



STOP THE
STORM





Storm chaser **REED TIMMER** studies tornadoes from the inside out.

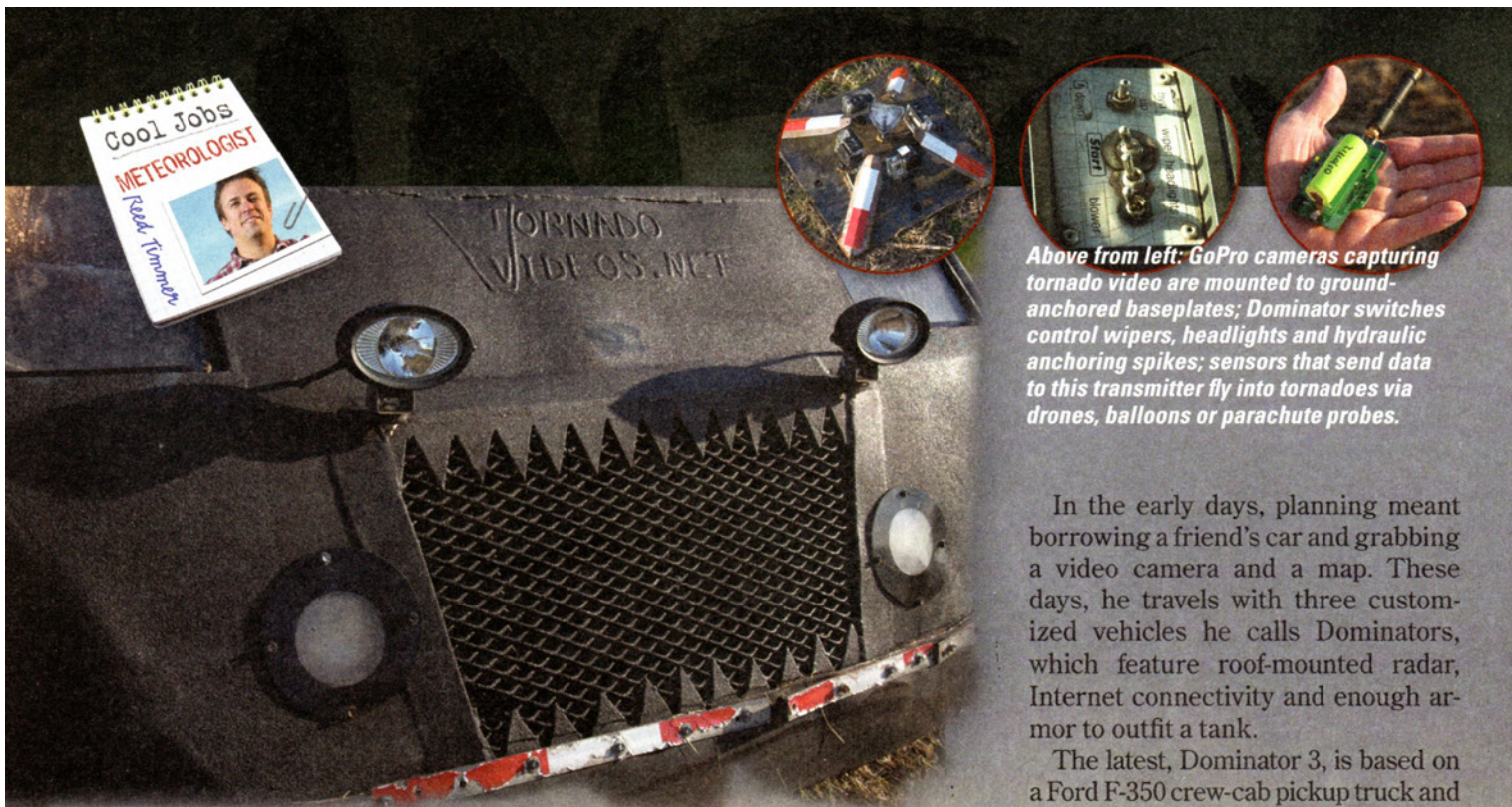
By Mark Ray

The raging storm was spawning tornado after tornado.

