NDSU Technology Action Plan Request

#1605

I. Action Plan Introduction and Authorizations

RECEIVED
JAN 15 2016
Office of the Vice President for Information Technology

NDSU ORGANIZATION OR UNIT Department of Health, Nutrition and Exercise Sciences			
TITLE OF PROJECT Golf Simulation Teaching and Training Lab			
Project Duration (3 years maximum)	**From: 1/16**		**To: 1/17**
Type of Project (Check one)	**New x**	**Previously Submitted**	**Renewal**
Total Technology Fee Request $39,900			
Project Director **(Must be NDSU faculty or staff)** Brad Strand	**Campus Address: FLC 417** **Phone: 19718** **Fax: 18872** **E-mail: Bradford.strand@ndsu.edu**		

Name (Type or Print)	Signature	Date
Project Director Brad Strand	Brad Strand	1/11/16
Unit Head ~~Young~~ Yeong Rhee	Yeong D Rhee	1/11/16
IT Division Consultant Melissa Stotz	Melissa Stotz	1/15/16

Executive Summary (maximum of 175 words)

The goals of the project are to 1) implement golf simulation technology and training in the curriculum for physical education teacher candidates, athletic training students, and exercise science majors, 2) enhance current Health, Nutrition, and Exercise Sciences (HNES) faculty instruction, and 3) prepare PE teacher candidates and HNES graduate students with 21st century skills that will contribute to K-12 and higher education student learning. This technology will compliment the resources we obtained last year as we developed our pedagogical lab.

We will only accept for consideration Technology Action Plan Request forms which are fully completed and signed according to the guidelines listed in the Instructions, pages 1 and 2.

Technology Action Plan Request forms will be opened and reviewed after the submission deadline.

NDSU Technology Action Plan Request

II. Project Overview

1. How does this project meet student needs?

This project will:

A. Implement golf simulation technology and training in the curriculum of physical education teacher candidates, athletic training students, and exercise science majors,
B. enhance current Health, Nutrition, and Exercise Sciences (HNES) faculty instruction, and
C. prepare PE teacher candidates and HNES graduate students with 21st century skills that will contribute to K-12 and higher education student learning.

2. What audience does this project directly serve? What audience is indirectly served? How many students are affected?

The project directly serves:

A. 65 undergraduate HE and/or PE majors (primary)
B. 60 graduate students
C. 15 HNES faculty
D. 250 undergraduate exercise science students
E. Potential for students outside of the Department of HNES to use the equipment and technology.

3. For projects that target a subset of NDSU's students, please describe the possibility for broader application in the future.

Requests to use the golf simulation lab could be made by outside departments and athletics. The simulation lab will be used by physical education teacher candidates in training sessions with students outside the department.

4. Describe both the immediate and long-term impact of this project.

Immediate impact:

A. Instructors will be able to use the latest golf technology to enhance instruction.
B. Students will have direct access to the latest golf technologies.

Long-term impact:

A. Undergraduate HNES students will have competency in a new and innovative sport technology.
B. Graduate students will be greater prepared for professional careers as well as instructional roles in higher education.

5. Who will pay for ongoing expenses following the technology fee funded portion of this project (e.g., who will replace hardware or software after it has reached its end of life)?

The HNES department will fund maintenance and equipment replacement.

6. Describe how this project will follow NDSU's best practices in information technology. (Please make sure the NDSU IT Division staff you consulted signs in Part I of this form.)

I met with ITS staff to discuss this project and best practices.

7. What service on campus is most similar to the one proposed here? How does this project differ?

There is no service on campus that is similar to the one proposed here.

NDSU Technology Action Plan Request

III. Project Description (5 pages maximum)

Include information on the background of this project: how did it come to fruition?

Until this past year the HE/PE program had few specialized technologies. Funding obtained through a successful Technology Fee award resulted in the establishment of a pedagogical lab that includes an instrumented classroom (Desktop computer, projector, document camera, smart board, iPad minis, FITNESSGRAM/ACTIVITYGRAM software license, FitBit Flex (10), and iPod Nano. The next step in the implementation of innovative sport technology for teaching and learning is the establishment of labs for specific sports.

