holes would be made in the base outer plastic wall and out side vinyl cover liner system for any manual cranking systems. The holes are seen to the left. The mechanical jack and elevating machines mentioned are well known in the art of mechanical and physical engineering and the design aspect may take the form of a COTS device or a customization of any of these COTS products (Thomas Register of products for those skilled in the arts offer all the products to complete this task). Grainger is another product catalogue that provides engineering specification as well. The powered systems would use the same kind of controller/processor with limit switches (micros), and preprogramming would energize these actuator functions to raise and lower the pool height and control the fill and drain of the water. The cover left is placed over the support structure right with the inner part of the cover serving as a water proof liner to hold the water containment. Any specific design for the inner cylinder elevation mechanism is within the scope of the invention by those skilled in the arts’ of hydraulic and or mechanical engineering. Obviously, any final choice for elevating the inner cylinder must be cost effective, reliable and safe, and all of which must comply with industry and safety standards.

[0113] Not shown here but inherent from figure two is an overhead support system. The inter cylinder can also be raised by these ceiling support systems and accessories. And as stated earlier the ceiling systems can be configured to double as weight bearing activity supports in the center of the pool.

[0114] !Warning Note!

[0115] Engineering, manufacturing, construction and installation instructions must insure and transfer all liabilities from and indemnify the inventors to those licensed to manufacture and sell the invention to include the responsibility to: Meet any and all standards and to obtain appropriate approval for all designs and support materials as well as, possible dangerous human contact points (to include guarding against improper and dangerous activities performed by children, and the mentally and physically challenged etc.)

[0116] FIG. 4

[0117] The Pool 401 with in the dotted circle left is the first inexpensive variation of the invention and can be the initial purchase with other devices purchased as desired or needed. In the initial state the pool is facet filled and drained as used or needed (for cleanliness). Manual water test equipment is provided with the initial sale, along with a starter kit of chemicals, and an information booklet teaching the importance of maintaining clean water and how to do so with the “Hydro Jogger”. The booklet and instructions are to be written by professionals in the art of pool and spa maintenance (and the responsibility of any licensed manufacturers of the “Hydro Jogger”). The pool is ready for more automated maintenance systems as the complete system progresses from Roman Numeral I to Roman Numeral II circle in figure four. But the unit is not programmed for such service in the processor. When the pump and operational filter portions are purchased (part I and 402 in the diagram the software is provided via physical down load mediums (A Disk, USB memory key Sony Memory Stick, 3.5 Floppy, flash memory, etc) depending on the data transfer technology chosen. Overall cost is the most likely determining factor. Or the programming can be delivered via a telephone line via a standard J15 phone line connector to the processor through a 56K modem integrated and interfaced. This is shown in the controller package detailed in figure five. A final set of wireless download options include cellular or pager telephony where the appropriate hardware connectors are available for cellular connection (PCMCIA, etc.) interface and a commercial cellular service hand set cable connector or complete PCMCIA unit card inserted into the docking port of the inventions controller/processor, or a dedicated RF signal is used and the download is sent to a specific electronic address, either long distance or short distance (All of these remote transfers and downloads are detailed in more depth in the related PFN/TRAC System of Filings). In any event once the accessory or component has been purchased it is down loaded to the unique and specific wireless address from the manufacturer’s server via wireless or a wireless telephony gateway.

[0118] The invention can be purchased with the sensor suite and processor that has programming that monitors the pool chemistry and applies the appropriate amount of chemicals via an automated chemical delivery system via actuator valves shown as a small shaded cylinder in the center of the figure. The Dispenser is administering Bromine due to the use of elevated heats in some therapies. When the invention is used strictly for exercise chlorine is the antibacterial water treatment (unless heated functions are desired). Lower temperatures allow for longer endurance training. Indoor room temperatures are close to work out temperatures in the athletic applications. So pool water sanitation, i.e. chemicals will be programmed based on pH values and water temperature with predetermined use factors. Multiple use applications may require separated water supplies. In this case the reserve system with additional storage tanks and filter may be one solution or a simple facet fill for the cooler exercise application and a heated reserve for therapeutic sessions. The processor will be programmable to specific personal
An alert light and LCD display on the controller will provide maintenance instructions for manual chemical additions in the phase II level, if automated chemical dispensing is not purchased. This is to be a default option for the automated systems when they are flagged with a malfunction. The third circle right is the final portion of the complete aquatic exercise system. It provides water conservation and energy conservation by storing water and refiltering it each time it is returned. Section III is for areas that have water shortage problems, or when the pool cannot be left filled or half filled and covered. Normally, section (I) and (II) are all that are needed. All three sections have software programming to operate the appropriate solenoid flow valves to control the water flow for water maintenance, pool setup exercise, rest, drain, and store modes. These specific programs are in machine language software detailed in figure five. The specific software programming and code writing are to be completed by those skilled in the art of programming. The final software programs are to be written to marketable product out of the three progressive purchase levels defined in this specification.