It was May 3, 1999, and Reed Timmer and three other college meteorology students watched beside Interstate 44 in Oklahoma while most of the tornadoes vanished as quickly as they formed. But then one didn't — and it headed straight for them!

Realizing they couldn't escape in their Jeep, the guys ran to a nearby highway overpass and took shelter (only later learning that's not a good place to hide). The EF5 tornado barreled toward them, snapping trees like matchsticks, peeling asphalt from roadways and sucking everything in sight into its whipping, whirling core. Then, just before it reached the overpass, the tornado took a quick left turn, leaving the storm chasers shaken but safe.

Others weren't so lucky. The tornado killed 36 people, injured nearly 600 and caused \$1 billion in damage. During 85 terrifying minutes, it carved a 38-mile path of destruction. **CONTINUED>>>**



Above from left: GoPro cameras capturing tornado video are mounted to ground-anchored baseplates; Dominator switches control wipers, headlights and hydraulic anchoring spikes; sensors that send data to this transmitter fly into tornadoes via drones, balloons or parachute probes.

Watching and Warning

No one can prevent disasters like that, but storm chasers like Timmer can help keep people safe by sending eyewitness reports to the National Weather Service, which issues tornado watches and warnings. And when those storm chasers are professional meteorologists, as Timmer is, they can gather critical data to better understand how tornadoes work.

“The biggest mystery about tornadoes is how big the wind speeds get right near the surface of the Earth,” he says — and that’s something fixed radar stations can’t measure.

Timmer first got interested in severe weather growing up in Grand Rapids, Michigan, where he became an Eagle Scout in 1995. (Yes, he earned the Weather merit badge.)

His storm chasing began when he attended the University of Oklahoma, which boasts one of the top meteorology programs in the country. Timmer has earned two degrees in meteorol-

ogy there and is close to finishing an advanced doctoral degree.

Team Dominator

For Timmer, a chase begins long before the skies turn dark. Throughout the spring and summer, he looks for just the right conditions for supercell thunderstorms to form: high dew point, strong winds and the collision of cool, dry air from the west with warm, moist air from the south. When conditions look right, he’ll plan a road trip that could take him hundreds of miles from home.

In the early days, planning meant borrowing a friend’s car and grabbing a video camera and a map. These days, he travels with three customized vehicles he calls Dominators, which feature roof-mounted radar, Internet connectivity and enough armor to outfit a tank.

The latest, Dominator 3, is based on a Ford F-350 crew-cab pickup truck and has 16-gauge steel armor strengthened with a polyethylene Kevlar composite, Lexan windows and gullwing doors that repel hail. When storms approach, special hydraulic systems lower the vehicle (to prevent wind from getting underneath) and drive spikes 8 inches into the ground to secure it. The vehicle is a 9,500-pound, 385-horsepower embodiment of the Scout motto, “Be Prepared.”

Even with the high-tech Dominators, Timmer and his team must still do a lot of driving around to find tornadoes, and they often come up empty (what storm chasers call a “blue-sky bust”). But Timmer has been lucky enough to



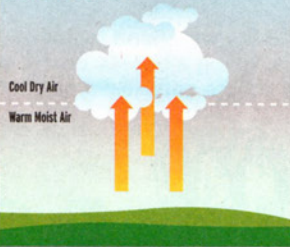
SEE TIMMER AND THE DOMINATOR IN ACTION CHASING DOWN A TWISTER AT boyslife.org/timmer

Birth of a Storm

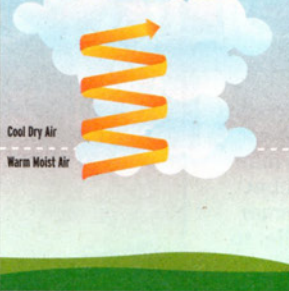
ALWAYS LEAVE STORM CHASING TO THE EXPERTS. FOLLOW HAZARDOUS WEATHER SAFETY RULES: boyslife.org/links/nws

boyslife.org

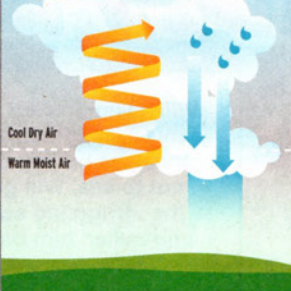
When cool dry air is layered over warm moist air and the sun warms the ground or a cold front arrives, the warm air is forced up into the layer of cool air.



