



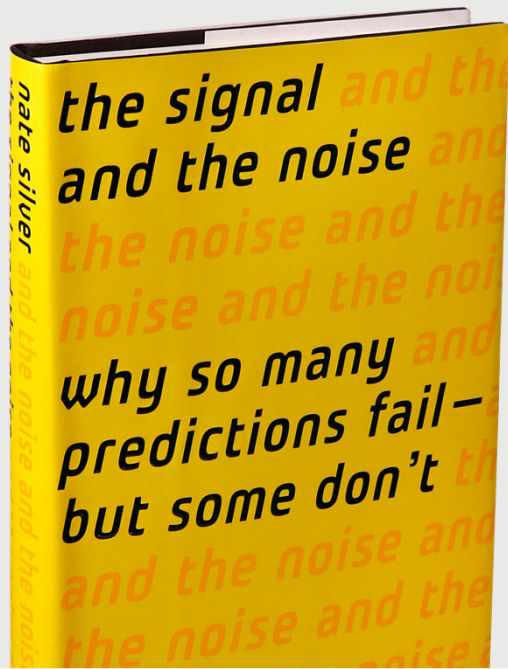
# Commercial Weather Sector Innovation: Its Evolution in the Great American Weather Enterprise

November 2020

Presented by Dr. Joel N. Myers

Founder, CEO & Chairman, AccuWeather

# Weather forecasts: the “success story”



- Most forecast types demonstrate little or no skill and have made little or no progress in accuracy over the past several decades
- Weather forecasting is the “success story” with more progress than any other forecasting field



- + Eastern New York – Cloudy Sunday, probably rain to the south and rain or snow in the north portions. Monday clearing; not much change in temperature.
- + New Jersey and eastern Pennsylvania – Cloudy with rain Sunday. Monday fair; not much change in temperature.
- + Western New York – Partly cloudy Sunday; probably preceded by rain; Monday fair; moderate temperatures.
- + Southern New England – Cloudy and warmer Sunday, probably followed by rain or snow by Sunday night. Monday clearing.





Background

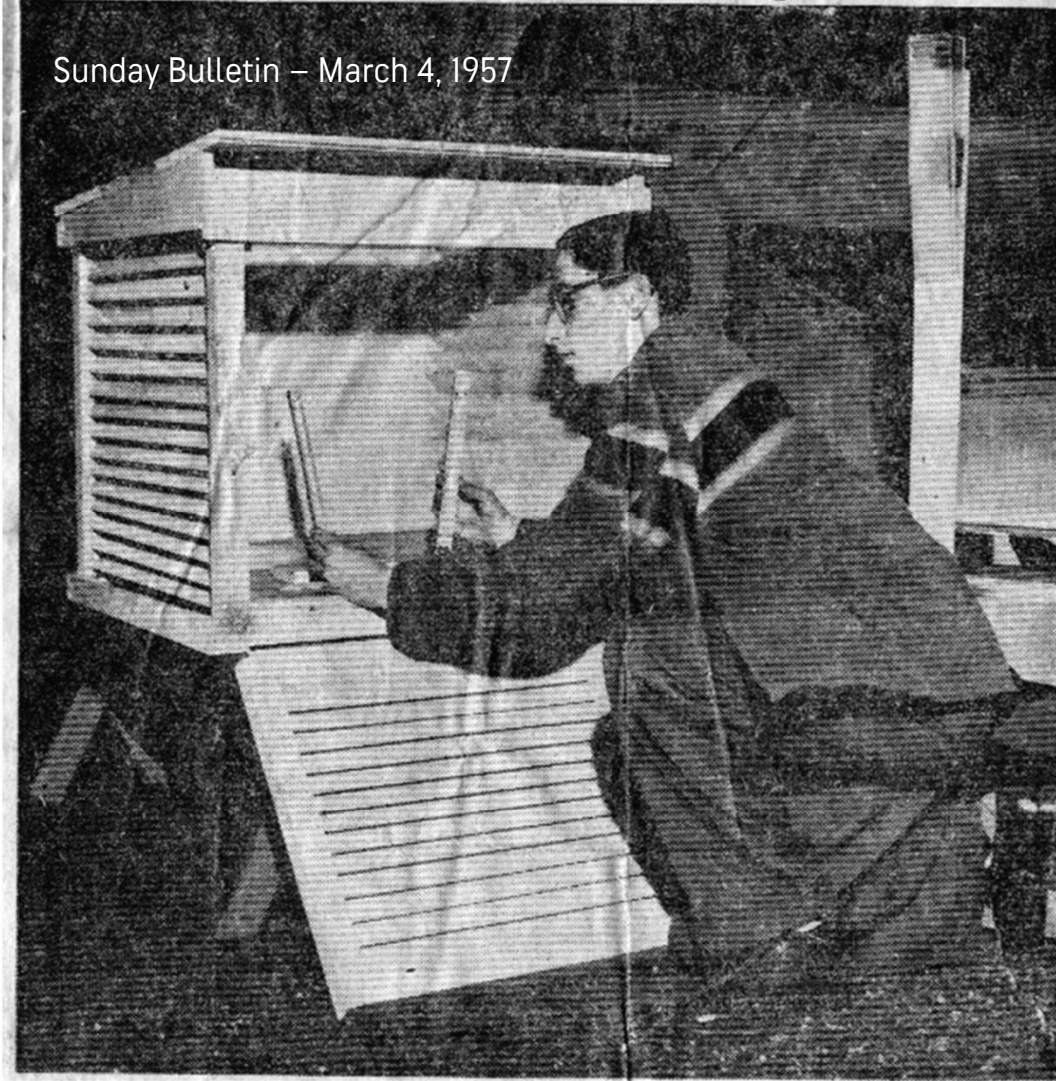
# My background



- Decided to be a weather forecaster at 7
- U.S. Weather Bureau observer for 10 years, intern in 1960
- Taught at Penn State for 21 years, did public television for 18 years
- Elected by Penn State alumni for 11 consecutive 3-year terms as a Trustee
- Started AccuWeather in graduate school in 1962

*Sunday Bulletin March 24, 1957*  
**East Oak Lane Teenager Forecasts Weather—And It's Official, Too**

Sunday Bulletin – March 4, 1957



In his homemade weather-observation station atop the family garage, 17-year-old Joel's bedroom office is the East Oak Lane City's first official weather station.





