Weather

Module 1

Ground Lesson 4

Lesson Objective

- The student shall gain knowledge of weather and how to make a weather Go / No Go decision
  - Weather sources
  - Weather briefings
  - Weather parameters and weather products
  - Weather requirements for specific drone make/model
  - Making a weather Go / No Go decision

Why does weather matter?

- Can affect the drone's performance
  - Shorten flight time
  - Overcome flight stabilization
  - Can cause ice build up on flight surfaces (props)
- Can affect the mission
  - Reduced visibility with the sensor
- Can affect safety
  - Crewed aircraft may not see the anti-collision lighting of the drone

Can you think of any other reasons?

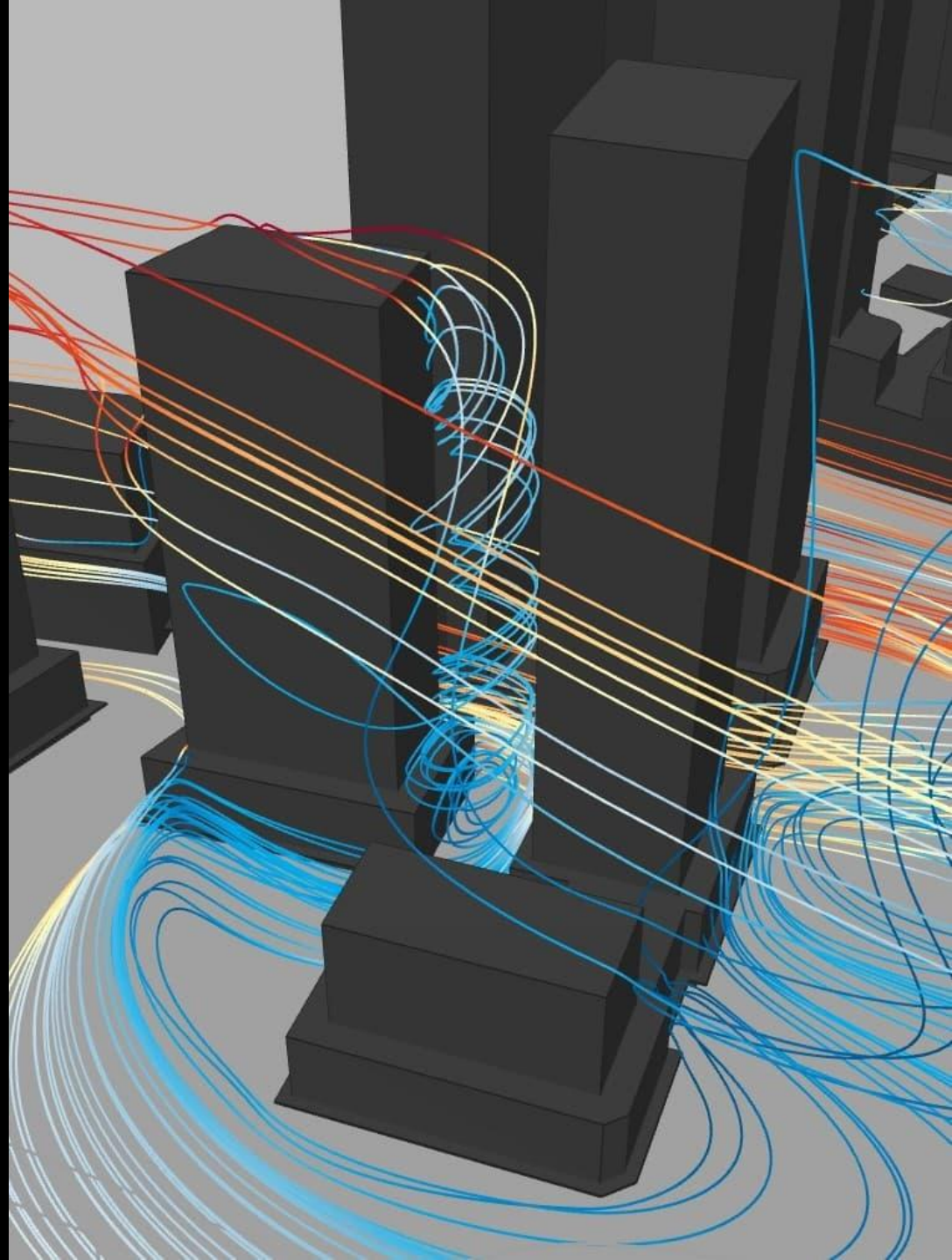
Weather Effects

Wind

- The movement of air from areas of high pressure to low pressure

Wind at low altitudes in an urban environment can vary significantly from point to point:

- Wind can be blocked or redirected by objects and structures
- Wind speed and direction can change in elevation



Flight Visibility

- The horizontal distance, from the drone or control station location, to an object that can be seen and identified.

Clouds & Ceilings

- Lowest layer of clouds that block the view above them, or the vertical visibility into an obscuration like fog or haze

Precipitation

- Water released from clouds in the form of rain, freezing rain, sleet, snow, or hail.

Adverse Weather

- Refers to dangerous or harmful weather, for example thunderstorms, blizzards, or extreme temperatures/winds.

Icing

- Icing can occur when:
  - The aircraft is flying in visible moisture (rain, fog)
  - The temperature is near or below 32 deg F

- Ice on the drone's propellers can cause adverse effects:
  - Increased weight
  - Less lift due to disrupted air over the propellers
  - If severe enough, loss of control

Weather Briefing

§ 91.103 Preflight action.

Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight.

