



DRONESVIP | CIVIL AERONAUTICAL
TRAINING CENTER

APPLIED METEOROLOGY

AGENDA

- AERONAUTICAL METEOROLOGY
- WEATHER MESSAGES
- REAL-TIME MESSAGES
- METER
- SPECI
- AIREP
- AERONAUTICAL FORECASTS

- TAF
- SIGMET
- SATELLITE IMAGERY
- RADAR IMAGES
- USE OF WEATHER APPLICATIONS

AERONAUTICAL METEOROLOGY

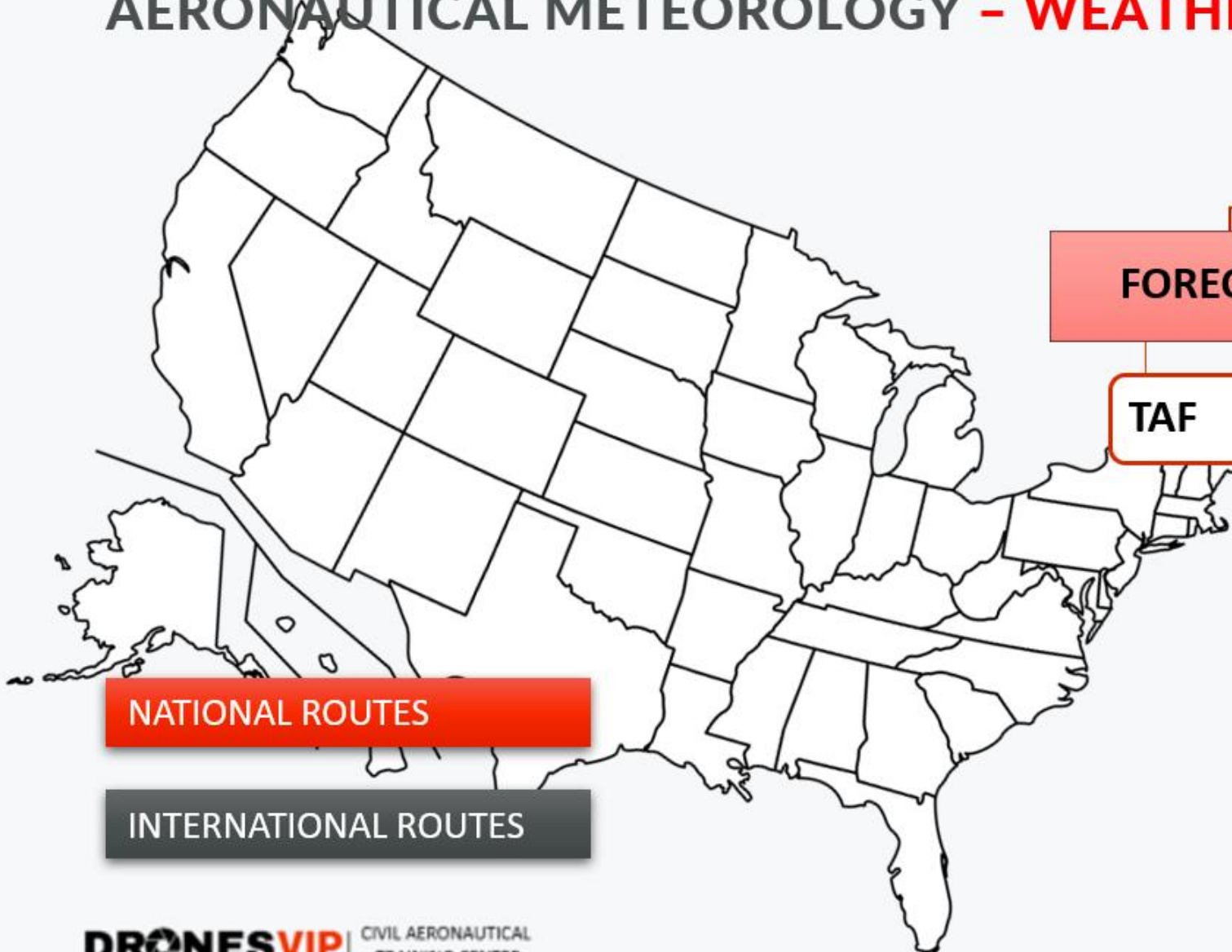


ANNEX 3 – METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION

“... To provide meteorological advice to aeronautical users. The purpose of this service will be to contribute to the safety, regularity and efficiency of national and international air navigation...”