PSU Daily Collegian





Weather World on PBS





Innovation & Challenges

# My talk today

01 —

The great  
American weather  
enterprise

02 —

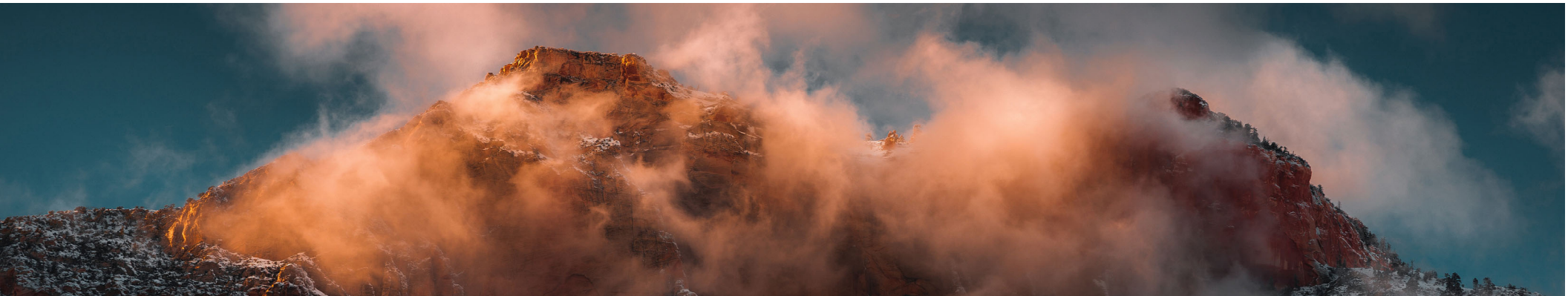
The three sectors

03 —

Commercial  
weather industry  
innovations

04 —

A uniquely  
successful  
partnership





# American weather enterprise



Government



Academia



Commercial





The great American weather enterprise

# The great American weather enterprise

- Distinct roles and value provided by each sector
  - Educational sector – Education, training and research
  - Public sector – Data, models, warnings, forecasts, infrastructure
  - Commercial sector – Innovation driven by competition, customized products and services
- Together we provide more innovations and value than in any other country











# Leadership

Professional and government boards and committees that AccuWeather people serve or have served on since the late 1970s

## **NWS/NOAA**

- NWS Partner's Meetings – Multiple
- NOAA Environmental Information Services Working Group
- NWS WeatherReady Nation Focus Group – Multiple
- NOAA NCEP Strategic Planning Meetings
- UCA NCEP Review
- NOAA NCEP Production Model Review

## **AMS**

- Membership Committee
- Forecast Improvement Group
- Broadcast Meteorology Board
- Weather Forecast and Analysis Committee
- Committee

- Network of Networks Committee
- Commission on the Weather, Water & Climate Enterprise
- Board of Broadcast Meteorology
- Aviation, Range and Aerospace Short Course on Forensic Meteorology
- Nominating Committee
- Board on Enterprise Economic Development
- Renewable Energy Subcommittee
- Climate Change, Improving Communications Committee
- Awards Nominating Committee
- Broadcast Seal of Approval Committee
- Summer Community Meeting Organizing Committee
- Public Private Forum Organizing Committee
- Energy Committee

- Ad-Hoc Committee on Radio Frequency Allocation
- Board on Enterprise Communication
- Ad-Hoc Committee on Uncertainty in Forecasts
- International Affairs Committee
- Emergency Management Committee
- Board on Global Strategies
- Board for Early Career Professionals
- Early Career Leadership Committee
- Board on Enterprise Strategic Topics
- Meetings Oversight Committee
- Board on Enterprise Economic Development
- Ad-Hoc Committee on Winter Storm Naming
- Board on Enterprise Strategic Topics
- Meetings Oversight Committee

- Board on Enterprise Economic Development
- Ad-Hoc Committee on Winter Storm Naming

## **NWA**

- Radio & Television Committee
- Radar Meteorology Committee
- Membership & Marketing Committee
- Annual Meeting Committee

The great American weather enterprise

# The commercial weather industry

- Would not be possible without the public and educational sectors
- Innovation and competition results in more information, better tailored for end-users
- Has grown dramatically as an AMS component

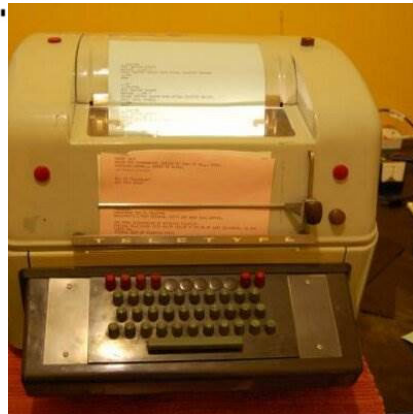
Studying a Map on the Old Alden Wet Fax



```

78      74|.....67.77..74..73'73 |
71      ..' 72 | ..''78'|      74 ||| /
4      ... 68 '0'' 71\72` . ''|70\` . .
      ... 63 72 .72 72 76 | 73|72\ `
.....\./      ..0' 70 78|  \ \ |...|
77 73      .' 73 73 78 74'| `74 /
      \ 63 70      72      |75 | /
75 /' . 69...'      73      77\ / /
..'' '71' 79 70 75 81      /' ''
/ 68 68 72      78 77''|
76 .''''77'75'78''''79'79'75'79''''|
.'''64 70 78 77 76 79 77 \ \
...'' 73 75 75 78 78 81 79 / |
.70..77... 75 75 77 79 .'' /
|''/ 73..... 75 77 73 78.'''
'.71 71      75. 73 .78''
2 `74      75 75. 74 .
71 \.72 76 73 75 `79.'''
73 \      77'
73. 74      ''
.....

