



**Find the best hotel deals!**  
 Search major travel sites at once and find the cheapest price  
[Click here](#)

November 19th, 2010 at 12:48 am

## New Device Detects Objects Through Bubble Clouds

in: Analysis, Animals, New Discoveries, People Making a Difference, Science & Technology News, Sealife

[Like](#) +1 0 
 [Tweet](#) 2 
 [Share](#)

[Submit](#)



Detection of targets in bubbly waters are key goals of shallow-water sonar.

Scientists at the University of Southampton have developed a new kind of underwater sonar device that can detect objects through bubble clouds that would effectively blind standard sonar.

Just as ultrasound is used in medical imaging, conventional sonar 'sees' with sound. It uses differences between emitted sound pulses and their echoes to detect and identify targets. These include submerged structures such as reefs and wrecks, and objects, including submarines and fish shoals.



2030  
2028  
2026  
2024  
2022  
2020

(Click here)  
**"Eight Critical Skills for the Future"**



*"The most readable and far-reaching futuring process to date"*  
 Dennis Bushnell,  
 Chief Scientist, NASA

*"...the craftsman's guide to molding your own destiny"*  
 Michael Cushman, CEO,  
 Keychange Institute



**Advertise Here**  
 Make an impact on the Impact Lab  
 ---- (Click here) ----



### UPCOMING EVENTS AT THE DAVINCI INSTITUTE

- Thu (11/10)** - Why Should I Buy From You? - Why Should I Buy From You?
  - Sat (11/12)** - Future of Work Now: Creating Measurable Results in Your Life - Future of Work Now: Creating Measurable Results in Your Life's Portfolio
  - Tue (11/15)** - Getting Started with iMovie Video Editing Boot Camp - Learn How to Use iMovie to Create Professional Videos For Your Business or...
  - Thu (11/17)** - Vision - You Can't Succeed Without It
  - Mon (11/28)** - Startup Junkie Underground - Outcome-based Marketing: New Rules for Marketing on the Web
  - Mon (12/ 5)** - Night with a Futurist - Where do your gadgets come from?
  - Sat (12/10)** - Make Fun Your Competitive Advantage!
- [MORE EVENTS](#)

### RECENT POSTS ON FUTURISTSPEAKER.COM

- The Enormous Power of the Slow Link
- Accomplishment-Based Education
- Invasion of the Digital Body Cloud
- The Golden Rule of Digital



However, standard sonar does not cope well with bubble clouds resulting from breaking waves or other causes, which scatter sound and clutter the sonar image.

Professor Timothy Leighton of the University of Southampton's Institute of Sound and Vibration Research (ISVR), who led the research, explained:

"Cold War sonar was developed mainly for use in deep water where bubbles are not much of a problem, but many of today's applications involve shallow waters. Better detection and classification of targets in bubbly waters are key goals of shallow-water sonar."

Leighton and his colleagues have developed a new sonar concept called twin inverted pulse sonar (TWIPS). TWIPS exploits the way that bubbles pulsate in sound fields, which affects the characteristics of sonar echoes.

"To catch prey, some dolphins make bubble nets in which the best man-made sonar would not work. It occurred to me that either dolphins were blinding their sonar when making such nets, or else they have a better sonar system. There were no recordings of the type of sonar that dolphins use in bubble nets, so instead of producing a bio-inspired sonar by copying dolphin signals, I sat down and worked out what pulse I would use if I were a dolphin," said Leighton.

As its name suggests, TWIPS uses trains of twinned pairs of sound pulses. The first pulse of each pair has a waveform that is an inverted replica of that of its twin. The first pulse is emitted a fraction of a second before its inverted twin.

Leighton's team first showed theoretically that TWIPS might be able to enhance scatter from the target while simultaneously suppressing clutter from bubbles. In principle, it could therefore be used to distinguish echoes from bubble clouds and objects that would otherwise remain hidden.

In their latest study, the researchers set out to see whether TWIPS would work in practice. Using a large testing tank, they showed experimentally that TWIPS outperformed standard sonar at detecting a small steel disc under bubbly conditions resembling those found under oceanic breaking waves.

Encouraged by their findings, they next conducted trials at sea aboard the University of Southampton's coastal research vessel the *RV Bill Conway*. They compared the ability of TWIPS and standard sonar to discern the seabed in Southampton Water, which handles seven per cent of the UK's entire seaborne trade. The seabed in this area varies in depth between 10 and 20 metres.

"TWIPS outperformed standard sonar in the wake of large vessels such as passenger ferries," said co-author Dr Justin Dix of the University of Southampton's School of Ocean and Earth Science (SOES) based at the National Oceanography Centre, Southampton.