Most of the working parts and components will be chosen for their cost and quality, and Commercial Off The Shelf COTS products will be used wherever possible. They will be selected from relevant industry catalogs according to standard engineering principles and protocols to accomplish the prescribed qualities, properties, and performance for these specifications by those skilled in the art of pool and spa design and manufacturing. The variation in product size, capacity, and diverse construction excludes any specifics at this point. The inventions specific product lines will be defined and determined through market interest. More specific components will be further detailed without changing the specification and basic components. So final specifications will be flexible and evolutionary and formed in pre manufacturer development and prototyping as a continual process to construct and manufacture the invention specific to market interest and demand (The Technology will be basically the same but design and aesthetics ever changing).

Plumbing and Water The quick drain and fill requirement when using the reserve water system is a characteristic of the invention. The diameter of the piping and pump ports must be large enough to handle 75 GPM so that most personal pool systems can be filled and drained in 2 minutes. This is needed for the Body Fat Measurement Program and safety. (The drain ports must be covered and protected from a person being suck to them and held by the suction under the water or until their skin hemorrhages, and the input ports must be directed down and away from the exerciser/patient during fill to avoid any injury. For horizontal swimming applications (slightly larger pool applications) the water flow has to be powerful enough to provide a support current for stationary swimming in the center of the pool.

Plumbing and Water Flow components (Standard Engineering Charts will be provided as much as possible in the formal filing, only as a tool to determine proper components but not to change the specification (in appendices). This teaching is of the full nature and scope of the invention and every configuration cannot be detailed). The pump for the water system, the air pump, the water flow pipes, the heaters, the reserve tanks, and the filters are to be chosen by application proficiency and cost.

Bacteria Lighting (Alternative Disinfectant Technologies)

Additionally, there is a waterproof ultraviolet light accessory for the reserve tanks and with in the cover of the pool itself to purify the water by destroying bacteria. This is of considerable importance in hospitals nursing homes and institutions where water cost and infectious environments are always a major concern.

One Commercial Off The Shelf COTS Product Considered for Application: The Hydro Jogger is:

The Ultra Biolyte Ultraviolet (UV-C) Water Sterilizer!

It has a space-saving design and the ultraviolet (UV-C) water purifier includes three stages of filtration for sterilized, bacteria-free water.

First, the water enters through a 5 micron pre-filter to remove any sediment in the water as part of the pool system.

Second, the water passes through a 1 micron heavy metal/cyst reduction carbon block cartridge that removes heavy metals (i.e.: lead, mercury, copper) and cysts (i.e.: crypto, giardia cysts) as well as chlorine, taste, odors, and chemical impurities from the water.

Finally, the invention uses the water tanks as a disinfecting chamber where it is exposed to high levels of Ultraviolet (UV-C) light which attacks harmful microorganisms, bacteria, viruses and sterilizes them.

The use of the light system would dictate the filter application and design. Indeed this system may not be necessary in most applications and only those where harmful pathogens were common place in the environment like hospitals. Nevertheless technology seems to go down with economy of scale so the more applications this technology is used in the lower its cost. This might prove to be a better way to control bacteria than the traditional chemical treatments to maintain clean water. The light is protected in an acrylic clear water tight encasement and mounted in the tops of the plastic reserve drums and plastic pool cover with a ground fault circuit. The light circuit is off and powerless when the pool is in service. Low Current DC energy systems for the UV-C bulbs will be sought for this application if they have enough intensity/strength to destroy the organisms.

Accompanying this bacteria eliminating device is a light sensing chamber to detect bacteria. The invention is to be forward engineered to employ a spectrometer sensor component to detect pathogens and generate a unique identity signal to the controller and remote monitoring stations as well as, deliver the correct treatment program to neutralize the organism (light chemical or both). The automated bacteria detector is shown in progression II as an in line sampling area before the operational filter. Readings are taken in a calm stationary state as the pool is in rest cycle and automatically chemicals are added to counter detected levels.
of unhealthy bacteria. Periodically, the software in the controller will perform a circulation stir and rest programs to evaluate water quality. A specific sensor is not named presently because there are many under development for the detection of pathogens used by terrorist in the air and water. Forward engineering is stated here for their use in this invention, and that they will provide their data in machine language operable in the controller and displayable within the ASIC parameters of the invention, from the local controller as well as, display their data in a windows program on remote monitoring accessory (e.g. PCs, Laptops and PDAs, etc).