```



## Weather databases

- NWS and FAA Data Circuits
- WeatherScan International
- WSI, TWC, AccuWeather and others



1. STORM ALERT  
 2. STORM WARNING  
 3. UPDATED WARNING

**SNOW WARNING SERVICE**  
**JOEL N. MYERS**  
 METEOROLOGICAL CONSULTANT  
 1143 OLD BOALSBURG RD. STATE COLLEGE, PA. 16801

**OUR NUMBERS**  
 814-237-0309  
 814-238-3223

*Sample*

**STORM ALERT**  
 Time ..... Date ..... 19.....  
 Received by: .....

**A. Dependability of Alert:**  
 4. Excellent  
 5. Good  
 6. Fair

**B. Prepare For:**  
 7. Snow ..... inches  
 8. Sleet  
 9. Freezing Rain (Glaze)  
 10. Blowing Snow  
 11. Drifting Snow  
 12. Flowing Operation  
 13. Major Snowstorm

**C. Storm Will Begin:**  
 14. At ..... a.m.  
 15. At ..... p.m.  
 16. Today  
 17. Tomorrow  
 18. Next Day

**D. Additional Comments**  
 .....

**E. Alert Expires If not Renewed By** .....

**STORM WARNING DETAILS**  
 Time 1:15 AM Date 2-11-1980  
 Received by: .....

**F. Dependability of Warnings:**  
 19. Excellent  
 20. Good

**G. Type of Storm**  
 21. Steady Snow  
 22. Intermittent Snow  
 23. Snow Flurries  
 24. Sleet  
 25. Freezing Rain (Glaze)  
 26. Snow Turning to Sleet  
 27. Snow Turning to Rain  
 28. Rain Turning to Snow

**H. Storm Will Begin:**  
 29. At 2 ..... a.m.  
 30. At ..... p.m.  
 31. Today  
 32. Tomorrow  
 33. Timing Excellent  
 34. Timing Good

**I. Storm Will End:**

**J. Storm Duration:**  
 42. Less than 6 hours  
 43. 6 to 12 hours  
 44. 12 to 18 hours  
 45. More than 18 hours

**K. Snow Accumulations:**  
 46. ..... in. by 4 p.m. today  
 47. 2-5 in. by 6 a.m. tom.  
 48. 6-7 in. by noon tomorrow  
 49. Storm Total ..... inches  
 50. Two inches by 5 A.M. ....  
 51. Reliability Excellent  
 52. Reliability Good

**L. Storm Probability Potentials:**  
 53. 90% chance of 2 in. or more  
 54. 80% chance of 4 in. or more  
 55. 60% chance of 6 in. or more  
 56. Maximum possible accum. 12"

**M. Heavy Snow Will Begin:**  
 57. At 4 ..... a.m.  
 58. At ..... p.m.  
 59. Today  
 60. Tomorrow

**N. Heavy Snow Will End:**  
 61. At 8 ..... a.m.  
 62. At ..... p.m.  
 63. Today  
 64. Tomorrow

**O. Snow Type:**  
 65. Very Dry (Below 23°)  
 66. Dry (23° to 28°)  
 67. Wet (29° to 32°)  
 68. Very Wet (33° to 35°)  
 69. Wet becoming Dry  
 70. Dry becoming Wet

**P. Drifting:**  
 71. None  
 72. Light  
 73. Moderate  
 74. Severe  
 75. Drifts to 1 1/2 feet

**Q. Operations:**  
 76. AWAIT FURTHER NOTICE  
 77. Begin Salting at .....

**R. Rain Will Begin:**  
 80. At ..... a.m.  
 81. At ..... p.m.  
 82. Today

**T. Effect of Rain:**  
 88. Turn Snow to Slush  
 89. Wash Snow Away Slowly  
 90. Wash Snow Away Quickly

**U. Temperature:**  
 91. Noon .....  
 92. 4 p.m. ....  
 93. 8 p.m. 31  
 94. Midnight 27  
 95. 6 a.m. 22  
 96. High Tom. 26  
 97. Low Tom. Nite 14  
 98. High Next Day 32

**V. Wind:**

	Dirac.	Ave. Spd.	High Gusts
<input type="checkbox"/> 99. Today			
<input checked="" type="checkbox"/> 100. Tonight	NE	10	20
<input checked="" type="checkbox"/> 101. Tomorrow	NW	15	25

**W. Expected Road Conditions:**  
 102. Main Roads Snow Covered  
 103. Main Roads Icy  
 104. Main Roads Icy in Spots  
 105. Main Roads Wet  
 106. Secondary Roads Snow Cvd.  
 107. Secondary Roads Icy  
 108. Secondary Roads Icy in Spots  
 109. Secondary Roads Wet

**X. Special Problems:**  
 110. Slush Will Freeze  
 111. Icing at Intersections  
 112. Icing on Bridges

**Y. Weather Following Storm:**  
 113. Hard Freeze  
 114. Rising Temperature  
 115. Rapid Thaw  
 116. Thaw Tonight  
 117. Thaw Tomorrow  
 118. Thaw on Thursday  
 119. Drifting to Continue  
 120. Next Storm Due on Wednesday