The warm air rises quickly, causing instability and a large rotating mass called a **mesocyclone**.



As rain falls, pushing cool air downward, the mass turns into a **supercell**.



Falling cool moist air cycles back up and the air condenses at a lower height to create a rotating wall cloud, from which a **tornado** forms.



get close to about 800 tornadoes. He's even been inside a few, capturing high-definition video and measuring wind speeds. (*Don't try this at home!*)

Storm Chaser Extraordinaire

From 2008 to 2011, Timmer and Team Dominator appeared on Discovery Channel's *Storm Chasers*, which followed teams of storm chasers across Tornado Alley, a region that includes Texas, Oklahoma, Kansas and Nebraska. After that show ended, Timmer created the on-demand web series "Tornado Chasers." He also works as a storm chaser for KFOR, a TV station in Oklahoma City, and leads storm-chasing tours.

But he is perhaps most proud of his contributions to tornado science. For example, some of his up-close video is

helping researchers better understand suction vortices, which are mini-tornadoes that appear in and around bigger tornadoes and might do the most damage to buildings.

Besides chasing tornadoes, Timmer has pursued other storms, including 15 hurricanes and Superstorm Sandy in 2012. During that storm, he encountered 40 inches of snow and nonstop lightning in the mountains of West Virginia, and he was glad for the winter-camping skills he'd learned in Scouting.

"I was never afraid because I knew that if we made a bad three-point turn on top of that mountain and slid into a ditch, we could just build a snow cave with a breathing hole, and we'd be totally fine," Timmer says. "I was kind of hoping the vehicle would get stuck so I'd have an excuse." ✦



JOB FACTS:

METEOROLOGIST

WHAT TO EXPECT: A meteorologist is a scientist who studies weather (what's happening now or will happen soon) and climate (what happens over a longer period of time). Don't expect to spend all your time chasing storms or giving forecasts on TV. More time is spent analyzing data using computers.

JOB OUTLOOK: The field is very competitive, but the number of jobs is growing, especially in private industry.

EDUCATION AND EXPERIENCE: You need a bachelor's degree in atmospheric science or meteorology, which requires serious math and science skills. Take all the math classes you can in high school, as well as classes in physics, chemistry and computer science. If you want to teach or do research, you need a master's degree or a Ph.D.

SALARY: Meteorologists on TV start off making about \$25,000 a year. The average salary for all meteorologists — including broadcasting, government, industry and higher education — is about \$90,000. Meteorologists in private industry have the highest average salaries.

FOR MORE INFO: boyslife.org/links/ousom

Meteorologist (Cool Careers) by Geoffrey M. Horn. Gareth Stevens Publishing, \$10.50 softcover. bookzone.boyslife.org

Everything Weather by Elizabeth Carney. National Geographic Society, \$12.95 softcover. bookzone.boyslife.org

EF-SCALE RATING	WIND SPEED (MPH)	POSSIBLE DAMAGE
EF0	65-85	LIGHT: Some damage to chimneys and signs, broken tree branches, shallow-rooted trees pushed over
EF1	86-110	MODERATE: Damage to roof surfaces, mobile homes overturned, moving cars pushed off roads
EF2	111-135	CONSIDERABLE: Roofs torn off frame houses, mobile homes destroyed, large trees snapped/uprooted
EF3	136-165	SEVERE: Roofs and some walls torn off solidly constructed houses, trains overturned, most trees in forests uprooted
EF4	166-200	DEVASTATING: Houses leveled, structures with weak foundations blown distances, cars thrown
EF5	200+	INCREDIBLE: Strong frame houses lifted off foundations and carried distances to disintegrate, trees debarked, steel-reinforced concrete structures badly damaged, car-sized missiles thrown more than 100 yards