FAA Weather Briefing

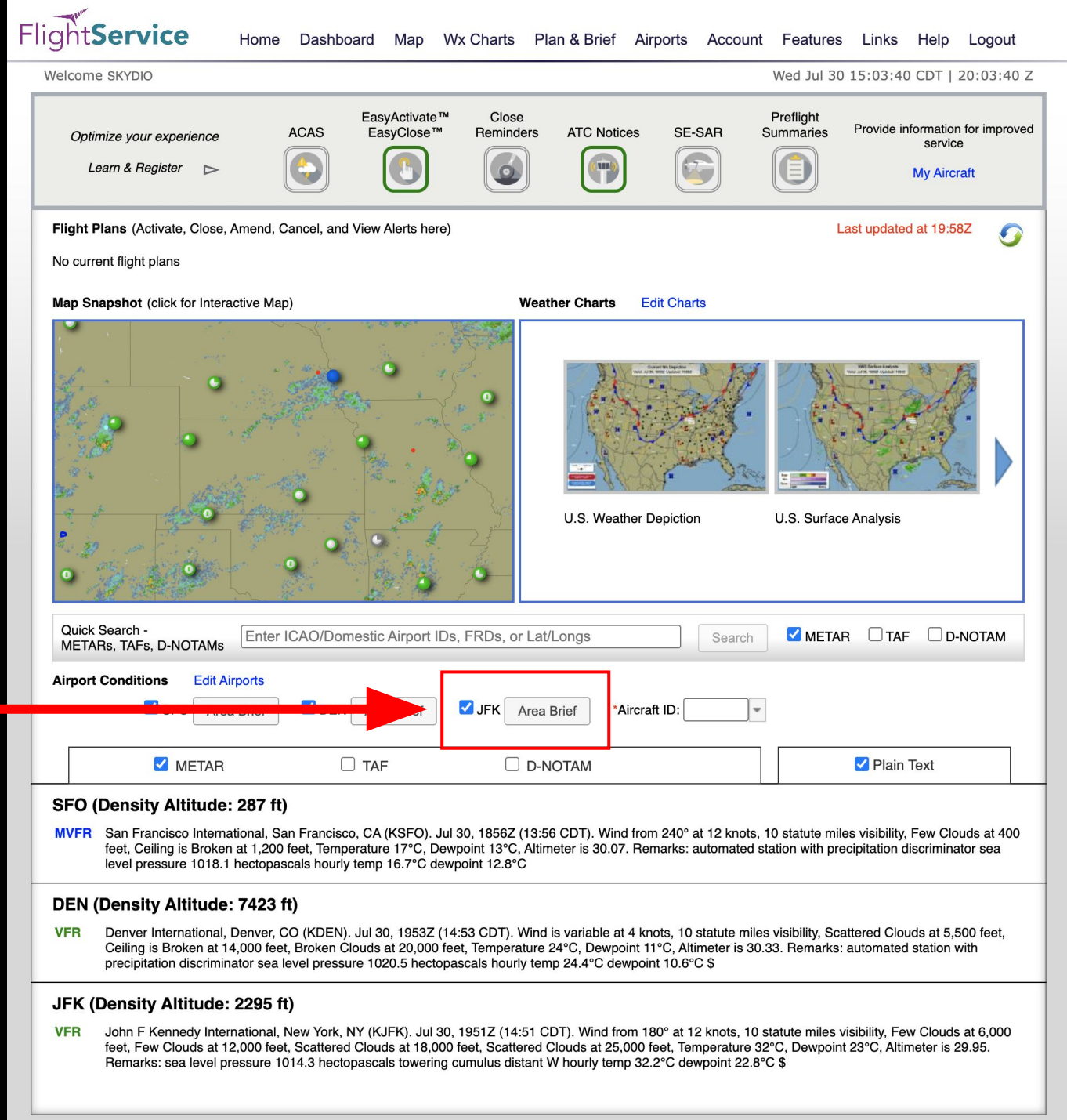
- Is tailored to aviation safety
- Comes from a reputable source
- Is recorded in the event of FAA inquiry

Two recommended weather sources

- www.1800wxbrief.com
  - Can acquire an area brief before first flight of day
- www.aviationweather.gov
  - Can be used for continuous monitoring of weather conditions

1800wxbrief

- FAA contracted flight service
- Can be customized to have NYC local airports for quick reference
- One click option to get an Area Briefing
- Is tracked for recordkeeping purposes