“... Each Contracting State shall determine the meteorological service which shall furnish the information to meet the needs of international air navigation...”

AERONAUTICAL METEOROLOGY - WEATHER MESSAGES



**AERONAUTICAL
SECTOR SERVICES**

FORECASTS

TAF

REAL TIME

METAR

SPECI

AIREP

REAL-TIME MESSAGES



Vector Options

- Gust
- Max

Wind Variance

Gust ---
Spread 1 KT

Vector Optio

- Gust
- Max

Wind Variar

Gust ---
Spread 0 KT

Altimeter
29.66 inH

Ceiling
3600 FT

Min Visibi

AERODROME WEATHER REPORT - METAR

"... They are weather reports on a particular aerodrome that are issued as a general rule every hour and are valid only for the hour after it was issued..."



CODED MESSAGE

AERODROME IDENTIFICATION

- ICAO INTERNATIONAL CODE (E.G. KMIA – KJFK - KBOS)

DATE AND TIME

- SEVEN CHARACTERS: DAY – INTERNATIONAL TIME (E.G. 011500Z – 051200Z)

WINDS (DIRECTION AND INTENSITY)

- SEVEN CHARACTERS: DIRECTION – CURRENT – MEASURED UNIT (E.G. 03015KT – 03015G30KT – 120V18015KT)

VISIBILITY

- FOUR DIGITS: EXPRESSED IN METERS (E.G. 9999 – 8000 – 13R/1500U – 31R/2000D – 27R/1000N)

AERODROME WEATHER REPORT - METAR

"... They are weather reports on a particular aerodrome that are issued as a general rule every hour and are valid only for the hour after it was issued..."



CODED MESSAGE

CAVOK

- CLEAR UP TO 5000 FEET – HORIZONTAL VISIBILITY GREATER THAN 10 KM.

NSC (NO SIGNIFICANT CLOUDS) AND NOSIG (NO SIGNIFICANT CHANGES)

- NO SIGNIFICANT CLOUDS / NO SIGNIFICANT CHANGES (END MESSAGE)

TEMPERATURE AND DEW POINT

- FOUR NUMBERS SEPARATED BY A BAR – DEGREES CELSIUS (E.G. 25/18 – 05/M01)

PRESIÓN ATMOSFÉRICA A NIVEL DEL MAR

- THE LAST FIVE DIGITS – QNH IN HPA LETTER Q OR QNH IN INHG LETTER A (E.G. Q1013 = 1013 HPA – A2992 = 29.92 INHG)

AERODROME WEATHER REPORT-METAR

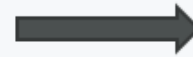
RAINFALL AND DARKENING

DZ	DRIZZLE	FC	DRIZZLE
TS	STORM	FU	SMOKE
SN	SNOW	SA	SAND
RA	RAIN	SS	SAND STORM
IC	ICE	VA	VOLCANIC ASH
SG	SLEET	DU	DUST
SH	SHOWERS	DS	DUST STORM
GR	HAIL	BR	MIST
GS	INTENSE HAIL	FG	FOG
UP	UNKNOWN PRECIPITATION	HZ	BRUMA

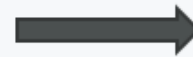
HEIGHT AND CLOUD COVER

THREE HUNDREDS OF FEET (E.G. 015)

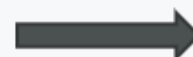
FEW	FEW CLOUDS	1/8 TO 2/8 COVERAGE
SCT	SCATTERED	3/8 TO 4/8 COVERAGE
BKN	BROKEN SKY	5/8 TO 7/8 COVERAGE
OVC	OVERCAST	FULL COVERAGE



VISIBILITY GREATER THAN 1000 METERS UP TO 2500 METERS.



VISIBILITY LESS THAN 1000 METERS.



VISIBILITY REDUCED BY SOLID PARTICLES.