NEXT WARNING DUE AT 2 PM

**SPECIAL REMARKS**

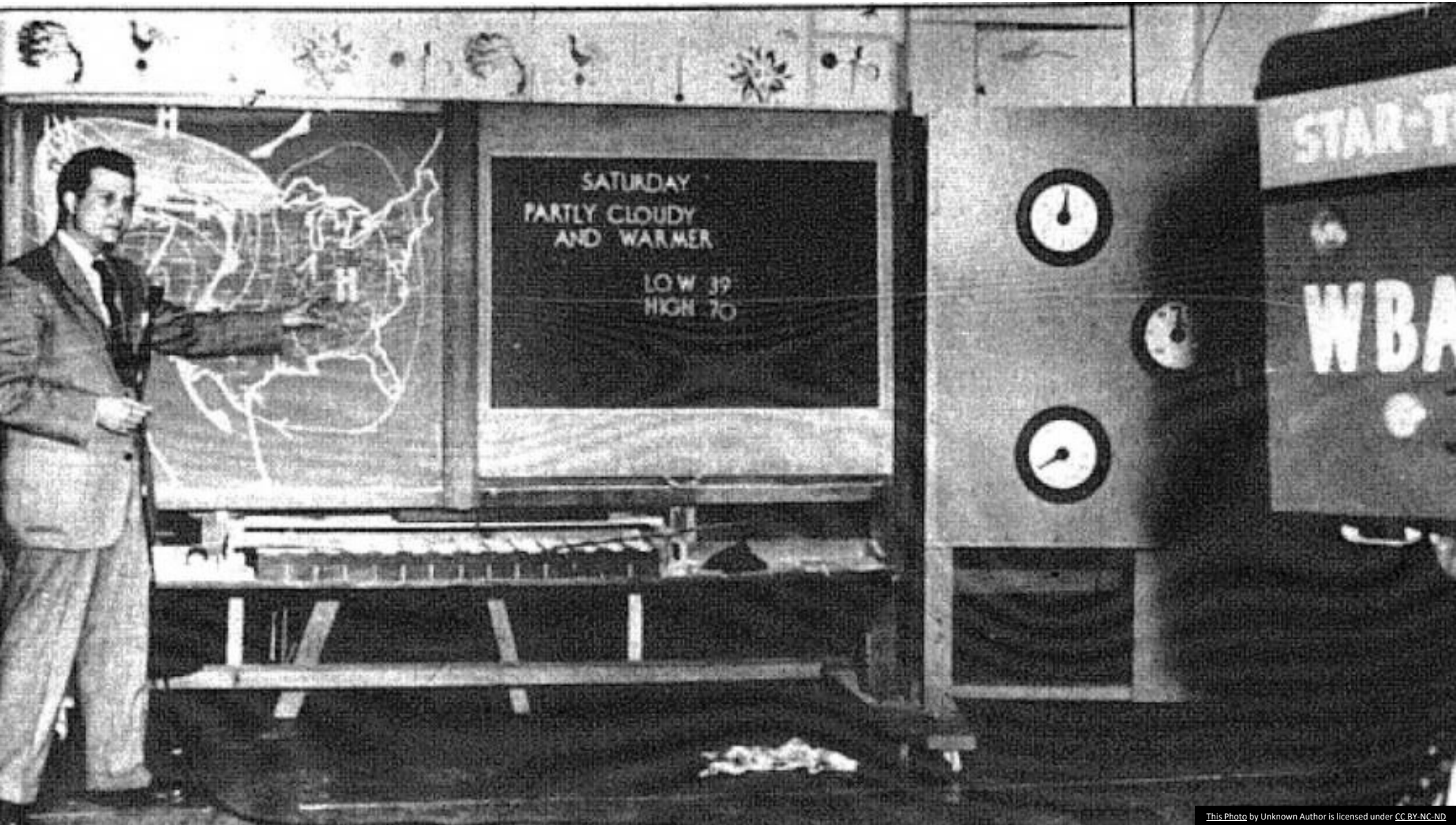
# Early innovations

- Trucking forecasts
- Railroad forecasts
- Snow and ice warnings for highway departments and schools
- Ski resort forecasts
- Utility forecasts



## Middle Innovations: the 1970s, 80s, and early 90s

- Ship routing by OceanRoutes (WeatherNews)
- Road Weather Information Systems by SSI (now DTN)
- Satellite-delivered weather database by DTN (Meteorlogix)
- Global agricultural and energy forecasts for Reuters by AccuWeather (1983)
- Weather by pager by Widespread Weather (acquired by AccuWeather)
- Digital forecast database
- 5, 7, 10 and eventually 15-day forecasts by AccuWeather
- Automated natural text generation development with 5, 7, 10 and 15 day forecasts



This Photo by Unknown Author is licensed under CC BY-NC-ND





The screenshot displays the AccuWeather website interface. At the top, the AccuWeather logo is prominent. Below it, there's a section for 'Weather' with a small portrait of a man. The main content area is divided into several sections:
 