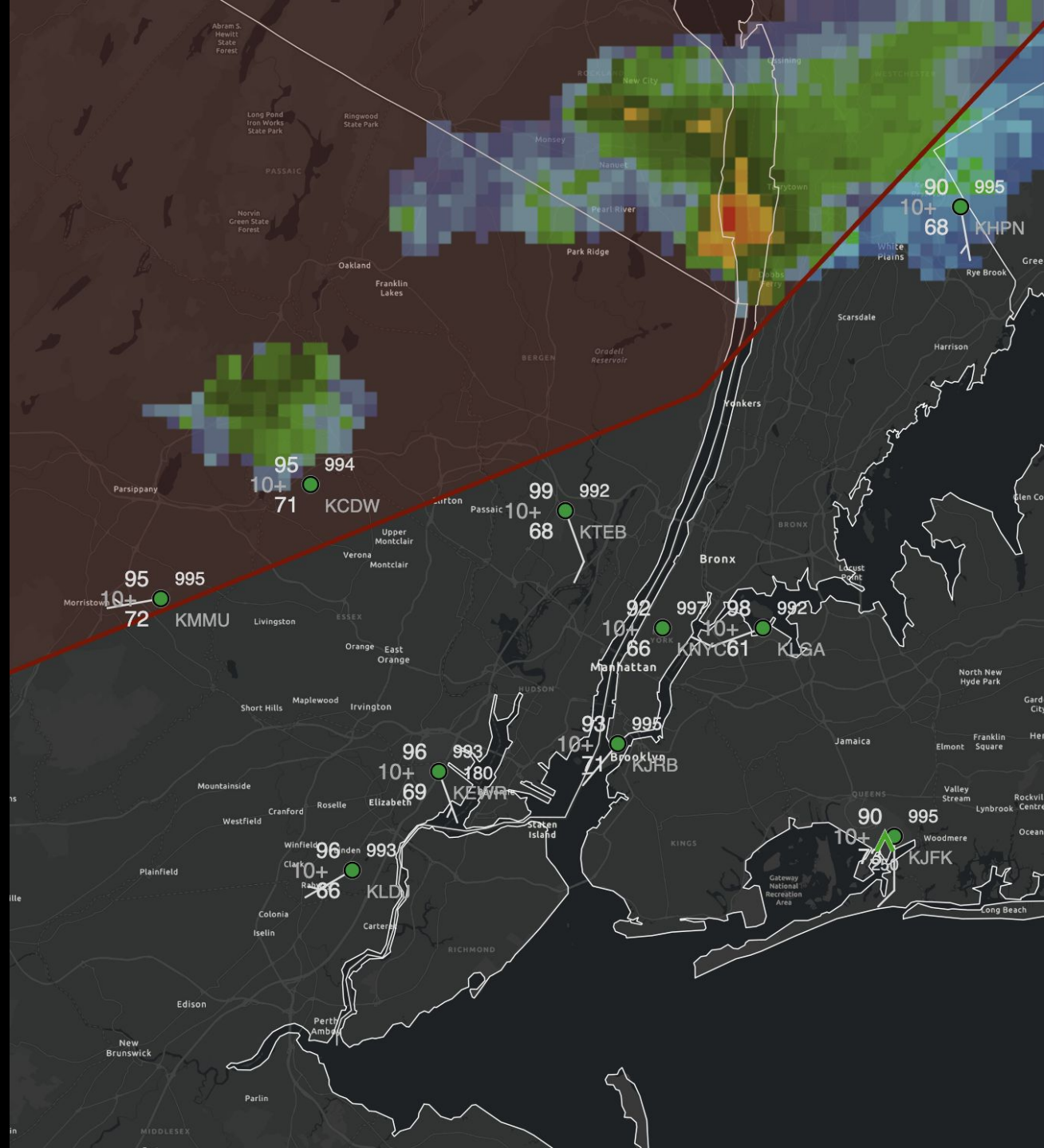


FAA Area Brief

- Includes
  - NOTAMS and TFRs
  - Current weather (METAR for local airports)
  - Forecasts
    - Flight category
    - Ceiling
    - Visibility
    - Precipitation
    - Adverse weather
    - Winds
  - UAS Operating Areas

Aviation Weather

- NYC Graphical Map
- Can be bookmarked for easy access



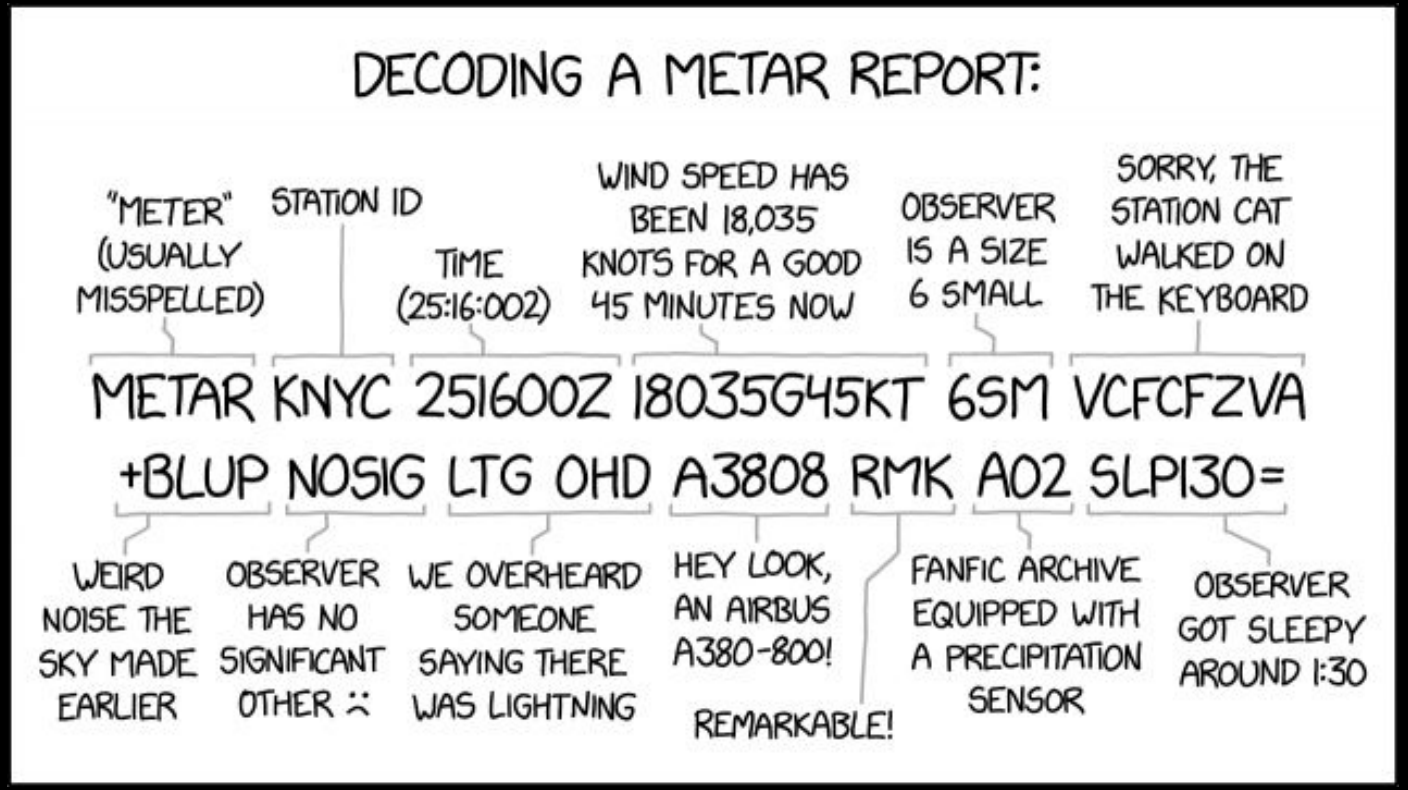
Aviationweather.gov

- Includes
  - Map of current and forecast conditions at airports
    - Wind
    - Visibility
    - Cloud Ceiling
  - Live radar
  - Weather alerts

Weather Sources & Products

What types of weather products are in these briefings?

How do you determine what the weather conditions are?



METAR

A METAR (French acronym translating to “aviation routine weather report”) is an observation of current surface weather reported in a standard international format.