AERODROME WEATHER REPORT-METAR

METAR KMIA 121800Z 02005KT 9999 08/M01 Q1013



- ICAO CODE – MIAMI INTERNATIONAL AIRPORT.
- DAY 12 – 20:00 HOURS UTC.
- WIND DIRECTION 020° - INTENSITY 5 KNOTS.
- VISIBILITY 10 KILOMETERS.
- TEMPERATURE 8°C – DEW POINT MINUS 1°C.
- QNH 1013 HPA.

METAR KJFK 011200Z 120V18015G25KT RA3000 BKN050CB 12/11 Q 0988

- ICAO CODE – JOHN F. KENNEDY INTERNATIONAL AIRPORT.
- DAY 01 – 1200 HOURS UTC.
- WIND DIRECTION VARIABLE BETWEEN 120° TO 180° INTENSITY 15 KNOTS WITH GUSTS 25 KNOTS.
- VISIBILITY 3000 METERS REDUCED BY RAIN BROKEN TO 5000 FEET WITH CUMULUNIMBUS
- TEMPERATURE 12° C - DEW POINT 11° C.
- QNH 988 HPA

AERODROME-SPECI SPECIAL REPORT

*"... They are meteorological reports on a particular aerodrome that are issued when **there is a deterioration or improvement with respect to the conditions emitted by a METAR...**"*



CHANGE IN SURFACE WIND DIRECTION OR INTENSITY

- 30° OR MORE AND 20 KNOTS OR MORE WITH RESPECT TO THE LAST REPORT.
- 10 KNOTS OR MORE LAST REPORT AND 20 KNOTS MORE THAN AVERAGE BEFORE OR AFTER THE CHANGE.
- GUSTS 10 KNOTS OR MORE LAST REPORT AND 15 KNOTS MORE THAN AVERAGE BEFORE OR AFTER THE CHANGE.
- THE AVERAGE WIND DIRECTION HAS CHANGED BY 60° OR MORE FROM THAT INDICATED IN THE LAST REPORT, WITH THE AVERAGE SPEED BEING 10 KT OR MORE BEFORE OR AFTER THE CHANGE

CHANGE VISIBILITY

- HORIZONTAL VISIBILITY ON THE SURFACE OR THE VISUAL RANGE ON THE RUNWAY DECREASES OR INCREASES TO A VALUE EQUAL TO OR GREATER THAN THE METEOROLOGICAL LIMITS OF THE AERODROME.

OTHER CHANGES AND CLOUD CEILINGS

- END OR CHANGE IN INTENSITY A STORM, HAIL, SLEET, FREEZING RAIN, BLIZZARD, DUST OR SAND STORM, SQUALL, WATERSPOUT.
- THE HEIGHT OF THE BASE OF THE CLOUDS THAT COVER MORE THAN HALF OF THE SKY DECREASES OR INCREASES TO A VALUE EQUAL TO, LESS OR GREATER THAN THE MINIMUM METEOROLOGICAL LIMITS DETERMINED FOR THE AERODROME.



AERODROME-SPECI SPECIAL REPORT

“... Such messages should be issued immediately after a deterioration in conditions. In the case of an improvement, the message will be issued if said improvement has been maintained for 10 minutes...”



METAR KMIA 121800Z 02005KT 9999 08/M01 Q1013

SPECI KMIA 121815Z 05025KT 9999 08/M01 Q1013

SPECI KMIA 121815Z 05025KT FU1000 08/M01 Q1013

SPECI KMIA 121815Z 05025KT FU1000 OVC 020 08/M01 Q1013

AERIAL WEATHER REPORT-AIREP

*"... Report of the operational and meteorological conditions produced by a pilot **in command of an aircraft...**"*

CODED MESSAGE

STATION, DAY, TIME, IDENTIFICATION OF THE AIRCRAFT, NEXT POSITION, TIME TO BE FLOWN OVER, FLIGHT LEVEL OR ALTITUDE, PRESENT CONDITION

➤ **MIAMI STATION 09-11:19 ARP HK-VIP TOLIM 1125
FL180 MS15 105/14**



APPLIED METEOROLOGY

PART TWO

AERONAUTICAL FORECASTS

AERONAUTICAL FORECASTS



AERODROME TERMINAL FORECAST - TAF

"... are forecasts on a particular aerodrome that are issued once a day with validity periods of around 24 hours...."