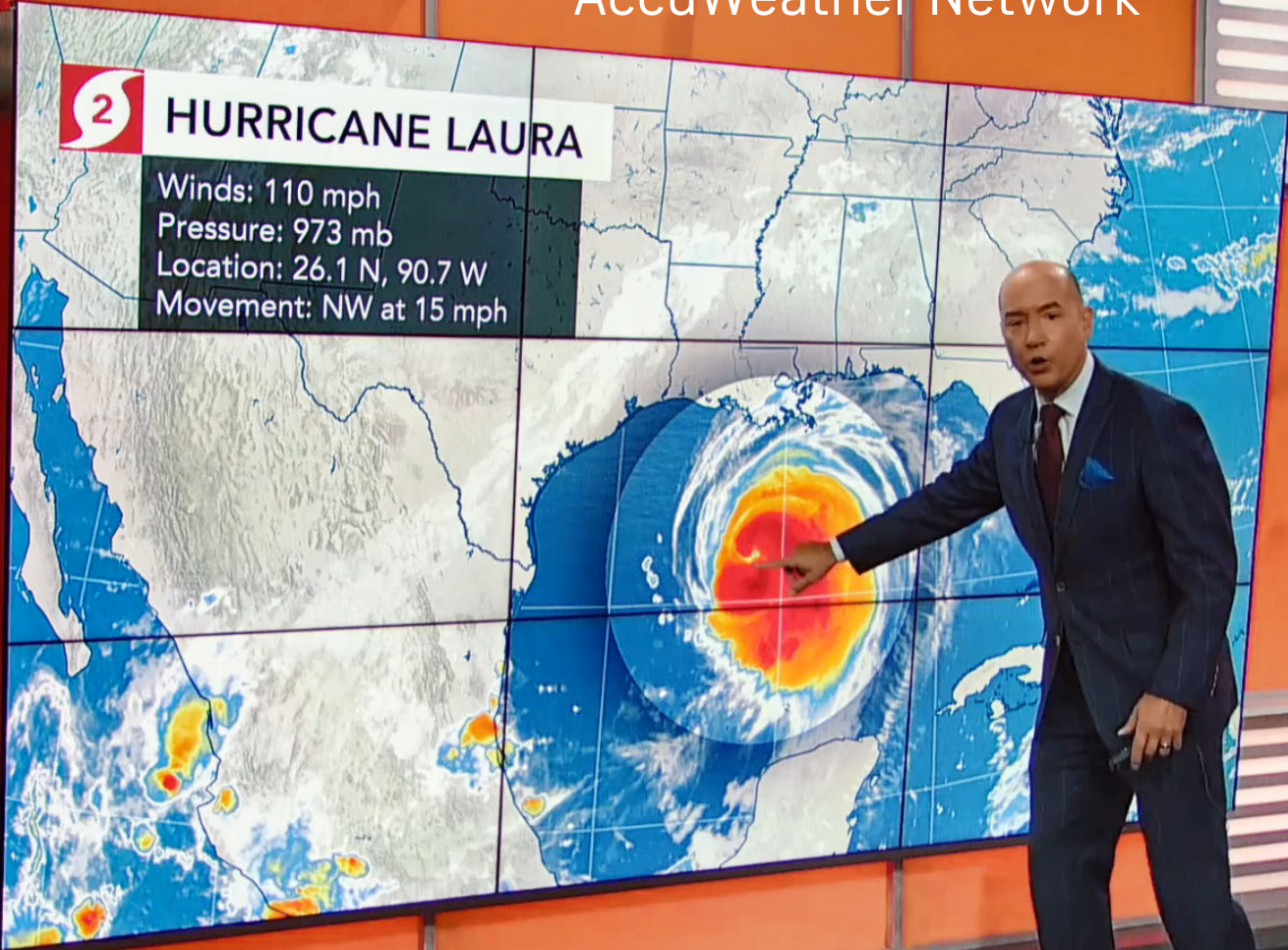
- PORTLAND'S 5-DAY FORECAST:** Shows icons for Monday through Friday, indicating varying cloud and precipitation levels.
- METRO CLIMATE DATA:** A bar chart showing temperature and precipitation trends over a period.
- NORTHWEST CONDITIONS:** A detailed weather report for the Northwest region, including temperature, wind, and humidity.
- ASTRONOMICAL DATA:** Information about the sun and moon, including their positions and phases.
- SKY WATCH:** A section for tracking celestial events.
- THE WEATHER CHANNEL:** A section for weather-related news and updates.
- Regional Forecasts:** Multiple sections for different areas like Oregon Coast, Willamette Oregon, Eastern Oregon, and Central Oregon, each with its own forecast.



# Traditional media

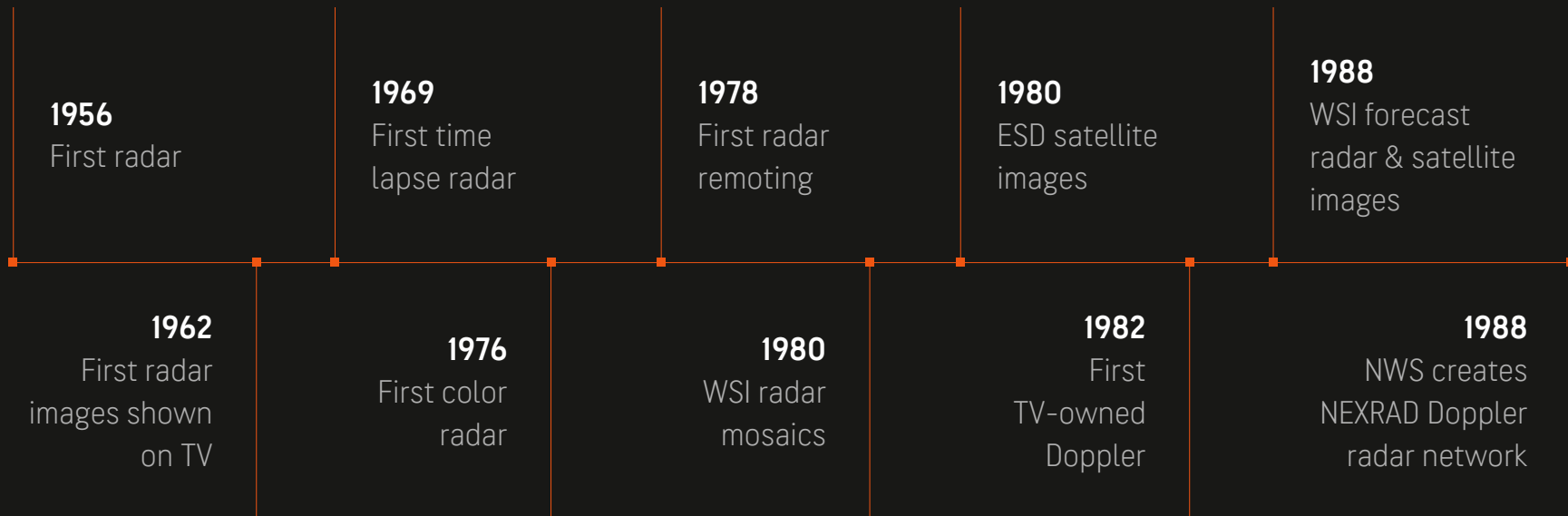
- Radio – From postcards to commercial meteorologists
- Newspapers – AP map, USA Today and electronically transmitted weather pages by AccuWeather and WeatherData
- Cable – The Weather Channel, AccuWeather Network Channel
- Pictured: Early Newspaper Weather Page (L), AccuWeather's Elliot Abrams in Radio Booth (R)