METARs are issued on a regularly scheduled basis unless significant weather changes have occurred. They only report data at the specific station, although the data can be used as reference from further away.

```
KJFK 311451Z 00000KT 10SM BKN025 BKN050 BKN170 BKN250 31/24 A2997 RMK AO2 SLP149 T03110239 50002
```

METAR Decoded

METAR for:	KJFK (New York/JF Kennedy Intl, NY, US)
Text:	KJFK 311451Z 00000KT 10SM BKN025 BKN050 BKN170 BKN250 31/24 A2997 RMK AO2 SLP149 T03110239 50002
Conditions at:	1451 UTC 31 Thu Jul 2025
Temperature:	31.1°C (88°F)
Dewpoint:	23.9°C (75°F) (RH = 66%)
Pressure (altimeter):	29.97 inHg (1015 hPa) (sea level pressure 1014.9 hPa)
Pres. tendency (3 hrs):	0.2 hPa
Winds:	calm
Visibility:	10+ mi (16+ km)
Clouds:	broken clouds at 2,500 ft, broken clouds at 5,000 ft, broken clouds at 17,000 ft, broken clouds at 25,000 ft
Ceiling:	2,500 ft
Flight Category:	MVFR

TAF

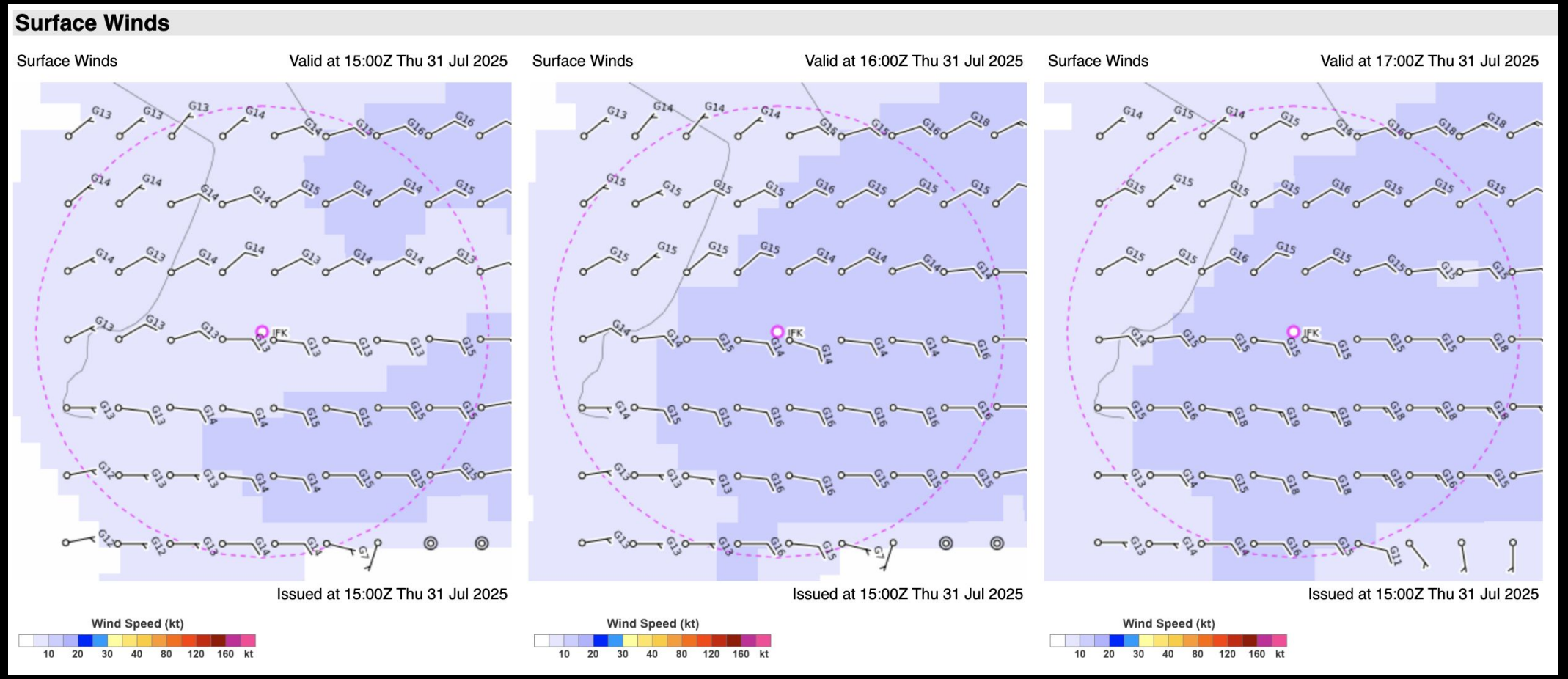
A TAF is a report established for the five statute mile radius around an airport and is usually given for larger airports. Each TAF is valid for a 24 or 30-hour time period and is updated four times.

```
KJFK 311451Z 3115/0118 17006KT P6SM BKN025 BKN100
  FM311700 04006KT P6SM SCT035 BKN100
    TEMPO 3117/3120 5SM -SHRA BR BKN050
  FM312000 08011KT 4SM SHRA BR BKN025 OVC100
    TEMPO 3120/3124 2SM -TSRA BR BKN025CB
  FM010000 05009KT 2SM RA BR OVC007
  PROB30 0100/0104 -TSRA BR BKN020CB
  FM010400 03014G22KT 4SM -RA BR OVC007
  FM010800 02014G22KT 5SM -RA BR OVC015
  FM011300 03017G24KT P6SM OVC015
  PROB30 0113/0115 6SM -RA OVC015
```