The gymnasium in the Bentson Bunker Fieldhouse is used for the teaching of many of our physical education teacher preparation courses. Certain activities however cannot be fully taught or practiced in that setting. For example, it is difficult, if not impossible, to teach physical education teacher candidates how to teach and/or coach golf. We currently have students travel to Edgewood Golf Course to participate in a couple of on-site practice sessions. However, even if they get a basic training at that site there is not an opportunity to peer-teach or to include golf in on-campus teaching experiences.

Accurate and affordable golf launch monitors provide a new teaching and research tool for teachers and coaches. Until recently the inexpensive launch monitors lacked accuracy while the accurate monitors were expensively priced. In addition, Blue Tooth technology has allowed the monitors to be moved and positioned both indoors and outdoors without bothersome wires. Golf launch monitors allow golfers to determine the distance the ball landed, total distance, launch angle, club speed, side spin, side angle, back spin, and offline while providing a visual display of the shot.

This pedagogical lab would be unique to NDSU as I am not familiar with such a lab within a multi-state area. This lab will provide HNES faculty with a teaching and research niche. Every year new golf training products arrive on the market. We would certainly be in a position to be a test center for the developers of those products.

A Summary of Items Requested for Project Include:

- S4 Golf Simulator = $25,900 plus taxes
  - Software
  - Projector
  - Hitting screen
  - Touchscreen
  - Computer
  - Computer cabinet
  - Hitting area
- 30 Course upgrade = $3,000
- Miscellaneous golf supplies = $1000
  - Golf ball
  - Weighted golf clubs
  - Swing ring
  - Mirrors
  - Smash bag

- Putting surface

- Freight and install charges = $10,000

Project will Address the Above Needs by:

- Provide access to golf technology applications and instructional sources to HNES physical education, athletic training, exercise science, and sport management faculty.
- Facilitating teacher candidate competencies in HNES and EDUC PE courses.
- Facilitate graduate technology education and pedagogical application during graduate seminar.

Training and Expertise

- One PE faculty member is already trained in the use of a golf simulator and will be able to provide consultation for other HNES faculty. We will also lead the HNES graduate seminar classes on technology use and pedagogical applications.

Expected Outcomes

- All equipment received and installed
- Assessment artifacts designed to meet designated teacher candidate competencies
- At least 9 HNES faculty will use lab equipment in the first year
- Graduate students will be educated in technologies and their pedagogical applications

Number of Students Impacted

A. 65 undergraduate HE and/or PE majors (primary)
B. 60 graduate students
C. 15 HNES faculty
D. 250 undergraduate exercise science students
E. Potential for students outside of the Department of HNES to use the equipment and technology.

Additional Supports Already Acquired to Facilitate Project:

- None

IV. Milestones

List the date for each project milestone. These milestones should represent the ***significant*** accomplishments that will be associated with the action plan. For each milestone, please indicate its expected outcome and the means for assessing that outcome. (The table may be extended as needed.)

	Date	Milestone	Expected Outcomes	Means of Assessment
1.	Feb. 1, 16	Space secured for the golf simulation lab	Dedicated space	
2.	March 1, 16	Equipment purchased		
3.	March 15, 16	Lab completed		
4.	April 1, 16	Use of lab by HNES faculty and students	At least 5 HNES faculty will use lab equipment	Usage log
5.	Sept 16	Technology classes within HNES graduate seminar	Graduate students will be educated in technologies and their pedagogical applications	Usage log
6.	Sept 16	PE major teaching non-PE students	PE majors will gain teaching experiences	Usage log

V. Supporting Documentation
Program Standards/Competencies Addressed

National PETE Standards

Outcomes—Teacher Candidate Will:
2.5 Analyze and correct *critical elements* of *motor skills* and *performance concepts.*

COMPETENCIES:
2.5 A Analyze, detect, and corrects all students' fundamental movement skills using skill cues linked to the identified critical elements.
2.5 B Provide specific, corrective feedback on critical elements for both motor skills and tactics.
2.5 C Identify objectives related to decision-making and the effective use of strategies and tactics and plans practice activities congruent to objectives.
2.5 D Provides specific, corrective feedback on the effective use of strategies and tactics to students.
2.5 E Demonstrate knowledge of current technology available and its use in the physical education setting.
2.5 F Emphasize the process as well as the product.

