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THE WEST'S BOOGYMAN

Hypersonic weapons have been tried in Ukraine and saber-rattled near Taiwan. Here are the technical challenges for defense and how the U.S. plans to meet them. **PAGE 24**



Hurricane Milton

Hurricanes often spawn tornadoes, but Milton's were particularly numerous and strong for a Florida storm. Images like this one from GOES-16, showing lightning flashing over Southwest Florida, helped forecasters issue tornado warnings with maximum lead time as the storm moved east. "The flash rates were very high with the tornado-bearing cells and thus confidence was increased," forecasters from the National Weather Service's Melbourne office explained by email. Forty-two tornado warnings were issued over six hours, a record for the office. With the advent of fine-resolution lightning mappers in space, starting with GOES-16, "forecasters no longer need an algorithm to tell them the flash rate has jumped; they can visually see it in the data," said Chris Schultz, a lightning scientist at NASA's Marshall Space Flight Center in Alabama.

THE IMAGE: Milton was imaged by GOES-16 on Oct. 9 at 1:30 p.m. Lightning detections from the satellite's Geostationary Lightning Mapper were overlaid on an infrared image from its Advanced Baseline Imager.

THE CONTRACTORS: Lockheed Martin built GOES-16 in Littleton, Colorado, and the Geostationary Lightning Mapper in Palo Alto, California. L3Harris made the Advanced Baseline Imager in Fort Wayne, Indiana.

THE TECHNOLOGY: ABI's internal mirrors scan Earth to produce images in multiple modes, including one that images specific weather features as often as every 30 seconds, as was done with Milton. The Geostationary Lightning Mapper is a near-infrared camera that generates hundreds of images a second.

* The EF3 tornado that struck the Spanish Lakes Country Club Village was unusually strong for a Florida hurricane, according to National Weather Service forecasters.

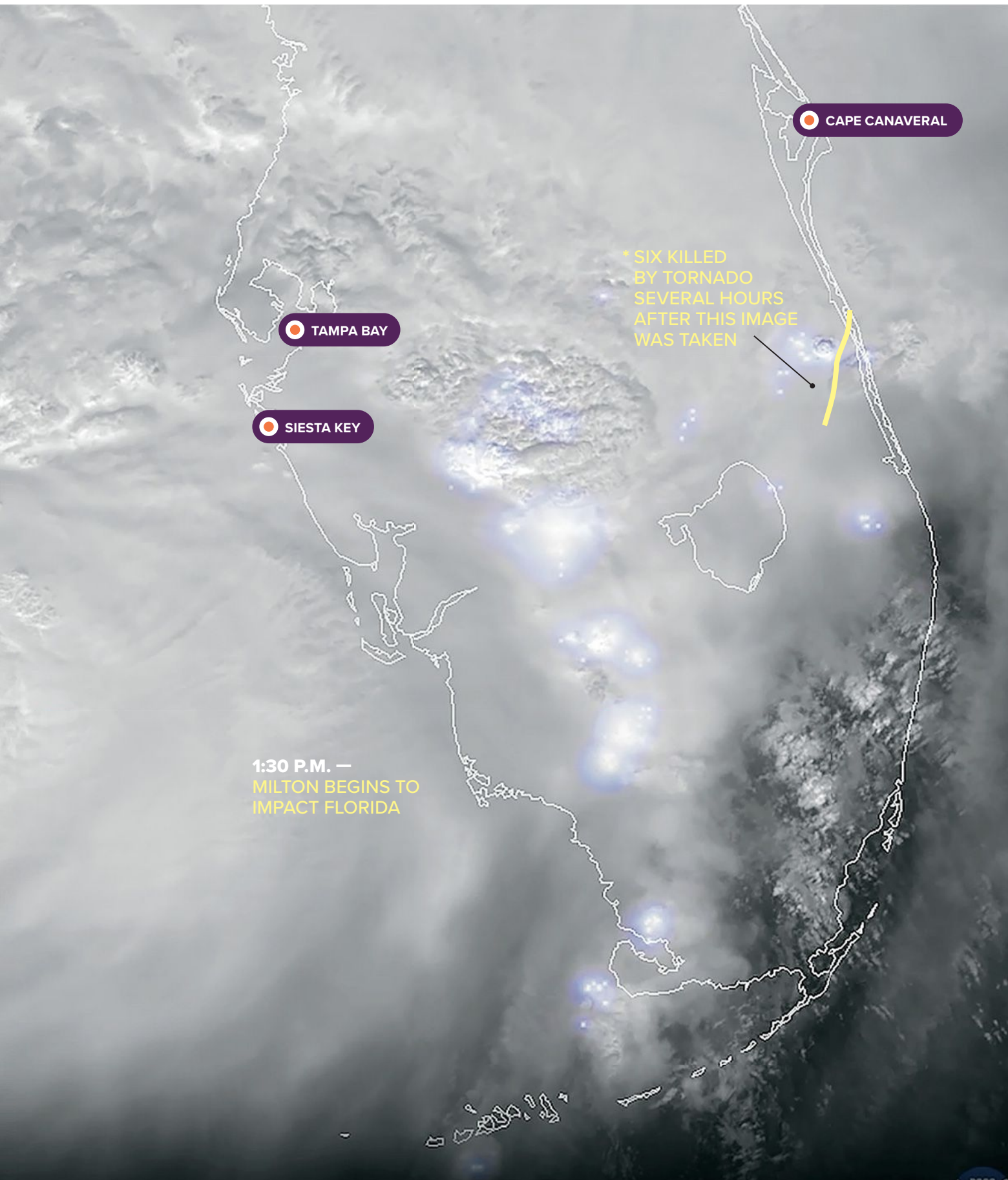
CREDIT: Image from the Cooperative Institute for Research in the Atmosphere at Colorado State University and NOAA.

GRAPHIC by THOR (thor-studio.com)

REPORTING by Ben Iannotta



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THE TIME
SERIES**



CAPE CANAVERAL

TAMPA BAY

SIESTA KEY

* SIX KILLED BY TORNADO SEVERAL HOURS AFTER THIS IMAGE WAS TAKEN

1:30 P.M. — MILTON BEGINS TO IMPACT FLORIDA