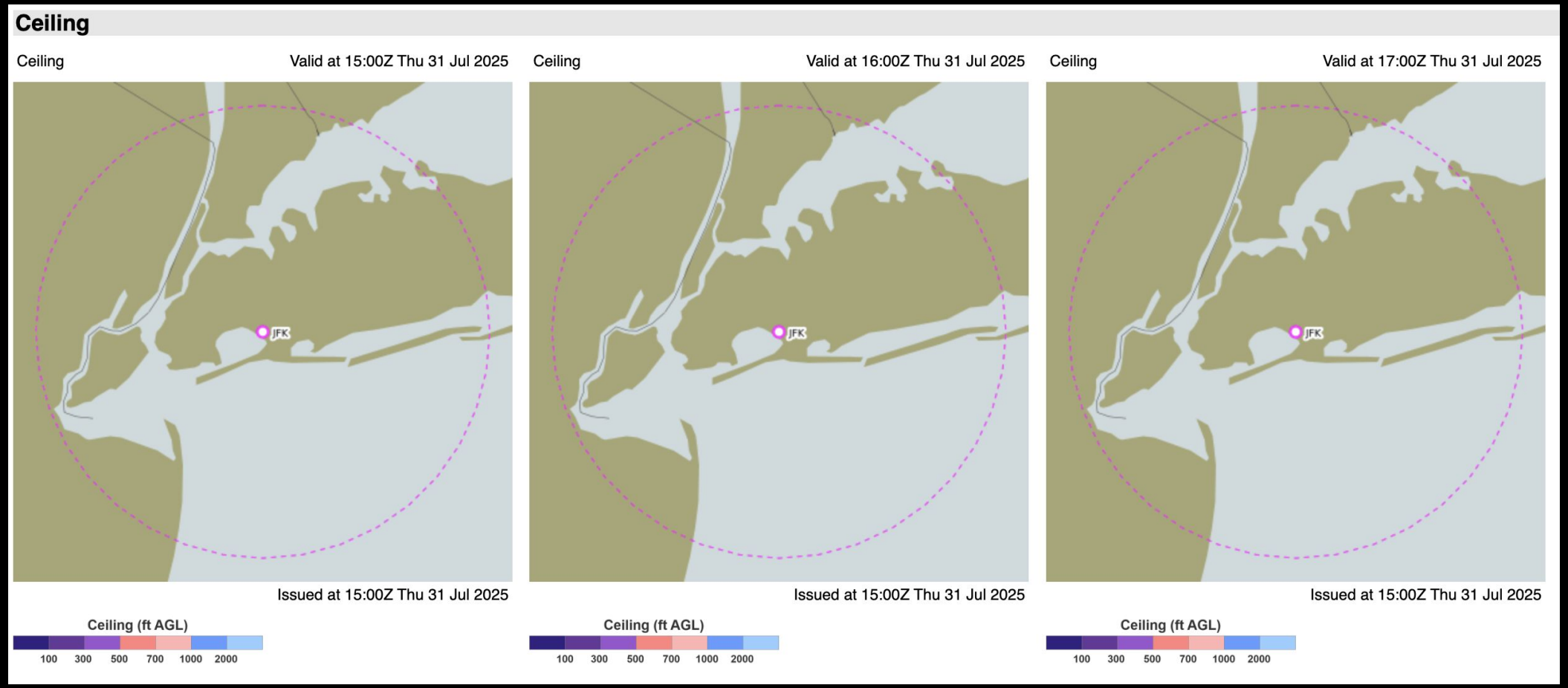
TAF Decoded

TAF for:	New York/JF Kennedy Intl, NY, US
Text:	KJFK 311451Z 3115/0118 17006KT P6SM BKN025 BKN100
Forecast period:	1500 UTC 31 Thu Jul 2025 to 1700 UTC 31 Thu Jul 2025
Forecast type:	standard forecast or significant change
Winds:	from the S (170°) at 6 kt (3.1 m/s, 6.9 mph)
Visibility:	6+ mi (10+ km)
Clouds:	broken clouds at 2,500 ft, broken clouds at 10,000 ft
Flight Category:	MVFR
Text:	FM311700 04006KT P6SM SCT035 BKN100
Forecast period:	1700 UTC 31 Thu Jul 2025 to 2000 UTC 31 Thu Jul 2025
Forecast type:	FM: standard forecast or significant change
Winds:	from the NE (40°) at 6 kt (3.1 m/s, 6.9 mph)
Visibility:	6+ mi (10+ km)
Clouds:	scattered clouds at 3,500 ft, broken clouds at 10,000 ft
Flight Category:	VFR
Text:	TEMPO 3117/3120 5SM -SHRA BR BKN050
Forecast period:	1700 UTC 31 Thu Jul 2025 to 2000 UTC 31 Thu Jul 2025
Forecast type:	TEMPO: expected for less than half the time period
Visibility:	5 mi (8 km)
Clouds:	broken clouds at 5,000 ft
Flight Category:	MVFR
Weather:	light rain showers, mist
Text:	FM312000 08011KT 4SM SHRA BR BKN025 OVC100
Forecast period:	2000 UTC 31 Thu Jul 2025 to 0000 UTC 01 Fri Aug 2025
Forecast type:	FM: standard forecast or significant change
Winds:	from the E (80°) at 11 kt (5.7 m/s, 12.7 mph)
Visibility:	4 mi (6 km)
Clouds:	broken clouds at 2,500 ft, overcast at 10,000 ft
Flight Category:	MVFR
Weather:	rain showers, mist