Outcomes—Teacher Candidate Will:
3.8 Design and implement *student* learning experiences that integrate technology.

COMPETENCIES:
3.8 A Integrate learning experiences that require students to use various technologies in a physical activity setting.
3.8 B Incorporate current technologies to enhance student learning.

Outcomes—Teacher Candidate Will:
4.1 Demonstrate effective verbal and nonverbal communication skills across a variety of instructional formats.

COMPETENCIES:
4.1 A Use of proper grammar and appropriate verbal communication.
4.1 B Incorporate multiple forms of communication during lesson.
4.1 C Use alternative forms of communication such as task sheets, bulletin boards, etc. to communicate content.
4.1 D Incorporated technology to provide feedback to students (such as pedometers and video).
4.1 E Demonstrate best practices.

Outcomes—Teacher Candidate Will:

6.2 Participate in activities that lead to professional growth and development

COMPETENCIES:

6.2 A Participate in professional development opportunities for professional growth.

6.2 B Participate in professional opportunities beyond the program requirements (such as presentations at professional conventions, providing leadership in student groups, and planning activities such as Hoops for Heart.)

6.2 C Use technology on a regular basis to communicate, network and locate resources.

InTASC

Standard #5: Application of Content

The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.

5(k) The teacher understands the demands of accessing and managing information as well as how to evaluate issues of ethics and quality related to information and its use.

5(l) The teacher understands how to use digital and interactive technologies for efficiently and effectively achieving specific learning goals

5(n) The teacher understands communication modes and skills as vehicles for learning (e.g., information gathering and processing) across disciplines as well as vehicles for expressing learning.

5(p) The teacher knows where and how to access resources to build global awareness and understanding, and how to integrate them into the curriculum.

Standard #6: Assessment

The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.

6(c) The teacher works independently and collaboratively to examine test and other performance data to understand each learner's progress and to guide planning. (Fitnessgram)

6(g) The teacher effectively uses multiple and appropriate types of assessment data to identify each student's learning needs and to develop differentiated learning experiences.

6(i) The teacher continually seeks appropriate ways to employ technology to support assessment practice both to engage learners more fully and to assess and address learner needs.

Standard #7: Planning for Instruction
The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.

7(k) The teacher knows a range of evidence-based instructional strategies, resources, and technological tools and how to use them effectively to plan instruction that meets diverse learning needs.

Standard #8: Instructional Strategies
The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

8(g) The teacher engages learners in using a range of learning skills and technology tools to access, interpret, evaluate, and apply information.
8(h) The teacher uses a variety of instructional strategies to support and expand learners' communication through speaking, listening, reading, writing, and other modes.
8(m) The teacher understands how multiple forms of communication (oral, written, nonverbal, digital, visual) convey ideas, foster self expression, and build relationships.
8(n) The teacher knows how to use a wide variety of resources, including human and technological, to engage students in learning.

Standard #9: Professional Learning and Ethical Practice
The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.

9(d) The teacher actively seeks professional, community, and technological resources, within and outside the school, as supports for analysis, reflection, and problem-solving.
9(f) The teacher advocates, models, and teaches safe, legal, and ethical use of information and technology including appropriate documentation of sources and respect for others in the use of social media.
9(h) The teacher knows how to use learner data to analyze practice and differentiate instruction accordingly. (video analysis and self-evaluations of teaching)

Standard #10: Leadership and Collaboration
The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.

10(g) The teacher uses technological tools and a variety of communication strategies to build local and global learning communities that engage learners, families, and colleagues.