[0133] For the III section where the additional reserve water is used from tanks there is a heater system available to maintain preheated water to desired temperatures for the pool. These settings can be programmed in the controller/processor to activate prior to a scheduled work out time or the user can remotely activate this feature from a regular touch tone phone or by wireless telephony to begin the heating process for a planned exercise period later. Machine messaging/phone tone to number program translation code is written as a remote control program, where an authorized caller (identified by a PIN Number is queried and responds via the touch tone numbers on the phone to deliver specific commands in a preprogrammed progression. Or, voice recognition remote commands are given by remote control communication via the phone. Both these modalities are further detailed in related filings and COTS programming products exist for these applications. Also, personal input preprogramming can be entered via the keypad on the invention or by the MIC/speaker waterproof connections interfaced on the local controller/processor. The same two programs are used, the touch tone and or the Voice recognition program for re-programming personal functions.

[0134] The heaters can be minimal current long term maintenance elements at 120 VAC house current or quick recycle single phase 220VAC depending on the application, current available, and skill of installer. In fact, in the commercial or hospital settings more commercial currents may be designed into the system, as these institutions have their own technical support staff and personnel to include licensed electricians. Of course all electrical circuits are to be bonded and fused to ground fault circuits and to code. Heater controls are to be entered by key code into the controller and the heater elements are to be powered by SRC circuits or waterproof relay/switch gear. The controller running a water temperature-monitoring program will turn the heating element on and off as needed for the reserve tanks. Basic pool and spa science, technology and regulations are applicable in the construction, use and maintenance of the invention in all aquatic aspects.

[0135] Pool Management for Larger and Cooler Applications

[0136] The automated filtration and flow management system essentially replaces manual multi-port valve selectors found in traditional pool applications and filtration systems. (However in the first and second phases of system progression these types of valves may be employed within the nature and scope of the invention to keep initial cost down. Replacement for these valves consists of an automated motorized valve or solenoid type valve either connectable to the manual components or as a same connection replacement device; either (COTS and or proprietary) that automatically control the flow of water through the filtration system and reserve tanks via the programming of the controller/processor (each I/O component connection (A valve connected to the SCR/rele terminal is recognized by the processor and a request for software and driver are made in the LCD screen and or remote monitors with a blinking alert light on the pool). The entire control system has been developed around the automated valve. COTS valves are planned for in the initial marketable products. These valves and their specifications are readily available in the Thomas Register of products and professional pool/spa and water control publications for anyone skilled in plumbing, pool and spa design to evaluate and chose the appropriate components per application in this specification. Water level is maintained by the water level sensor array, which detects the water level of the pool and corrects the level by adding fresh water from the supply or from the reserve system if appropriate. It uses a low voltage electrical solenoid valve. Chemical and pH levels of the pool water are sensed and processed by the processor/controller and the electronic valves are activated per preprogrammed settings and commands to either filter and or add pre-programmed amounts of chemicals into the body of water.

[0137] Another Chemical Treatment Option of the Water

[0138] The pH sensor data is relayed to the central processing unit which causes the system to react on the information. pH measurement is (6-9 parts Hydrogen). A COTS sanitation delivery system exists to introduce a dual method of ionization and gas chlorination. The process ensures controlled amounts of chemicals in the water, and brings pool water within drinking water standards. Ionization and, copper ions are released into the water through the circulation process, effectively killing bacteria and algae (black as well as green). This natural and safe purifying process minimizes the use of harmful chemicals.

[0139] In conjunction with the gas chlorinator, this method is proven and most effective. Gas Chlorination; pure chlorine gas obtained from HCl (pool acid) is deposited into the pool water in very small doses. Should the system detect a high pH reading, the dosage will be slightly increased. This serves to lower the pH to within acceptable levels, as well as constantly assisting with water sanitation. Alternatively, it can be installed to control a conventional salt chlorinator.

[0140] Final Engineering, manufacturing, and construction must assume all liabilities for producing and selling safe products and indemnify the inventors from any responsibility to maintain clean and safe aquatic conditions including filtration and disinfecting the water and providing any appropriate safety warnings!