Possible future marine applications for TWIPS include harbour protection and the detection of bubbles in marine sediments and manufacturing. Technologies based on the same basic principles could be used in medical ultrasound imaging, which was already using pairs of inverted pulses to enhance (rather than suppress) contrast agents injected into the body. The TWIPS principle would work with other sensors such as in Magnetic resonance imaging (MRI), and Leighton has proposed TWIPR (Twin Inverted Pulse Radar) for the detection of improvised explosive devices or covert circuitry.

## Travel Affiliate Program

### CATEGORIES

- [Alternative Transportation](#)
- [Analysis](#)
- [Animals](#)
- [App](#)
- [Architecture](#)
- [Art](#)
- [Award Winner](#)
- [Baby Gadgets](#)
- [bicycle](#)
- [Big Problems](#)
- [Birth](#)
- [Brain](#)
- [Breakthrough Thinking](#)
- [Business](#)
- [Corporate Manipulation](#)
- [Crazy Photos](#)
- [Crazy Stuff](#)
- [Culture](#)
- [Current Events](#)
- [DIY](#)
- [Ecological Products](#)
- [Economy](#)
- [Education](#)
- [Entertainment](#)
- [facebook](#)
- [Famous Inventor](#)
- [Fashion](#)
- [Food](#)
- [Games](#)
- [Global Warming](#)
- [Globalism](#)
- [government](#)
- [Great New Product](#)
- [Great Videos](#)
- [Green Friendly](#)
- [Health & Fitness](#)
- [Historical Perspectives](#)
- [Hot Issues](#)
- [Human Behavior](#)
- [Humor](#)
- [Insects](#)
- [Internet](#)
- [Latest News](#)
- [Latest Trend](#)
- [Medical Breakthrough](#)
- [Money Talk](#)
- [Music](#)
- [Nanotechnology](#)
- [New Discoveries](#)
- [New Inventions](#)
- [New Viewpoints](#)
- [People Making a Difference](#)
- [Photo Perspectives](#)
- [Plant Life](#)
- [Poetry](#)
- [Record Breaker](#)
- [Recycling](#)
- [Report](#)
- [Robots](#)
- [Science & Technology News](#)
- [Sealife](#)
- [Solar Power](#)
- [Space](#)
- [Spirituality](#)

[The Coming Food Printer Revolution](#)

[Tapping into the Secret Language of Plants](#)

[Why Industries Collapse](#)

[Introducing the Perpetual Self-Updating Book](#)

[Four Fundamental Myths Derailing Academic Change](#)

[The Great Information Wall of China](#)

[Eight False Promises of the Internet](#)

### RECENT POSTS

[FCC to provide low-income homes with cheap broadband internet service and computers](#)

[Digital divide shrinks among mobile internet use](#)

[NASA creates groundbreaking super black light absorbing material](#)

[Launched Today: The story of 'Broke' puts the real crony capitalism on notice](#)

[The world's first non-alcoholic whiskey](#)

[AstroCantus - iPhone app creates music from stars and galaxies](#)

[Working from home ups risk of exhaustion](#)

[America's middle class families eat more fast food than poor families: study](#)

[Colorado company claims DNA testing could help choose your kids' sport](#)

[First of its kind national program will put 3D printers into high school students' hands](#)

[Airdrop design pulls water from air to irrigate deserts](#)

[Oregon puts iPad voting on the map](#)

[Can "Opt-Out" organ donation law be the solution?](#)

[Mind control: pushing the limits](#)

[Arrests of illegal immigrants at Arizona border fell 40%](#)

But what about the original inspiration for the research – do dolphins and other echolocating animals use TWIPS?

“Key ingredients of a TWIPS system appear in separate species but they have never been found all together in a single species,” said Leighton. “There is currently no evidence that dolphins use TWIPS processing, although no-one has yet taken recordings of the signals from animals hunting with bubble nets in the wild. How they successfully detect prey in bubbly water remains a mystery that we are working to solve. I have to pay credit to the team – students Daniel Finfer and Gim-Hwa Chua of ISVR, and Paul White (ISVR) and Justin Dix of SOES. Our applications for funding this work were repeatedly turned down, and it took real grit and determination to keep going for the five years it took us to get this far.”

more via [sciencedaily.com](http://sciencedaily.com)

 [Share This](#)



You must be [logged in](#) to post a comment.

<a href="#">Sports</a>
<a href="#">sports</a>
<a href="#">Star Trek</a>
<a href="#">Star Wars</a>
<a href="#">top 10</a>
<a href="#">travel</a>
<a href="#">Twitter</a>
<a href="#">Uncategorized</a>
<a href="#">Upcoming Events</a>
<a href="#">Video Games</a>
<a href="#">Weapons</a>
<a href="#">Weather</a>
<a href="#">wii</a>
<a href="#">Wind Power</a>

[Your Ad Here](#)