ESPB Standards

Standard 08025.5. Communication
The program requires the study of effective verbal, nonverbal, and media communication techniques to enhance learning and engagement in physical activity settings. Teacher candidates demonstrate sensitivity to all learners, and model appropriate behavior. The program uses a variety of performance assessments of candidates' understanding and ability to apply that knowledge.

Standard 08025.6 Planning and Instruction

The program requires the study of how to plan and implement a variety of developmentally appropriate instructional strategies to develop physically educated individuals, based on state and national standards. This standard deals specifically with pedagogical knowledge and application. The core of this standard will be a series of sequential and progressive field experiences that allow teacher candidates to refine, extend, and apply their teaching skills. The program uses a variety of performance assessments of candidates' understanding and ability to apply that knowledge.

Standard 08025.8. Reflection.
The program requires the study of reflective practice, with evaluation of the effects of the educator's actions on others (e.g., learners, parents/guardians, fellow professionals). Teacher candidates seek opportunities to grow professionally. This standard can be met through a series of learning experiences that promote self-reflection on the part of teacher candidates. The program uses a variety of performance assessments of candidates' understanding and ability to apply that knowledge.

Standard 08025.9. Technology
The program requires the study of current, appropriate instructional technologies to enhance learning and to enhance personal and professional productivity. The program uses a variety of performance assessments of candidates' understanding and ability to apply that knowledge.

National K-12 Standards (ND is currently adapting)

- Uses available technology to self-monitor quantity of exercise needed for a minimal health standard and/or optimal functioning based on current fitness level. (S3.M8.8)
- Analyzes and applies technology and social media as tools to support a healthy, active lifestyle.(S3.H2.L2)
- Adjusts pacing to keep heart rate in the target zone, using available technology (e.g., pedometer, heart rate monitor), to self- monitor aerobic intensity. (S3.H10.L2)

NDSU Technology Fee Action Plan Request
VI. Budget
(double-click on the form to begin entering data)

1.	NDSU ORGANIZATION OR UNIT Health, Nutrition and Exercise Sciences
2.	PROJECT DIRECTOR(S) (Must be NDSU faculty or staff) Brad Strand

3. SALARIES AND WAGES			
Personnel description	Number employed	Number of months	Funds Requested
A. Staff	0	0	$0.00
B. Graduate students	0	0	$0.00
C. Undergraduate students	0	0	$0.00
4. TOTAL SALARIES AND WAGES			$0.00
5. FRINGE BENEFITS			$0.00
6. TOTAL SALARY, WAGES AND BENEFITS			$0.00

7.	EQUIPMENT	
	S4 Golf Simulator	25,900.00
8.	TOTAL EQUIPMENT	$25,900.00

9.	MATERIALS AND SUPPLIES	
	Shipping and Instalation	$10,000.00
	30 course upgrade	$3,000.00
10.	TOTAL MATERIALS AND SUPPLIES	$13,000.00

11.	TOTAL TECHNOLOGY FEE REQUEST	$38,900.00
12.	MATCH (Describe in Match Section)	$1,000.00
13.	TOTAL PROJECT EXPENDITURE	$39,900.00

NDSU Technology Action Plan Request

VII. Budget Justification

Equipment	Justification
S4 Golf Simulator **30 course upgrade** **Golf supplies**	• HNES currently does not have any technology for teaching and practicing golf • The equipment is necessary for teaching HEPE students how to golf and how to teach golf. • The lab will provide NDSU with a niche teaching and research lab
Additional Equipment	

NDSU Technology Action Plan Request

VIII. Budget Match

1. Attempted Budget Matches:

None

2. Actual Budget Matches:

$1000

3. Additional Budget Match information:
The budget match will come from HNES, the HEPE program, and HDE.

WHO'S HITTING FULL SWING?

WOODS

"Their new technology is impressive, as it allows me to shape my shots the way I want to."

SPIETH

"The FSG sim is the closest thing to being out on the course."

POULTER

"My time is precious and I don't like to compromise. That's why I chose the Full Swing simulator."

HAAS

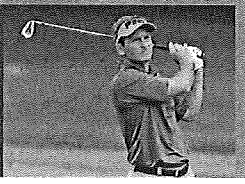
"My sim continues to surprise me. I love this machine!"