[0141] FIG. 5

[0142] This Application Specific Integrated Circuit ASIC circuit is specific to the invention “The Hydro Jogger” all other applications and uses are the inherent property of the PFI/TRAC system of technologies and Kline & Walker LLC. This Application Specific Integrated Circuit ASIC for “The Hydro Jogger” ASIC can be constructed from Commercial Off The Shelf COTS hardware components or be completely proprietary and manufactured as per drawing five to include a refined development of the ASIC systems into a SOC or Systems On a Chip. This allows for the forward engineering necessary to keep the invention current with latest circuit designs.
The electronic accessories are designed to be progressive for the purchaser, allowing a person, owner or institution to purchase the basic pool and add on necessary equipment as they require it. Starting to the left, the sensors interfaced can be COTS or proprietary technology. The left column lists the system under control by the local processor. It displays an initial communication modality via a standard phone line and 56 K modem interfaced with the processor. The first block of electrical components is the biometric sensor section. These electrical components are accessory options or they can be included as desired or prescribed by a physician or physical trainer. The sensors include, Heart Rate, Blood Pressure (BP), Respiration Per minute sensor, Blood O2, Co2 sensor, EKG sensor signals, Body Fat Water Displacement measurement and any Arbitrary Biometric sensor capable of unique signal/data generation and processing by the ASIC running the application specific software drivers. The circuit is designed to handle machine language as detailed in the implementation portion of this specification and to be forward engineered for future biometric sensing and personal devices. All proprietary sensors with hard wire connections are to be plug and play capable with the appropriate/standard high reliable watertight connections to include the J15 phone Jack. And additionally wireless sensors will be used via Dedicated Short Range Communications DSRC (FM) communication appropriate for the application (e.g. FCC 5. GHZ or 915 MHZ. Are some COTS possibilities. These are examples only, any frequency/signal that can accommodate the data requirements from the sensor to the local processor and meet remote monitoring requirements is acceptable and considered to fall within the nature and scope of the invention. The local controller unit has a lighted LCD display to read information with a keypad to prompt and query the system. A waterproof clip on display and keyboard interface package is a possibility that connects either by wireless or cable to the local controller/processor and as a PDA terminal/remote controller to augment program choices in the pool processor. Audio and voice command and voice recognition are other interfaces as well as, digital camera and a broad enough signal band to carry the data. These interfaces would be in the machine messaging interface section and use appropriate machine language as detailed and available in COTS. Also, programming mediums like CD players, various disk technology FDD, USB and MP3 storage devices can be connected by standard reliable connectors and appropriate standard interfaces. The drawing size does not permit for all the machine and biometric interfaces to be illustrated clearly and listed so they are further detailed in this text portion. None or all communication interfaces are possible and within the nature and scope of the invention, however cost and practical application will dictate the modalities chosen for use.

The second machine messaging set of interfaces will vary from model to model as well as the connections used. These will be part of every pool purchased and rarely add on accessories. However their will be a connection block to add new equipment sensing and the manufacture will be able to reprogram the local processor via a phone line connection (J-15) connector or cellular interface if one is connected or embedded in the electrical system or by standard download mediums (already named) or by long or DSRC Dedicated Short Range Communications. This control module will reside in a plastic pouch with a clear plastic window to view the display and use the entry keypad, and further be provided a water tight plastic case with o ring seal and boots for hardwire connections. Temperature sensors, water pressure sensors, leak detection sensors even amp load sensing circuits will monitor electrical components for standard operating data generated by the electrical sensing system and process it in the local programmable processor/ controller. These sensors will provide critical data to control the automated inflation, setup and pool firmness as well as, the water fill, temperature, bubble jets and filtration process. There are too many sensors to list in the diagram so the term arbitrary sensors is used to include their interface. They include sensors for the water Ph, as well as, biological pathogens detected via light spectrometry surveying a quantity and of water for clarity in a measured chamber from time to time during a pool rest period. Even when the system is not in use, signaling the condition of a contamination level that is processed locally and opens a bromide valve for a measured amount of chemical per the preprogrammed contamination level sensed and quantity of water known. These sensors are being perfected inexpensively today for the homeland security initiatives and will be available in the future for public safety hazards as well as, national security. The invention is to be forward engineered to take advantage of these developments and be able to inherent the enhancements within the nature and scope of the invention as detailed in this specification and related technology.

The next interfacing is the pool activity controls and high power circuit for the operation of the pools hard ware components. As much as possible low power DC voltage 12vdc bus will supply power to silicon relays and waterproof mechanical relays for motors and solenoid applications like lights, pumps and valves near the water. Control signals are to be low computer voltages to SCR gates or relays. Any necessary pump motors and heating elements using house current or commercial currents of 120VAC, 220 VAC are to have water proof protected units properly bonded to ground fault circuits and operated away from the body of water. Computer circuits voltages will be 18-5 VDC. The high current will have silicon relay and mechanical motor starts with their gates and control leads connected to the I/O board of the ASIC as displayed in figure five. For safety purposes most all systems should be powered by 12 volt DC near the water. The power supply unit is housed outside the pool containment and grounded where it converts line or house voltage to the desired low DC voltage. All the relays to control auxiliary systems are situated in this unit with a cable plug-in to the pool containment (any improved circuitry is acceptable and within the nature and scope of the invention however, all wiring and circuits must meet code and be approved by the appropriate authorities). The processing unit controls the entire system and drives the user interface, which consists of a keypad and LCD display and a waterproof wireless DSRC remote controller. The processing unit acts on data received either from the user or from external devices such as sensors reporting on, air or water pressure, pH, water level, temperature and position indicators on the valve and sensors.

The dotted line in figure five indicates the circuit is protected and encased in a waterproof structure and properly insulated and grounded. In the containment the processor is to have its own power supply, a re-chargeable Ni Cad or lithium battery of sufficient capacity to pump down the pool water to a safe level if the house power is compromised. The emergency power in the containment is to control all func-
tions including the lowering of the wall and any patient equipment to egress the pool in an emergency.