CODED MESSAGE

AERODROME IDENTIFICATION

- ICAO INTERNATIONAL CODE (E.G. KMIA – KJFK - KBOS)

DATE AND TIME

- CONSTRUCTION AND SHELF LIFE (E.G. 092100Z 1000/1100)

MAXIMUM AND MINIMUM TEMPERATURE

- MAXIMUM TEMPERATURE (TX) AND MINIMUM TEMPERATURE (TN) (E.G. TX10/101800 TNM03/100900)

PROBABILITY

- PROB30 – PROB40 (PROB40 1018/1022 03015G25KT TS RA)

AERODROME TERMINAL FORECAST - TAF

"... are forecasts about a particular aerodrome that are issued once a day with validity periods of around 24 hours...."



CODED MESSAGE

BECMG

- GREATER PROBABILITY 50 % (EXAMPLE: BECMG 1020/1023 2000 BR)

TIME

- TEMPORARY FLUCTUATION (E.G.: TIME 1021/1022 RA)

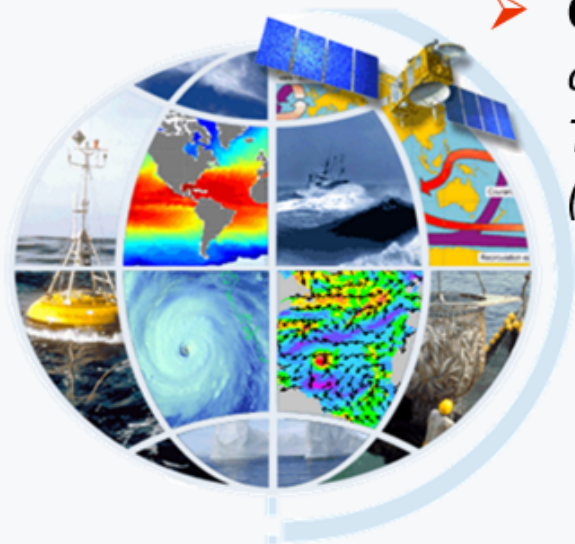
FM

- RADICAL CHANGE CONDITIONS (E.G.: FM 1700 OVC010)