MAHAN

"I use my Full Swing sim several times a week to fine-tune my game."

WILSON

"Probably the most important aspect is that the shot data is consistent."

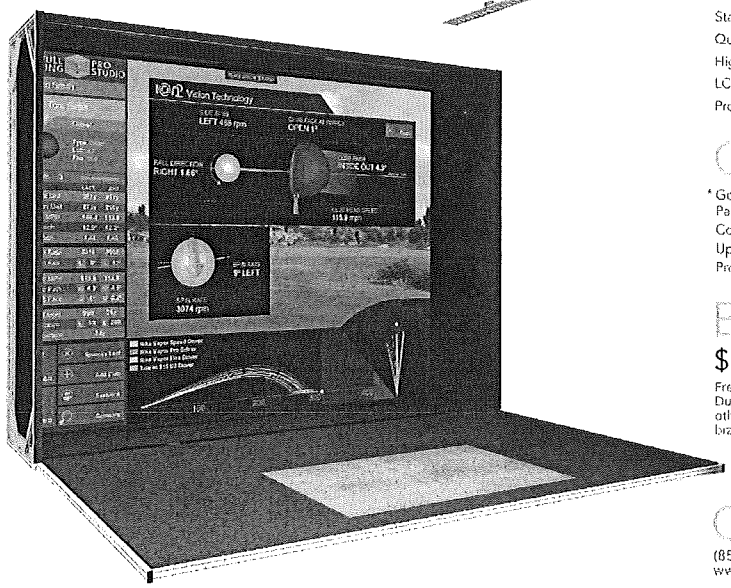


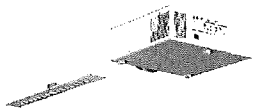
FULL SWING™
SIMULATORS

S4 SIMULATOR

Accurate. Reliable. Affordble.

The perfect solution for the discerning client who wants the best quality at a value price. Experience the technology used by the pros.





OVERVIEW

Compact Depth Enclosure

Patented Tracking System
- Light Speed Infrared Technology
- Ion2 Vision Technology

Pro Studio : Driving Range

Standard Resolution Projector

Quiet Hitting Screen

High Performance Computer

LCD Touchscreen Monitor

Professional Grade Hitting Mat

OPTIONS

* Golf Course Packages:
  Packages of 30, 57, and 90 available

Commercial Enclosure

Upgraded High Definition Projector

Pro Studio : Club Compare

BASE PRICE

$25,900*

Freight & install charges are not included. Duties, federal, state and local taxes and other costs are extra. Specifications and brands are subject to change.

CONTACT

(858) 675-1111
www.fullswinggolf.com

DETAILS

ENCLOSURE
Compact Depth – wall & ceiling panels are shallow depth, floor panels are full depth.
Rigid frame structure with durable stretch fabric.
Durable, light absorbent turf interior.
Easily installs in many locations and applications.

STANDARD OPTIMAL SIZE REQUIREMENTS
S4 Actual Size: 12'4"W x 9'10"H x 12'3"D
Optimal Space Needed: 12'6"W x 10'H x 18'D

S4 (Commercial) Actual size: 15'W x 9'10"H x 16'D
Optimal Space Needed: 15'2"W x 10'H x 18'D

PATENTED DUAL TECHNOLOGY TRACKING
Infrared: Lightwave technology accurately measures ball speed, launch angle, and direction.
Ion2: High speed camera technology accurately measures ball spin and club head data.

SOFTWARE
Ground Breaking Golf Software.
Live motion environment.

PROJECTOR
Standard Resolution, HD Capable,
High Lumens.

SCREEN
Quiet hitting screen.

TOUCHSCREEN
22" LCD touchscreen system controllller.

COMPUTER
Custom built gaming computer featuring an Intel processor and high-end graphics card.

COMPUTER CABINET
Sleek, minimal design houses the computer, keyboard, mouse, and tracking controllers.

HITTING AREA
Highly durable, fairway-realistic, hitting mat.