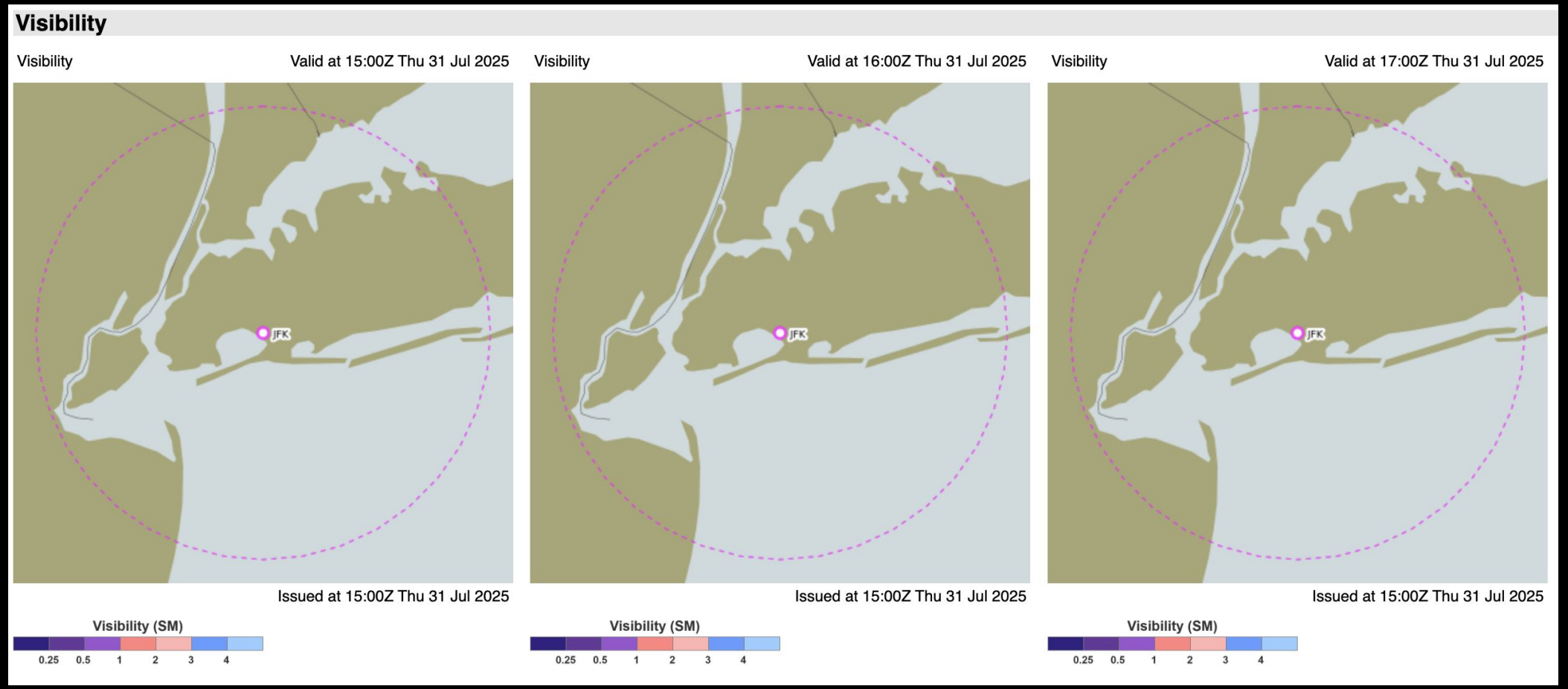
Surface Winds



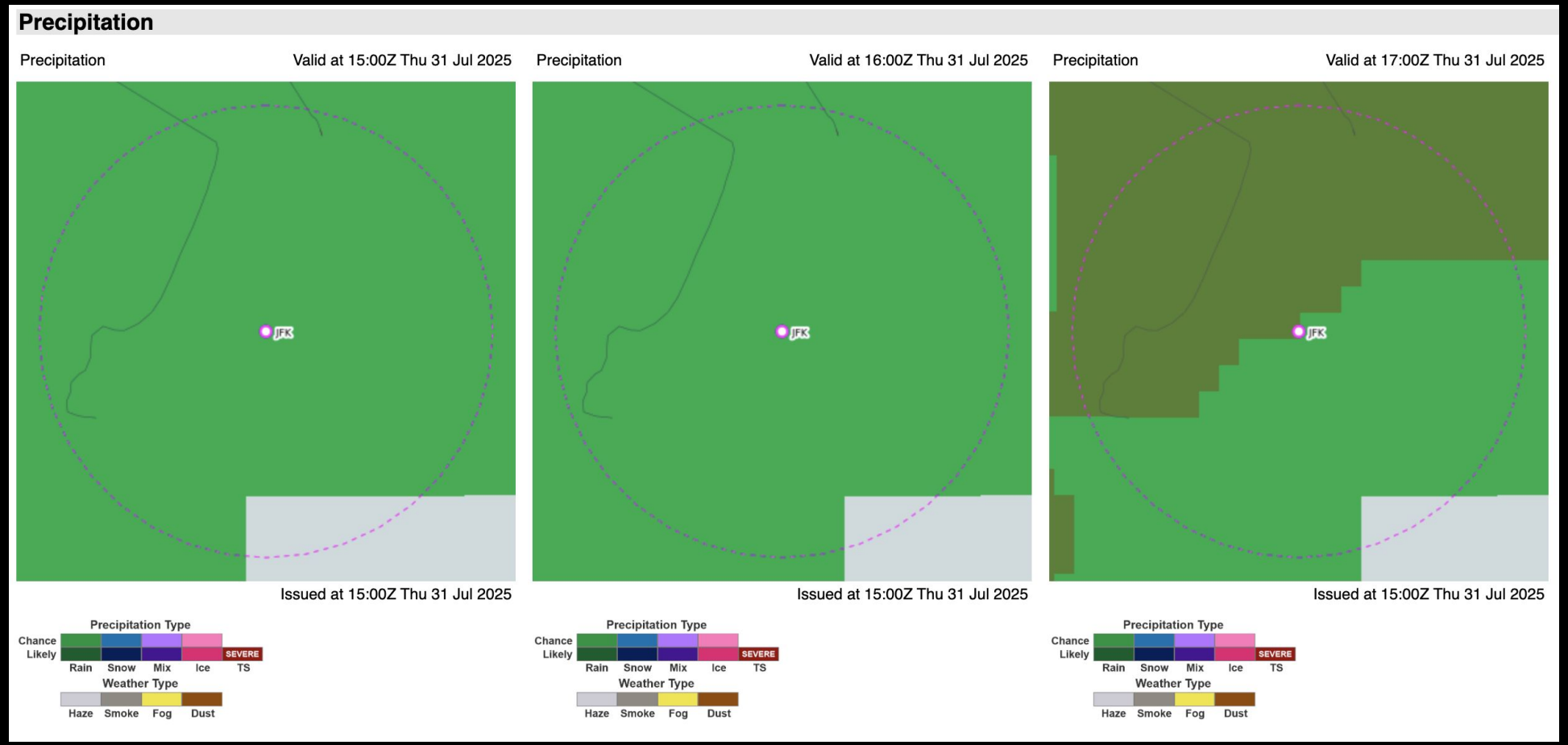
Ceiling


Ceiling
Ceiling
Valid at 15:00Z Thu 31 Jul 2025
JFK
Issued at 15:00Z Thu 31 Jul 2025
Ceiling (ft AGL)
100 300 500 700 1000 2000
Ceiling
Valid at 16:00Z Thu 31 Jul 2025
JFK
Issued at 15:00Z Thu 31 Jul 2025
Ceiling (ft AGL)
100 300 500 700 1000 2000
Ceiling
Valid at 17:00Z Thu 31 Jul 2025
JFK
Issued at 15:00Z Thu 31 Jul 2025
Ceiling (ft AGL)
100 300 500 700 1000 2000