SATELLITE IMAGES

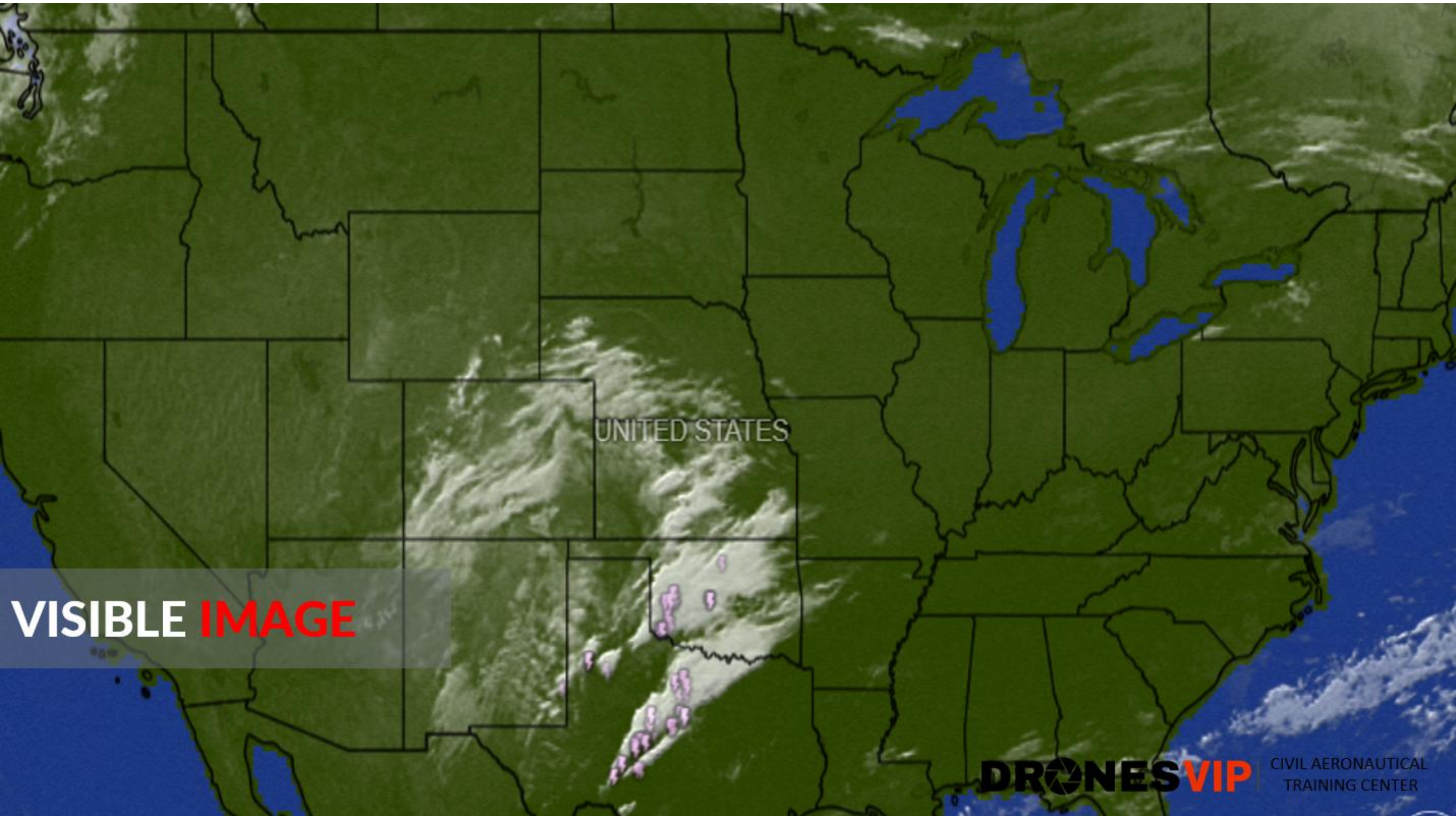
"... They are taken from different devices that are orbiting planet Earth and are generally updated in periods of one to three hours. The geostationary type, which allows them to remain on the same point and always observe the same area of the atmosphere..."

- **VISIBLE IMAGE:** *taken by a satellite in the so-called visible channel or band. In this channel, the satellite "sees" the earth-atmosphere system in a way equivalent to what a human being, located inside the satellite, would see through the window.*



- **CLOUD TOPS:** *It is an IR image, in which the temperature areas have been reinforced or enhanced, through digitization processes. The goal is to delineate the major cloud systems and highlight the storm cloud areas, (peaks of the highest and coldest clouds).*

- **WATER VAPOUR:** *It is an IR image, focused on the spectral region in which the greatest absorption of water vapor occurs. The images of water vapor roughly represent the humidity of the middle troposphere, where the largest clouds are located.*