DUAL TRACKING TECHNOLOGY

INTUITIVE CLUB HEAD DATA

Ion2 Vision Technology gives you club head speed, club face angle, and club path information with an intuitive on-screen illustration of your club, so you can better understand your swing.

TAKING BALL SPIN SERIOUSLY

Ion2 collects real-time spin data, including back spin, side spin, and spin axis. Measuring true spin and displaying it on-screen allows you to make better equipment choices and shot decisions.

WORK THE BALL YOUR WAY

Full Swing prides itself on ball flight accuracy and realism of the golf shot. Focusing only on ball spin and club head, Ion2 allows the ball path to be shaped exactly as if it were outdoors.

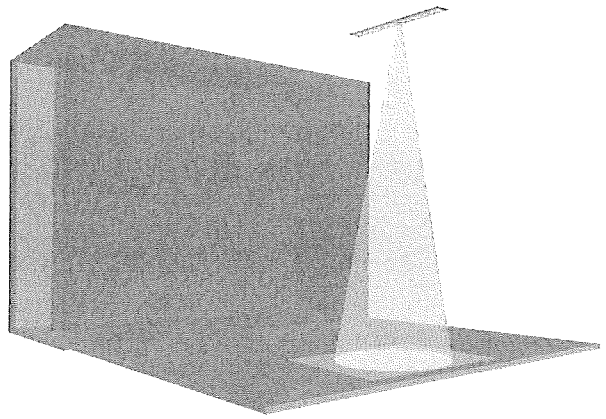
INFRARED TECHNOLOGY + **HIGH SPEED CAMERAS**

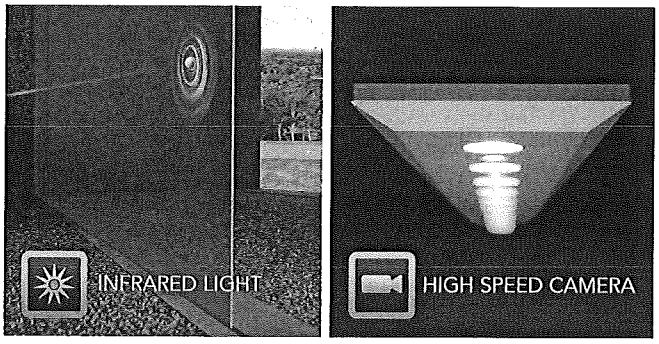
SUPERIOR **Speed and Trajectory** MEASUREMENT

SUPERIOR **Spin and Club Head** MEASUREMENT

Full Swing has developed a third generation extension to its existing infrared tracking system. Utilizing a single high-speed camera to focus solely on ball spin and club head data, Full Swing has truly mastered the art and science of ball flight.

ION2 VISION TECHNOLOGY



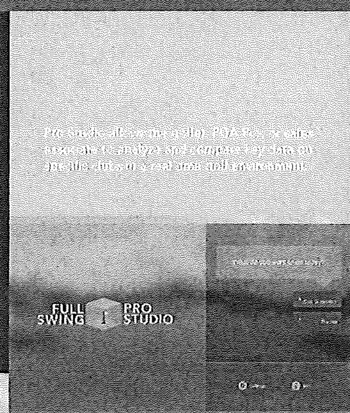


FULL SWING PRO STUDIO

DRIVING | CHIPPING | SHORT GAME | TRAINING | CLUB COMPARISON (additional option)

Full Swing's new Pro Studio practice and club comparison suite is a streamlined solution that makes game improvement and club fitting efficient and fun.

- Includes Driving Range, Chipping Range, and Club Comparison.
- Get immediate and extensive feedback with intuitive and easy-to-read visual elements.
- Compare the subtle differences between each club type and brand by analyzing key data points.

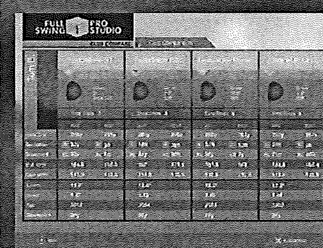


ANALYZE DATA

The Post Shot screen is loaded with incredible features and information to help you analyze all of your shots, whether its the last shot you took or the average of a specific club.