AccuWeather Network





# TV radar & satellite imagery





Cullman, AL



# Tornado Warning

Source: U.S. National Weather Service

End  
**7:00 PM**  
Saturday, June 27

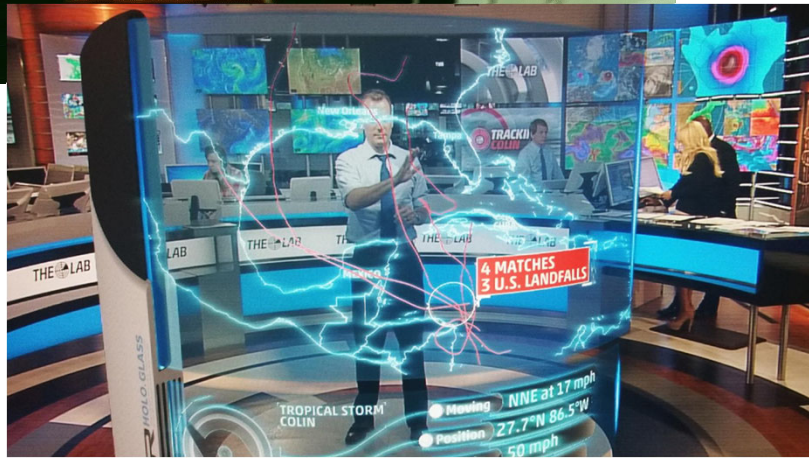
Start  
**6:31 PM**  
Saturday, June 27

The National Weather Service in Huntsville  
Alabama has issued a

\*Tornado warning for...  
Southwestern Marshall County in northeastern  
Alabama.... Northern Cullman County in north  
central Alabama...

\*Until 700 PM CDT  
\*At 630 PM CDT, a confirmed tornado was located  
near Nesmith, or 10 miles west of Cullman, moving  
east at 20mph. Multiple public reports confirmed  
tornado near country road 490





## TV weather revolution

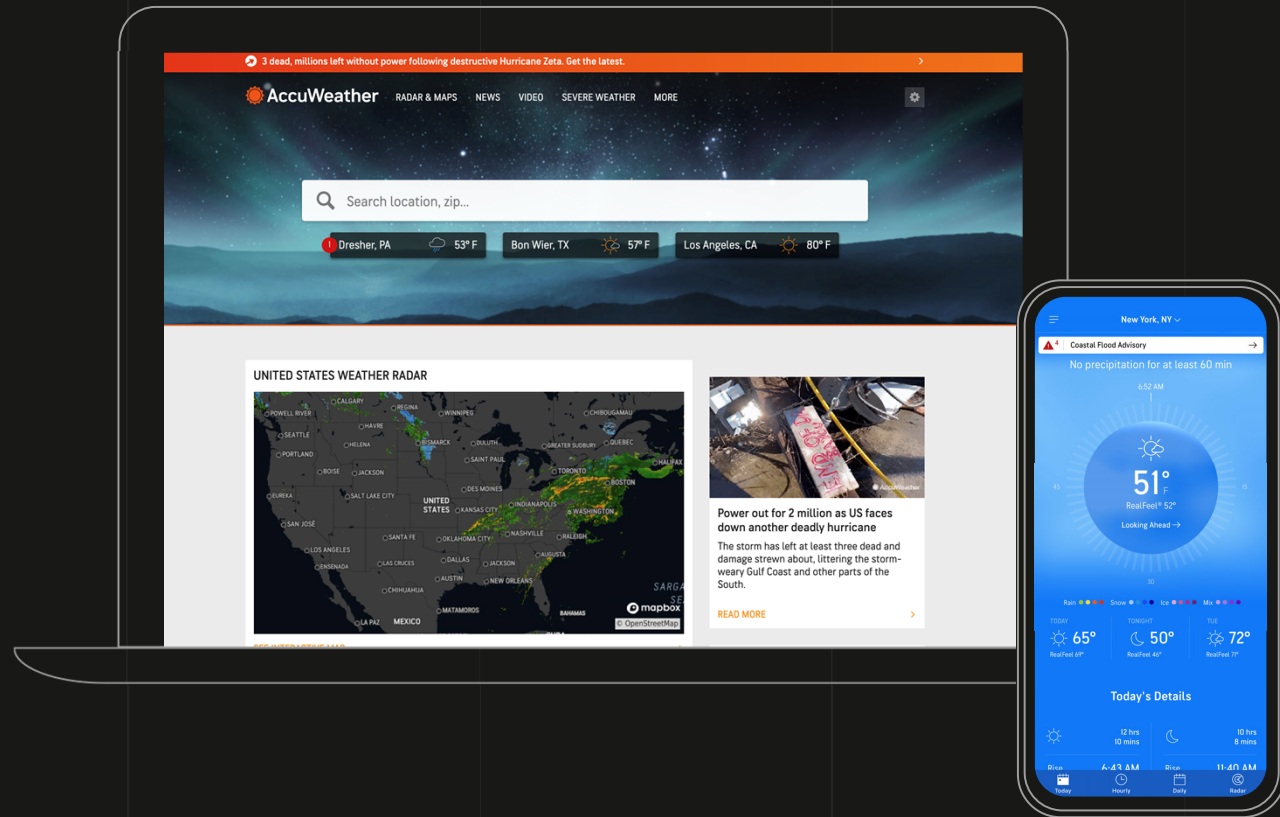
- Weather Presentation Systems – ColorGraphics, EarthWatch, Kavouras, WSI, WeatherGraphix, ESD, AccuWeather, Barrons, WeatherBug
- Radar Systems and Displays
- Local Data Networks and Mesonets
- Served to educate the public
- Pictured: Terry Kelly, ColorGraphics founder, Doing TV Broadcast With First ColorGraphics System (Top), Immersive 3D Weather on The Weather Channel (Bottom)





# Digital media

- Traditional internet:  
AccuWeather.com,  
Weather.com started  
in early 1990s
- Mobile internet and apps  
began in the late 1990s
- Today we reach billions  
all around the world



# Exclusive AccuWeather RealFeel® Temperature Guide

The exclusive and patented AccuWeather RealFeel Temperature has been the gold standard to advise people of how weather conditions really feel. Now, this new AccuWeather RealFeel Guide empowers you to take full advantage of the index, detailing its meaning and impact to enhance your safety and comfort as well as being prepared for extreme conditions.