[0147] The transformer lower left is shown in the water tight compartment but as stated earlier, it is to be part of a remote power supply unit providing a low power cable connection to this controller unit. It is shown this way for circuit clarity only. Additionally, if design for the emergency power is better housed in the remote supply unit it is still within the nature and scope of the invention. In fact all variations that meet code and standards are within the nature and scope of the invention regardless of component use and or placement or operational voltages.

[0148] The center processor portion can be configured from COTS products or specifically designed. This is detailed in the implementation description of this figure. The most important point is practical functionality per application and reasonable cost. A wide technology description is made for any implementation to meet all the possible applications, sizes and design configurations of the invention “The Hydro Jogger™”.

[0149] IMPLEMENTATION may be accomplished with a number of flexible methods, depending on space or funding constraints and level of integration required for the system to control and to route machine messaging data. With cost in mind A micro processor/mini computer (PCU) or (PC 104) or a Systems On a Chip (SOC) evolution embedded with a dedicated DOS or Windows based program, consisting of machine language, Basic, C, C++, Visual Basic, Visual C or C++, or other high level language which accomplishes the function through software control. Interfaces to the System Under Control (SUC) may be accomplished through appropriate I/O cards, either analog or digital, plug and play chips with protocols in firmware and compatible connectables.

[0150] The wireless Interfaces To include PC compatible Modems and or Cellular phone interfaces to include DSRC technologies like 802.11 and Blue tooth (via chipset) to provide the interface for a Remote Monitoring System (RMS). SUC and RMS interfaces may be in the form of ISA, PCI, PMC, VME, Compact PCI, Future Buss, or other commercial interfaces compatible with the PC-based system used. More compact and custom implementations of the ASIC may consist of dedicated state machine controller implementations in which the functions are executed through embedded firmware. These implementations may incorporate multi-chip (or Hybrid) solutions using EPROM or EEPROM interfaced to Arithmetic Logic Units (ALU), I/O ports and discrete memory elements. They may also be microprocessor or microcomputer based. A large variety of board, level products are commercially available for such an implementation. Single chip or high density implementations might consist of Field Programmable Gate Array (FPGA) or Application Specific Integrated Circuit (ASIC) based devices and Systems On a Chip or SOC technology, as detailed. Additionally, the different wireless protocols can be in hybrid chips and firmware on Plug and play (PC104) interface boards or I/O cards and could be developed from developer kits provided from the 18 most frequently used wireless telephony protocols to include CDMA and TDMA, Pager FLEX and REFLEX/Rea link protocols 1 and 11, 802.11 and Bluetooth technologies. All implementations may incorporate a sequencer, firmware, I/O and storage functions on a single device and would provide the highest level of integration and smallest size.

[0151] Display video and Audio (Auxiliary Data) for the programs can be in many forms and types. These may range from analog systems, in which tape or other magnetic media store the analog signal, to digital systems in which data is stored on hard disks, EEPROM or RAM or the myriad of new storage mediums to include USB chips, Flash memory and Sony Memory Sticks. Data format may be modulated through FM or AM, compressed, packetized or otherwise encoded for reduced bandwidth or for transmission over the Internet as (packet data).

[0152] Hardware Implementation are to be progressive and flexible first COTS Based Micro Processor, Mini computer, (STAMP I or II), PC—Programmable Controller (PC104)—Custom Logic Sequencer mP (Micro processor) FPGA (Field Programmable Gate Array) Custom Gate Array (ASICs) System on a Chip (SOC) covers the present and foreseeable future in micro computing. Any a comparable hardware not named or future developments are inherent and within the nature and scope of the invention.

[0153] Features The invention’s electrical components use “Industry Standard” Interfaces, they are modular, programmable & scalable, and provide a level of redundancy. It has event storage and is to use algorithm type software. It has security commercial 128/64 bit encryption (Web Transaction), (PGP) IEEE Standardization, Computer Standardization, H-Rel Connectors, Actuators, Sensors.

[0154] Dedicated RF and Wireless Telephony and data interfaces to include short range 802.11 Bluetooth various FM, Digital Cellular, PCS, 56K Modem, RF & Pager Technology and all the approved DSRCs, a framework for passing configuration information to hosts on a TCP/IP network (application level translation from machine language to wireless protocols to IP Protocols, Time of Day Protocol [RFC], to obtain the time of day, Data or network, Edge or access routing, DSP medium, RF medium (cogx, modulator/demodulator, antenna), RF management software (e.g. APRS).

[0155] Remote monitoring out side the containment show the communication mediums Laptop and PCS connected either by short range wireless or long range wireless and telephony depending on application and need, and the further connectivity to the Web with IP protocols to send the data to other specific internet addresses. The personal data and the manufactures augmentation software for the pool operation is to be encrypted with (PGP).