CUSTOMIZE PRACTICE

You can choose to drop a fully functional green in the middle of the driving range. Complete with undulations and bunkers, drag the green as close or as far as you want, so you can perfect that short chip or long approach shot over and over.

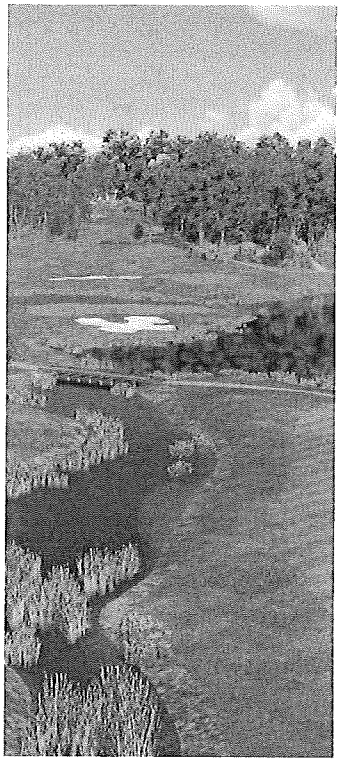


COMPARE CLUBS

(additional option)

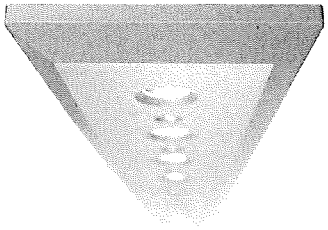
One of the most powerful features of Pro Studio system is the Club Comparison screen. Here you can test and compare multiple club brands and settings to find the best fit for each golfer, and it's all presented in an easy to understand chart.

UPGRADE OPTIONS
FOR S4 SIMULATORS



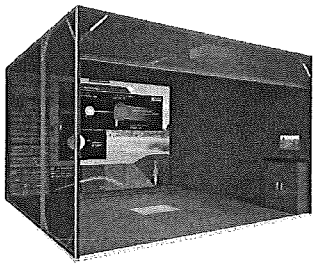
A 2ND ION2... FOR LEFTIES
Dial in your lefty friends and family.

All Full Swing simulators already come loaded with the Ion2 Vision Technology, but the smaller enclosure requires a second Ion2 if you want ball and club head data for the lefty hitters. It's just one way we maintain the smallest footprint in the industry.



CHAMPIONSHIP GOLF COURSES
The best quality courses and environments in the industry.

Full Swing's live motion software package is the most comprehensive and realistic motion graphics innovation in the golf simulation industry.

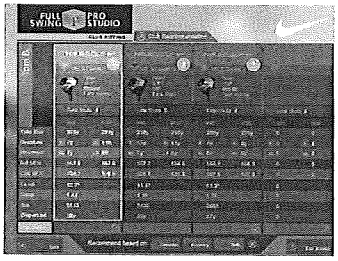


COMMERCIAL ENCLOSURE
A full depth enclosure provides privacy and added durability.

