

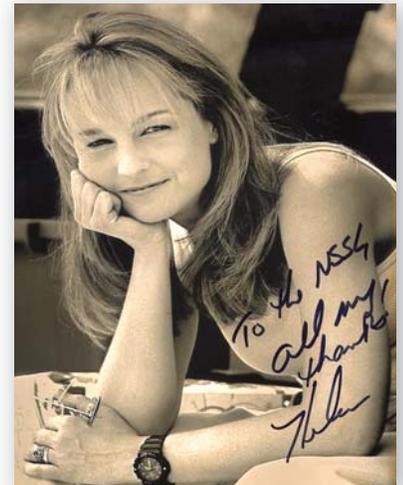
# TWISTER

Much about tornadoes remains a mystery, especially the details about what is happening inside the tornado at the surface of the Earth. Researchers have been trying to collect weather data on the ground from inside a tornado since the early 1970's. Their mission has always been to discover new clues that will help increase tornado warning times and reduce false alarms, saving lives.

Dr. Al Bedard and Carl Ramzy from the NOAA Environmental Research Laboratory (former parent organization of the NOAA National Severe Storms Laboratory) created the first device designed to take weather measurements in the actual path of the tornado. The TOTO, named after Dorothy's little dog from the movie "The Wizard of Oz," was a 55 gallon barrel outfitted with anemometers, pressure sensors, and humidity sensors, along with devices to record the

data. In theory, a team would roll TOTO out of the back of the pickup in the path of a tornado, switch on the instruments, and get out of the way. Several groups, including those led by Dr. Howie Bluestein from the University of Oklahoma and later by NSSL, tried to deploy TOTO over the years, but never scored a direct hit. The closest TOTO ever came to success was in 1984 when it was sideswiped and knocked over by the edge of a weak tornado. TOTO was retired in 1987.

TOTO inspired screenwriters Michael Crichton and Ann Marie Martin to develop a story around a similar device that became the 1996 movie "Twister." "Dorothy" was a barrel designed to release hundreds of sensors into the center of a tornado, sending the data back to the weather researchers on the ground, played by actors Bill Paxton and Helen Hunt. To add to the drama, a competing team of storm chasers attempted to deploy a similar device named "D.O.T. 3." The screenwriters, along with producers Steven Spielberg and Kathleen Kennedy, consulted with Kevin Kelleher, Harold Brooks, and other NSSL scientists to make sure their script was realistic. The Universal Studios production with digitally-created tornadoes became a blockbuster, making \$500 million at the box office. The movie also inspired the special effects attraction "Twister...Ride it Out" with simulated tornadoes and severe weather located at Universal Studios theme park in Orlando, Fla.



"Dorothy" and "D.O.T.3" which appeared in the movie "Twister" are on loan from Warner Brothers.

Today we have instruments that are smaller and easier to deploy in large numbers to sample tornadoes. Tornado PODs are 1-meter tall towers of instruments with a flat base to measure wind velocity and direction at the ground level. StickNets are 2-meter tall tripods designed to collect complete wind data sets and atmospheric variables. Setting these instruments in a large array increases the chances one will be hit by a tornado. On June 5, 2009 in southeast Wyoming, a tornado did pass over one of the StickNet arrays collecting valuable data during the Verification of the Origins of Rotation in Tornadoes Experiment (VORTEX2) 2009-2010.

From TOTO to PODs and StickNets, instruments designed to measure the weather in and near a tornado at the ground have the potential to add valuable pieces to the tornado puzzle, hopefully saving more lives.



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