[0156] Specification Condition For Licensing!

[0157] Engineering, manufacturing, construction and instructions are left open to final engineering and cost consideration however, any design manufacturer and commercialized form of the invention must indemnify the inventors by those who have been licensed to manufacture and sell the invention.

[0158] FIG. 6

[0159] The air system is used to form and support the wall structure in an elevated state to retain the water in the pool. The air pump “P” pumps filtered air into the wall structure as shown in the inflated diagram until the pressure sensor sends a signal to the I/O board of the processor where the
inflate and bubble program flags a firm wall pressure level and cuts the power off the pump via a command signal sent from the processor to the pump motor relay. Numerous one way valves or bleeder jets are set to allow air to pass at 4 PSI+firm wall pressure and expel bubbles more vigorously up to 10 PSI to 12 PSI over firm wall pressure and to cycle the pump respectfully. The program sends a signal (analog or digital) to cycle the pump by reducing the motor RPM via SCR relays or standard motor controls, or solenoid release valves to maintain a maximum wall pressure. (Also there is an emergency blow off valve down to firm wall pressure).

[0160] The controller/processor has the pressure settings programmed into the air pump program to perform the various bubble jet massage functions (above maintaining the firm wall pressure). The local keypad or short-range remote controller can be used to set the level of desired bubbles, or the level can be preprogrammed for the pool to automatically change current flow and bubbles if a specific regimen is desired. Or remote programming by the exerciser or therapist for a particular exerciser and session can be set from a responsive PC, PDA or laptop and or change it in real-time.

[0161] To the right is a leotard or spandex swimsuit with EKG sensors embedded in the tight fitting suit. These contacts are submersible sensors held in position by non-water solvent adhesive on the back of the sensor, which adheres to a small piece of Velcro. The Velcro attaches to a mating Velcro piece of material attached to the flexible skintight suit. The other side of the sensor has a slight suction cup flexible plastic lip, when pressed to the skin creates a vacuum and holds the contact sensor in the right place on the body to pick up a specific portion of the cardiac rhythm (any appropriate COTS product can be used and falls within the nature and scope of the invention).

[0162] The blood pressure cuff on the arm has an elastic snap connection from the outside left portion to the top shoulder strap of the suit. The cardiac leads are attached to the strap. One modality has the cuff and a water tight cable and flexible air tube or hose with isolated line pressure of 200 PSI and pressurizes the arm cuff and releases it governed by a blood pressure program that records the surge of blood through the brachial artery during diastolic and systolic points and counts the heart beats. Signal is generated for these states and sent to the I/O board of the processor where appropriate software processes the unique signal and displays results in the LCD or remote windows displays. Additionally, an infrared sensor pressed against the skin generates the blood O2 level signal and a respiratory algorithm running in the processor using the respiration count the body weight and body composition data to project CO2 body generation and other exercise and metabolism chemistry. Contemplated for accurate real-time exercise gases and comparison, is to collect through a sensor snorkel placed in the exercisers mouth during exercise a collection of expelled gases, identify them and their percentage to respiratory volume and pass this sensed data to the controller via a standard interfaces. An elastic sensor in the suit counts respiration and depth of inhalation. Initial readings for individuals can be made most accurate by the breathing into a flexible tube with sensors measuring volume and CO2. These sensors are connected to the processor and recorded for the individual. Then respiration efficiency can be projected without the breathing tube all the time.

[0163] Rather than a tube and cable connection a small dedicated RF transceiver transmits the data to the processor and a similar transceiver in the controller unit transmits commands to the wireless cuff. The wireless cuff will have a power supply to operate the pump, transceiver, sensor suite and control circuits. The suction line for the portable cuff pump goes up the shoulder strap to the top of a bath cap to remain above the water, and the units are housed in water proof encasements.

[0164] Specification and Licensing Note of Responsibility and Liability!

[0165] Any and all liabilities are the responsibility of the licensed manufacturer and or marketers, and the inventors must be indemnified by those licensed to manufacture and sell the invention; their responsibilities include but are not limited to, obtaining or meeting all approved standards for any designs, materials used, production, setups, and to identify any dangers and hazards in the design and or use of the invention, and to inform and protect the public properly against physical injury from mechanical structure/components and or electrical energy or obvious misuse of the invention with all electrical components and or dancer points identified by durable permanent (water proof) warning labels or decals placed in appropriate locations as determined by exercise and safety experts and product use engineers to provide user and or health care professionals any necessary safety information for safe appropriate use of the invention. These labels should and must be multi-lingual as appropriate and or needed. Additionally, ready for market designs and actual manufactured equipment is to be appraised evaluated and approved by any appropriate industry organizations, and or appropriate government agency or consumer organizations like Underwriter Laboratories, etc.