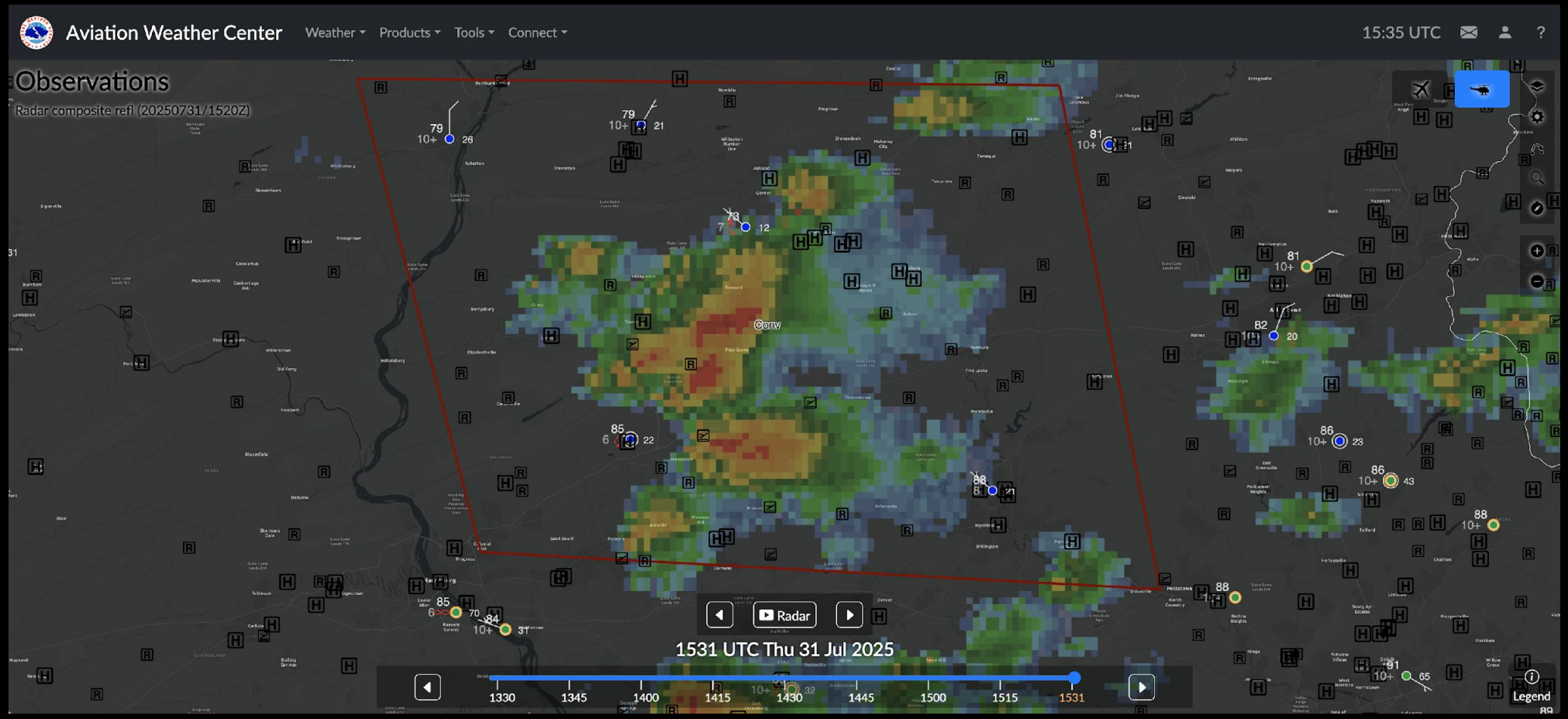
Visibility


Visibility
Visibility
Valid at 15:00Z Thu 31 Jul 2025
JFK
Issued at 15:00Z Thu 31 Jul 2025
Visibility (SM)
0.25 0.5 1 2 3 4
Visibility
Valid at 16:00Z Thu 31 Jul 2025
JFK
Issued at 15:00Z Thu 31 Jul 2025
Visibility (SM)
0.25 0.5 1 2 3 4
Visibility
Valid at 17:00Z Thu 31 Jul 2025
JFK
Issued at 15:00Z Thu 31 Jul 2025
Visibility (SM)
0.25 0.5 1 2 3 4