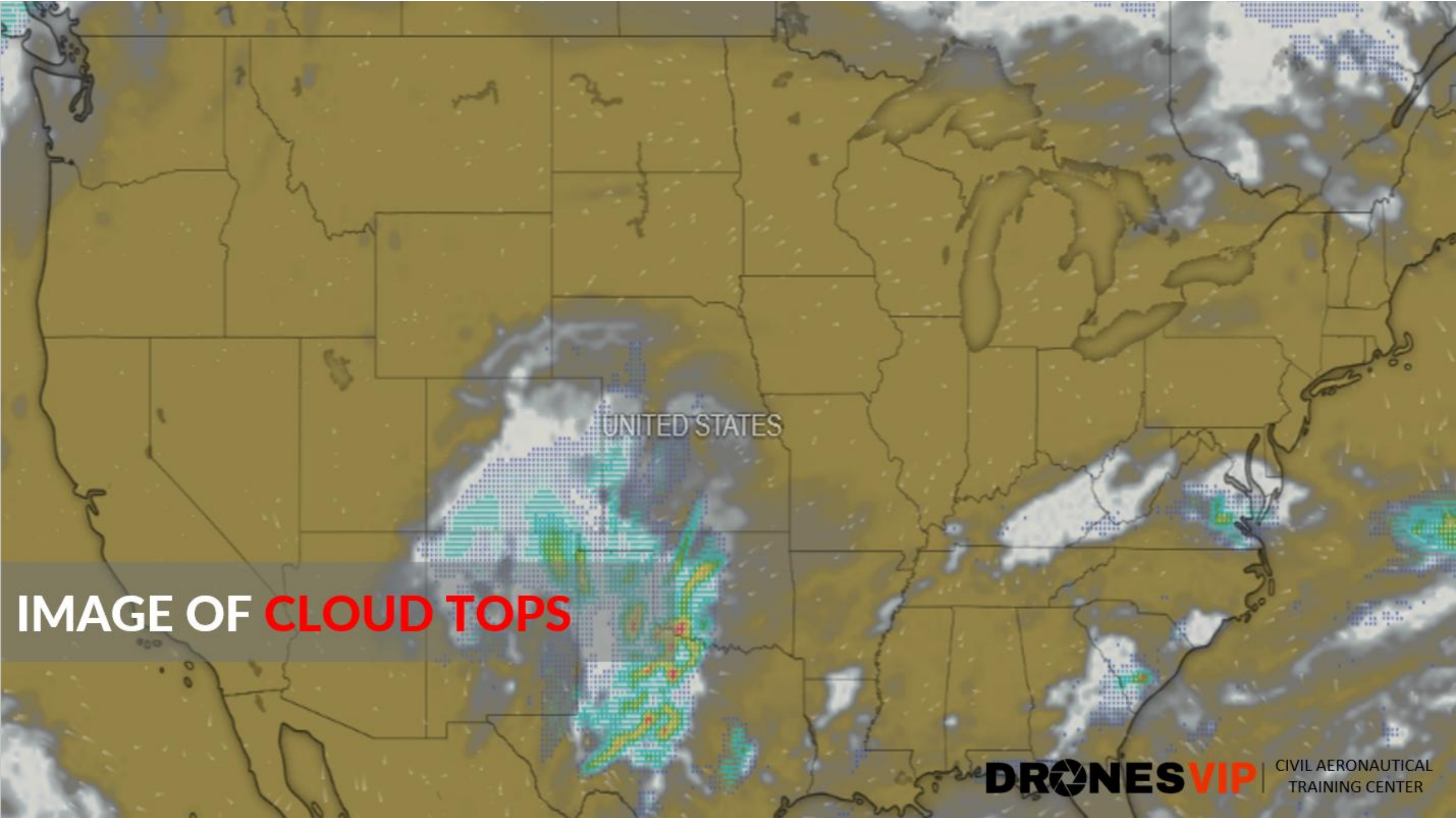


UNITED STATES

VISIBLE IMAGE

DRONESVIP

CIVIL AERONAUTICAL
TRAINING CENTER



UNITED STATES

IMAGE OF **CLOUD TOPS**

DRONESVIP

CIVIL AERONAUTICAL
TRAINING CENTER

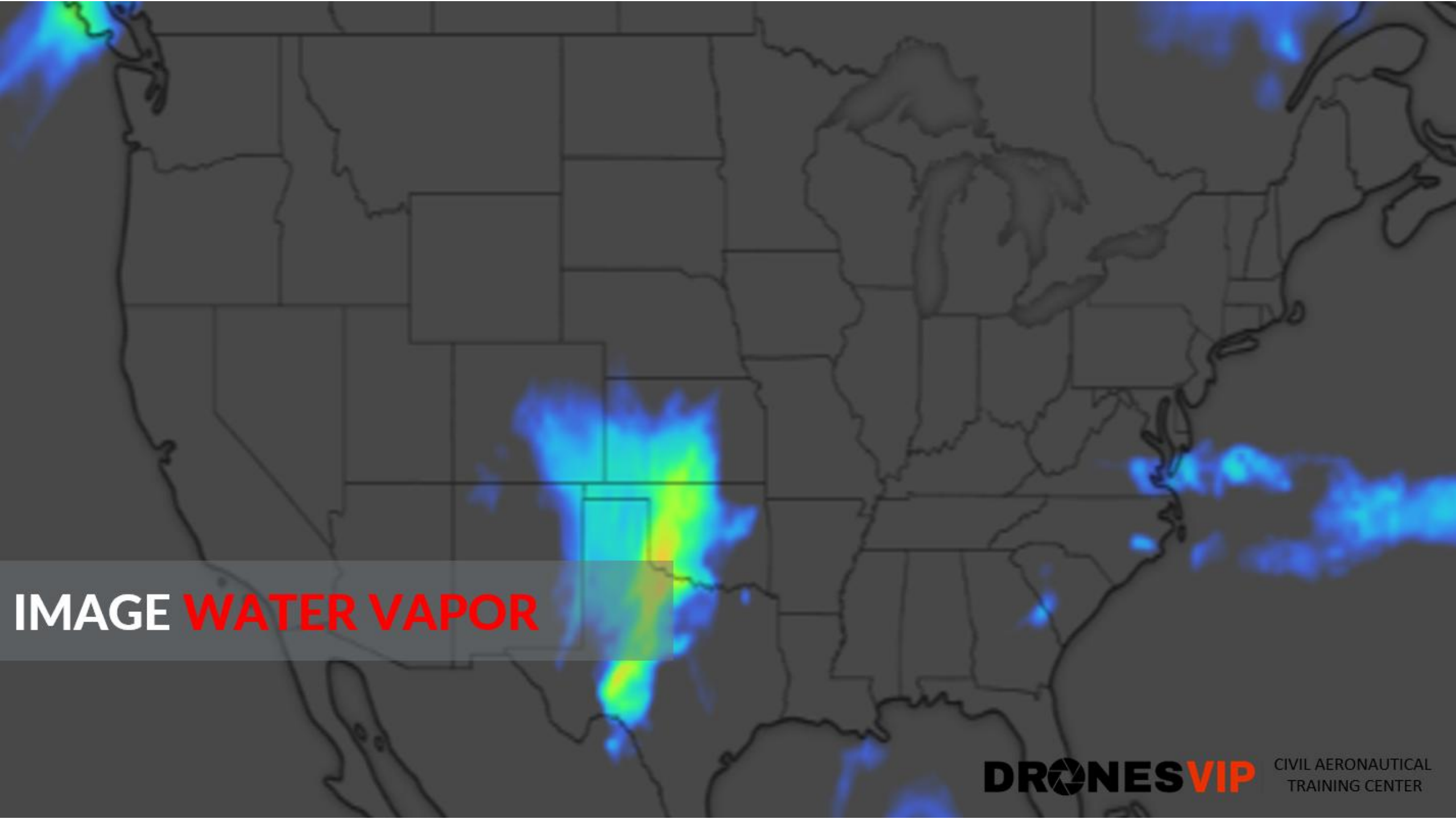


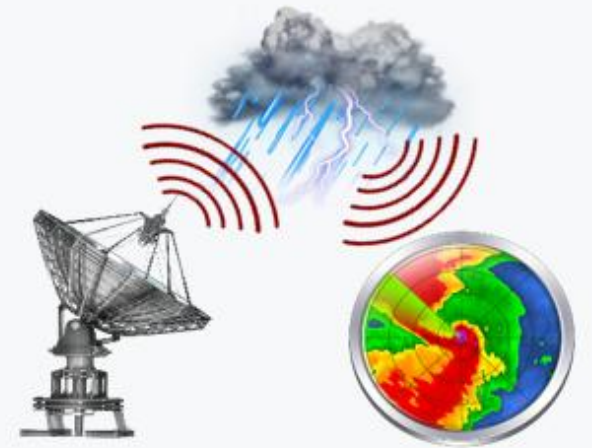
IMAGE WATER VAPOR

RADAR IMAGES

"... It is an image obtained from a type of radar used in meteorology to locate precipitation, calculate its trajectories and estimate its types (rain, snow, hail, etc.). In addition, three-dimensional data can be analyzed to extract the structure of storms and their trajectory and damage potential..."



- MIAMI
- NEW YORK



APPLIED METEOROLOGY

PART THREE

NATIONAL WEATHER SERVICE AND WEATHER APPS PAGE

USING WEATHER APPS

UAV - FORECAST

CURRENT TIME

PROGNOSIS

CONFIGURABLE DATA

SPEED READ

EASY INTERPRETATION



WINDY

CURRENT TIME

PROGNOSIS

SATELLITE AND RADAR IMAGERY

MORE INFORMATION

EASY INTERPRETATION



QUESTION TIME!