[0166] FIG. 7

[0167] Figure seven shows the two basic programs running in the inventions Processor/controller. One is the real-time operational equipment program and the other is the real-time exerciser’s data. This latter biometric telemetry refers to patients as well. Obviously, the extent of data monitored and provided to a remote computer terminal depends on cost and the need for such monitoring. The good thing is that the invention is progressive and the basic hardware can be purchased inexpensively as accessories and added in time as needed. The programs are windows applications.

[0168] Looking first at the equipment program, the basic operational information is displayed in a pull down windows format. Current data is displayed with archival readings available to the viewer for each category. This data is encrypted but available to the manufacturer via proper coded query via wireless and hardwired connections. However, no personal exercise data or use data on an individual is accessible without proper personal pin codes and might even require a unique individual biometric reading in real-time to confirm an authorized access. The local controller unit has a lighted LCD display to read all the same information with a keypad to prompt and query the system. Window boxes are to cascade down or change like that in a PDA display giving more detailed information as requested. A water proof clip on display is contemplated that connects either by wireless or cable to the local controller/processor, temperature of the pool water, reserve water, the air pressure in the walls to
include an alert if the system detects a leak. An air leak parameter is set in the software and the pool will evacuate the water if a leak in the support wall is detected or the power is lost to the power supply (An Emergency power pack energizes the pump). The filters are monitored and the down arrow windows display every component programmed into the system. Alert readings where there is a malfunction will appear in the current window display otherwise pool readings take precedence. The accessory filter and flow control systems operating normally will only be visible if the viewer queries the system for this information. Water flow/pool gallons, reserve gallons, water pH, water clarity, bio count bromide concentration, pumps, heater/amp draw will be monitored and have safety parameters and programmed alerts.

[0169] The personal telemetry package will show the current user and the other down arrows are archival readings from past exercisers and or the current exerciser's previous readings. Heart rate, Blood Pressure, Respiration, Blood Gases, and other sensed data is possible. If the exerciser wishes to use their Lap top or computer monitor a full screen request option will display the most important readings in an enlarged mode for their observation during an exercise session. Obviously, the computer and electrical wiring should be up and away from coming in contact with any water for safety and to prevent damage to these devices. The personal screen and accessories include an EKG hook up in a tight fitting swim suite and below is a video option to view the exerciser and give remote instruction via the audio connection.

[0170] Electrical Technology Special License!

[0171] This telemetry and control package for remote monitoring and management of equipment data and personal telemetry can only be used exclusively with "The Hydro Jogger" through a specific license agreement with Kline & Walker L.L.C., for the use of their technology which includes elements of The PFN/TRAC System; any other use is prohibited and requires additional licensing from Kline & Walker L.L.C., additionally, these remote telemetry applications detailed in this filing are based on the PFN/TRAC System and any developments are inherent to that technology (The PFN/TRAC System) and the owners Kline and Walker L.L.C., with no special consideration or licensing.

[0172] Additional Components of The Invention Include:

[0173] Additional Names And Trade Marks to commercialize Product Under:

[0174] Entered into the Specification to be Claimed Note (ref to claim 13)

[0175] In this filing, the invention is termed "The Hydro Jogger" throughout the specification; however, these following names are being reserved to commercialize the invention and subsequent proprietary accessories, innovations and/or versions of the invention because they are accurate terms to define the, science, properties and qualities that make up the full nature and scope of the invention and its purpose; therefore a claim, claim thirteen, is made for the following words as protected and herein made proprietary property to include; any use of these words to market or describe use of any other commercial product involving hydro/aquatic or water therapies, arbitrary applications or exercise; and that any such use of these words, is an infringement on claim thirteen and this unique technology (the invention) Also Known As (AKA):

- "The Soggy Jogger™" - "The Heat in Hike™"
- "The Hydro Health Center™" - "The Bubble Bouncer™"
- "The Fizzy Fitness Center™" - "The Splash n Dash™"
- "The Aqua Jog™" - "The Heated Hike™ or Hik(er)"
- "The Aquatic Exerciser™" - "The Aquaciser™"
- "The Aquatic Acrobat™" - "The Splushucer™"
- "The Water Walker™" - "The Aqua Hike™ or Hik(er)"
- "The Water Walk™" - "The SwimGym™"
- "The Hydro Hiker™" - "The Swimiser™"
- "The Training Tank™" - "The Wet Gym™"
- "The Trainer Tank™" - "The Hydro Gym™"
- "The Training Tank™" - "The Gym Tank™"
- "The Triner Tank™" - "The Aqua Gym™"
- "The Splash-n-riser™" - "The Bubble Jet Gym™"
- "The Wet Walker™" - "The Bubble Gym™"
- "The Wash n Walk™" - "The Water Workout™"
- "The Wet Workout™" - "The E20 Hiker™"
- "The Water Gym™" - "The Workout Tank™"
- "The Wet WorkOut™" - "The Workout Tub™"
- "The Water Works™" - (The) "H2O Gym™"