133 to 140°<sub>F</sub>  
(56 to 60°<sub>C</sub>)

EXTRAORDINARILY  
DANGEROUS HEAT

- Extraordinary caution advised. Very high danger of dehydration, heat stroke, heat exhaustion and heat cramps.
- Stay indoors in air conditioning or, if air conditioning is not available, in a well-ventilated area away from direct sun exposure.
- Outdoor activity is dangerous and potentially life-threatening.
- Loose fitting, light colored cotton clothing is recommended.

125 to 132°<sub>F</sub>  
(51 to 55°<sub>F</sub>)

EXTREMELY  
DANGEROUS HEAT

- Extreme caution advised. High danger of dehydration, heat stroke, heat exhaustion, and heat cramps.
- Stay indoors in air conditioning or, if air conditioning is not available, in a well-ventilated area away from direct sun exposure.
- Most outdoor activity is dangerous and potentially life-threatening.
- Loose fitting, light colored cotton clothing is recommended.

116 to 124°<sub>F</sub>  
(46 to 50°<sub>C</sub>)

VERY DANGEROUS HEAT

- Significant caution advised. Danger of dehydration, heat stroke, heat exhaustion, and heat cramps.
- Stay indoors in air conditioning or, if air conditioning is not available, in a well-ventilated area away from direct sun exposure.
- Most outdoor activity is dangerous, especially for older adults, infants, and those with sensitive medical conditions.
- Loose fitting, light colored cotton clothing is recommended.

108 to 115°<sub>F</sub>  
(42 to 45°<sub>C</sub>)

DANGEROUS HEAT

- Caution advised. Danger of dehydration, heat stroke, heat exhaustion, and heat cramps if outside for extended periods, and especially while doing strenuous activities.
- Stay indoors in air conditioning or, if air conditioning is not available, in a well-ventilated area away from direct sun exposure.
- Minimize outdoor activity, especially for older adults, infants, and those with sensitive medical conditions.
- Loose fitting, light colored cotton clothing is recommended.

101 to 107°<sub>F</sub>  
(38 to 41°<sub>C</sub>)

VERY HOT

- Caution advised.
- Danger of dehydration, heat stroke, heat exhaustion, and heat cramps if outside for extended periods, and especially while doing strenuous activities.
- Older adults, infants, and those with sensitive medical conditions, should minimize outdoor activity and stay indoors in an air-conditioned location or, if air conditioning is not available, in a well-ventilated area away from direct sun exposure.
- Loose fitting, light colored cotton clothing is recommended.

90 to 100°<sub>F</sub>  
(32 to 37°<sub>F</sub>)

HOT

- Caution advised.
- Possible danger of dehydration, heat stroke, heat exhaustion, and heat cramps while doing strenuous activities.
- Older adults, infants, and those with sensitive medical conditions, should minimize outdoor activity and stay indoors in an air-conditioned location, if possible.
- Loose fitting, light colored cotton clothing is recommended.



# Exclusive<sup>®</sup> AccuWeather RealFeel<sup>®</sup> Temperature Guide

The exclusive and patented AccuWeather RealFeel Temperature has been the gold standard to advise people of how weather conditions really feel. Now, this new AccuWeather RealFeel Guide empowers you to take full advantage of the index, detailing its meaning and impact to enhance your safety and comfort as well as being prepared for extreme conditions.

82 to 89°F  
(27 to 31°C)

VERY WARM

- Older adults, infants, and those with sensitive medical conditions, should minimize outdoor activity, especially in the sunshine.
- Loose fitting, light colored cotton clothing is recommended.

63 to 81°F  
(17 to 26°C)

PLEASANT

- Most consider this temperature range ideal.

53 to 62°F  
(11 to 16°C)

COOL

- Light jacket or sweater may be appropriate.

40 to 52°F  
(4 to 10°C)

CHILLY

- Jacket or sweater is recommended.

25 to 39°F  
(-3 to 3°C)

COLD

- Coats and hats are appropriate, consider gloves and a scarf.

10 to 24°F  
(-12 to -4°C)

VERY COLD

- Caution advised.
- Older adults, infants, and those with sensitive medical conditions, should be well dressed to protect from hypothermia and frostbite. Coat, hat, gloves and a scarf are appropriate.

# Exclusive<sup>®</sup> AccuWeather RealFeel<sup>®</sup> Temperature Guide

The exclusive and patented AccuWeather RealFeel Temperature has been the gold standard to advise people of how weather conditions really feel. Now, this new AccuWeather RealFeel Guide empowers you to take full advantage of the index, detailing its meaning and impact to enhance your safety and comfort as well as being prepared for extreme conditions.

-10 to 9°F  
(-23 to -13°C)

QUITE COLD

- Caution advised.
- Frostbite to exposed skin within 15 minutes. Hypothermia likely without protective clothing.
- Limited outdoor activity recommended. Wear winter clothing that covers as much of the body as possible.

-24 to -11°F  
(-31 to -24°C)

BITTERLY COLD

- Caution advised.
- Frostbite to exposed skin within 8 minutes. Hypothermia likely without protective clothing.
- Outdoor activity can be dangerous and should be avoided or limited. Wear thick winter clothing that covers as much of the body as possible.

-43 to -25°F  
(-41 to -32°C)

DANGEROUS COLD

- Significant caution advised.
- Frostbite to exposed skin within 2 minutes. Hypothermia likely without proper protective clothing.
- Outdoor activity can be dangerous and should be avoided or limited. Wear thick winter clothing that covers nearly all exposed skin.