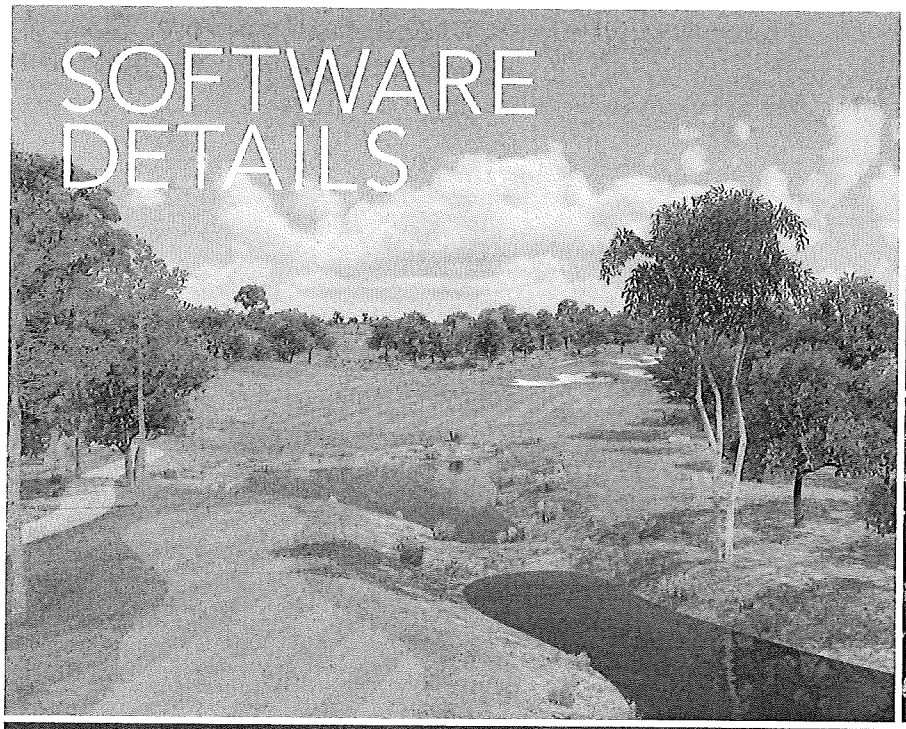
These fully enclosed simulators allow indoor centers and businesses to provide a more durable and protective wall structure for heavy traffic situations.

PRO STUDIO : CLUB COMPARE
A simplified and streamlined club fitting experience.

Full Swing's new Pro Studio Club Comparison tool is a beautifully designed and efficient solution for golfers and retailers.



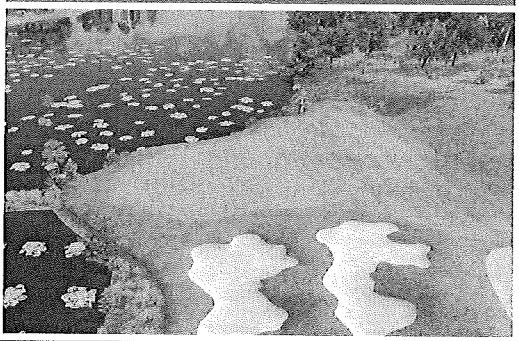
SOFTWARE DETAILS



93 championship courses, a live and fluid environment, multiple camera angles, real time daylight, and highly complex object collision models make this unquestionably the most life like and enjoyable indoor golfing experience available.

Additional features include a completely customizable interactive practice facility, on-screen ball flight and club head data, and the ability to compete online against players worldwide. These graphics, combined with the most accurate ball tracking system in the industry, create a stunningly detailed golfing experience.

You need to get in this simulator to truly see the difference.



CHAMPIONSHIP COURSES

93 breathtaking and challenging golf courses from around the world are available, including Pebble Beach, Oakmont, and The Old Course at St. Andrews. Every tree, bunker, and patch of grass has been painstakingly placed, bringing out the subtle, and not so subtle, nuances that make each course a unique work of art.

CONTEST CAPABILITIES

Each Full Swing simulator is equipped with Closest to the Pin software and Long Drive capabilities. Set up an individual contest, or add these features to a golf scramble or tournament you're hosting in the simulator, complete with leader boards.

E6 PRACTICE RANGE

We've designed and built an entire area dedicated solely to practice, featuring driving, approach shots, putting, uphill, downhill, bump and run, lob, over trouble, and many more. Our visual feedback system can precisely pinpoint your weaknesses and strengths, while ground level grids and targets can help you refine your skills.

DETAILED GOLF ENVIRONMENTS

The top courses from around the world come to life with immaculate fairways, crosscut greens, swaying trees, water hazards, and even wildlife. These highly realistic courses feature options to control factors like green speeds, wind variables and weather conditions.

SHOT CONTROL

Real-time ball flight data is derived from precise ball and club head measurements to give you complete control over each and every shot. Ball speed, spin, launch angle, carry, direction, and course conditions are all factors in the real world, and each of these elements are precisely replicated by the Full Swing system.