[0176] Accessories

<table>
<thead>
<tr>
<th>Personal PNs</th>
<th>Remote Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biometric Bracelet/Band or Cuff</td>
<td>3 Levels of Automated maintenance</td>
</tr>
<tr>
<td>EKG Sensor Swim Suit</td>
<td>Ultra violet Light (bacteria)</td>
</tr>
<tr>
<td>Remote Telemetry Package</td>
<td>Various Control Systems</td>
</tr>
<tr>
<td>Software Display Program</td>
<td>Spotting Belt</td>
</tr>
</tbody>
</table>

1. A claim is made for an aquatic exercise system optionally named "The Hydro Jogger" comprise of a vertical/ horizontal water-tight containment of adequate size and space for an aquatic exerciser/patient to perform vertical and horizontal full range of motion physical movements in a stationary and or supported position.

2. A claim is made according to claim 1 for the invention to be constructed of sufficiently rugged and or flexible plastic and or a waterproof material to form support walls via inflation to hold a body of water within the watertight containment.
3. A claim is made according to claim 1 for the invention to be constructed of a sufficiently rugged, strong and rigid waterproof material to support a body of water within the watertight containment with sufficient height and width to perform full range of motion physical movements.

4. A claim according to claim 1, is made for the invention to be constructed from flexible or rigid waterproof materials with the capacity to be assembled and disassembled, or of a single setup construction and or to be mobile or portable and or to be permanent or stationary in one location or numerous locations.

5. A claim according to claim 1 is made to form a watertight containment out of rigid water-tight materials that are lightweight, and can form a water tight containment of a desired set height, or several heights in stages that elevate to specific heights by air, hydraulic, electrical and or mechanical means.

6. A claim according to claim 1, is made for a pneumatic inflatable construction of the invention with the use of an air pump or compressor to inflate and maintain the watertight containment walls in a vertical state with air or gas pressure, or similarly accomplished with hydraulic or fluid pressure and the appropriate equipment.

7. A claim according to claim 1, is made for an air pump to provide sufficient air pressure to inflate the pool walls and aerate the water with bubbles injected into the water from one way valves in the pool wall.

8. A claim according to claim 1, is made for an electronic management system, a controller to be responsive to a set of sensors to monitor and manage the pools pressurized structure, clean fluid operation, automated equipment maintenance, water level, temperature and fluid flow as described in the specification.

9. A claim is made according to claim 1, for an electronic biometric sensor package to report on the aquatic exerciser’s real-time physical state via a responsive local controller interfaced with responsive local memory and a telemetry technology either physically connected or wireless as described in the specification.

10. A claim is made according to claim 1, for a processor/controller to be preprogrammed with software monitoring the mechanical and physical sensor settings/parameters to maintain a structurally sound and physically safe and healthy pool state to include; structure, water chemistry, clarity and detectable pathogens and or hazards and to provide warnings to those hazards.

11. A claim according to 1, is made for the use of remote controls and management technology to include detachable memory that can store, and when connected to a computer/processor be queried responsive and deliver stored data to a compatible windows application program on a personal computer, laptop, PDA or PFPNs wireless internet terminals as detailed in the specification.

12. A claim according to 1, is made for the use of remote control and management technology for at least one wireless interface to deliver the data form the pool operation and or the exerciser to a locally remote computer monitor with wireless modem or via wireless telephony, IP protocols or a PFN wireless internet terminal and or land line internet connection as detailed in the specification.

13. A claim according to claim 1 is made for remote control and management software with programming in a windows application to operate on a PC or MAC platforms and process operational pool data for manufacture service analysis and remote repair and to provide the consumer additional equipment information for accessory electronic components for remote installation via encrypted security implementations as detailed in the specification.

14. A claim according to claims 1 is made for the security encryption of the software programming access to be separate and unique for authorized access for manufacture augmentations and for the access to private individual personal data stored by the owner and their health care professionals.

15. A claim of standardization, law and code compliance is made for the invention in all the art areas; industry, health and social and to include applicable law, rules and or regulations governing the safe construction, setup, maintenance, movement, storage and use of the invention, and that all data stored transferred or shared on an individual must meet all civil liberty requirements for privacy and the latest HIPPA regulations.


17. A claim according to claims 1, is made for the use of the invention in the healthcare industry, hospitals, nursing homes and rehabilitation facilities and to follow the patient home as a portable device and be set up in the house for continued therapy and use.

18. A claim according to claims 1 is made for remote patient to professional monitoring and telemetry via direct and or wireless telephony to include vital sign data packets and alert signals for an automated 911 communication and advanced life support data transfer as a preprogrammed response through the invention’s controller.