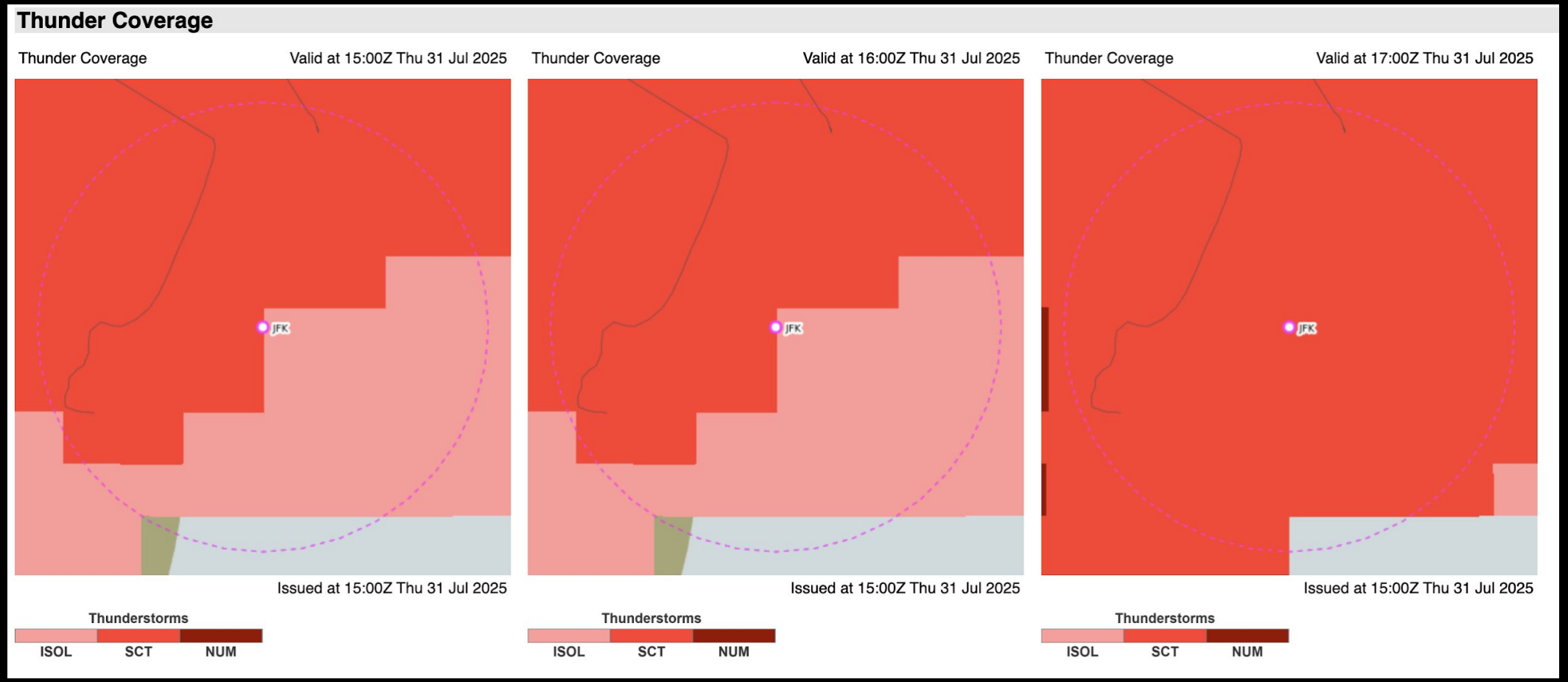
Precipitation



Radar


Aviation Weather Center
Weather
Products
Tools
Connect
15:35 UTC
Observations
Radar composite refl (20250731/1520Z)
Radar
1531 UTC Thu 31 Jul 2025
1330
1345
1400
1415
1430
1445
1500
1515
1531
Legend

Adverse Weather



Weather Minimums & Requirements

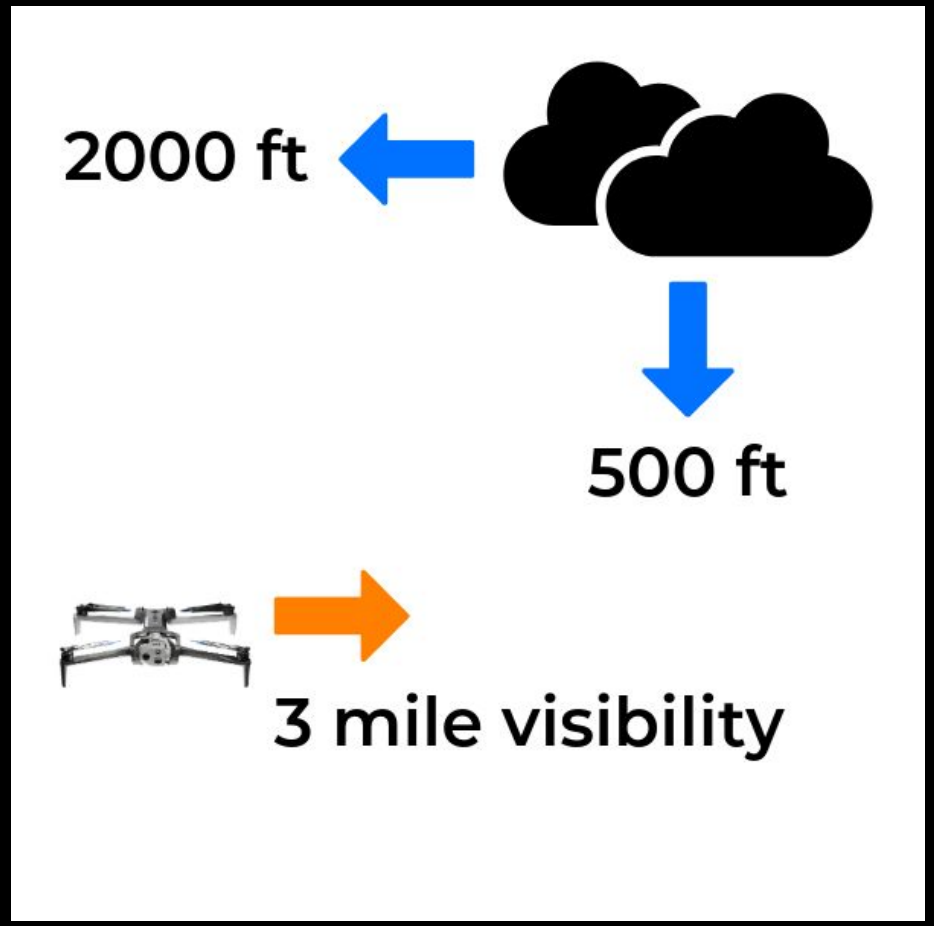
Skydio X10

	Spec
Maximum wind speed (including gust)	28 mph (24 knots)
Operational Temperature Range	-4F to 113F
Flight in Precipitation	IP55 provides protection for flight in light to moderate precipitation. Flight in moderate to heavy precipitation is not recommended.
Flight in Icing Conditions	Not supported or recommended

https://support.skydio.com/hc/en-us/articles/360000586653-Skydio-Safety-and-Operating-Guide

Regulatory Requirements – Part 91

- Per Part 91 waiver:
  - Provision 18 – Minimum visibility of 3 statute miles
  - Provision 19 - Minimum distance from clouds is no less than:
    - 500 ft below
    - 2,000 ft horizontally



Regulatory Requirements – Part 107

- 107.51
  - (c) – Minimum visibility of 3 statute miles
  - (d) – Minimum distance from clouds is no less than:
    - 500 ft below
    - 2,000 ft horizontally