-69 to -44°F  
(-56 to -42°C)

VERY DANGEROUS COLD

- Great caution advised.
- Frostbite to exposed skin within 1 minute. Hypothermia likely without proper protective clothing.
- Outdoor activity is very dangerous and potentially life-threatening. Stay in a heated area or, if outdoor activity is necessary, it should be limited to a few minutes and only if all skin surfaces are covered.

-90 to -70°F  
(-67 to -57°C)

EXTREMELY  
DANGEROUS COLD

- Extreme caution advised.
- Frostbite to exposed skin within 30 seconds. Hypothermia likely without proper protective clothing.
- Outdoor activity is extremely dangerous and life-threatening. Stay in a heated area or, if outdoor activity is absolutely necessary, it should be limited to a few minutes and only if all skin surfaces are covered.

-120 to -91°F  
(-84 to -68°C)

EXTRAORDINARILY  
DANGEROUS COLD

- Extraordinary caution advised.
- Frostbite to exposed skin within 20 seconds. Hypothermia likely without proper protective clothing over all skin surfaces.
- Outdoor activity is extraordinarily dangerous and life-threatening. Stay in a heated area.



# LAURA IMPACTS

Through Saturday

- Catastrophic storm surge
- Isolated tornadoes
- Coastal flooding
- Flash flooding
- Structural damage
- Dangerous waves and rip currents
- AccuWeather ReallImpact™ Scale: 4





# Select commercial sector weather innovations

The following are selected highlights about the thousands of commercial sector weather innovations that have benefited the public.

## Select commercial sector weather innovations

1. Color satellite images
2. Satellite loops
3. GOES satellite mosaics
4. World satellite mosaics
5. 3D satellite images
6. Satellite overlays
7. Future satellite images
8. Color radar images
9. Radar loops
10. Radar mosaics
11. Radar overlays
12. Merging of radar and surface observations
13. Flashing radar levels
14. Storm tracker radar
15. Street level radar
16. Future radar images
17. Storm path graphics
18. AP algorithms
19. "Cleaned" radars
20. Wx map animations
21. Front-drawing tools
22. Layered weather maps
23. Timeline animations
24. Automatic data plotting
25. Nowcast™
26. UV Index
27. School-Day Weather
28. RealFeel® Temperature<sup>†</sup>
29. Feels Like
30. Automated warning scrolls
31. Warning maps and icons
32. 5-day forecasts
33. 7-day forecasts
34. 10-day and longer forecasts
35. Hour-by-Hour™ Forecasts
36. Minute-by-Minute Forecasts
37. Comfort Index
38. Picnic Index
39. Probability of Precip
40. FlyThru<sup>□</sup>
41. Smoothed satellite loops
42. Lightning data
43. Color cycling animations
44. Tornado warnings
45. Klystron radar technology
46. GPS weather tracking
47. HD weather
48. SelectWarn<sup>□</sup>
49. Natural text generation
50. Digital forecast database

## Select commercial sector weather innovations

51. AI forecast systems
52. Transportation services
53. Ski resort services
54. Summer resort services
55. Utility forecasts
56. Direct data feed into utility load models
57. Intelligent vehicle data services
58. Ship routing forecasts
59. Combined radar and satellite images
60. Combined radar and lightning images
61. Weather presentation systems
62. Hurricane Window of Movement™
63. ModelBlender™
64. Metro Radar
65. Local weather channels
66. Jet stream animations
67. Local weather nets
68. Time lapse animations
69. NEXRAD Level 2 graphics
70. Hurricane animations
71. CityScape™
72. Automatic updating
73. A.D.O.N.I.S.™
74. MicroCast™
75. Predictor™
76. PrecisionCast™
77. MetroCast™
78. ULTRA LocalCast™
79. Automatic severe weather plotting
80. WeatherPager™
81. Bilingual warnings
82. MagicTRAK™
83. Event-driven storm tracking
84. PDA weather
85. Zip code forecasts
86. Sunburn index
87. Weather cams
88. Weather trucks
89. MetroVision™
90. Weather watchers
91. GIS weather
92. 3D lightning data
93. Global imagery
94. 3D radar
95. Weather Tubes
96. Satellite data delivery
97. Health indices
98. School Cancellation index
99. LocalCast
100. Seasonal Outlooks





# Innovation & Challenges

## Challenges for the future

- Public and Educational Sectors – Funding
- Commercial Sector – Competition and Profitability
- All Sectors – Big data, innovations, communication, actionability









## March 2020 Tennessee Tornadoes

- AccuWeather User: App “Literally saved our lives”
- Delivers official government warnings faster than any other source when seconds count

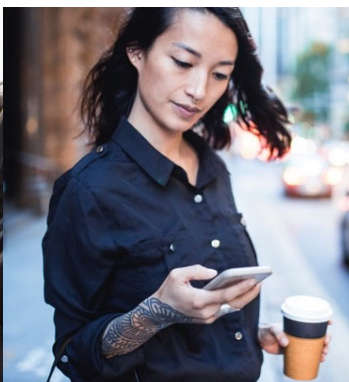
## Innovation & Challenges



Desktop



Radio



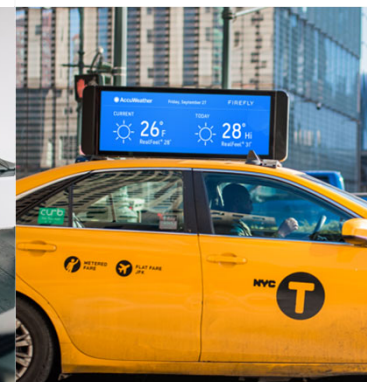
App



Network



Publishing



DOOH



Mobile Web



Newspapers



For Business



Podcasts



Partnerships



API

# Thank you



[accuweather.com](https://www.accuweather.com)

[The Signal and The Noise](#)

[Fair Weather: Effective  
Partnership in Weather & Climate  
Services](#)

[In Celebration: American  
Weather Enterprise Collaborating  
to Protect Lives and Property](#)