Lake Elmo Airport
ADVISORY COMMISSION
LEAAC

Educational Session #2
Aircraft and Flight Operations

Education Sessions Objectives

Educate the Commission on the basics of airport and aviation operations

LEAAC Education Session Series

Meeting 1: Airports and Regulatory Structure

Purpose: Educate the Commission on how airports are regulated and how 21D fits into that regulatory system

Topics:

1. Overview of Aviation
2. Overview of Local Aviation
3. Overview of 21D
4. Airport Regulators
5. Airport Funding & Economic Output

Meeting 2: Aircraft and Flight Operations

Purpose: Educate the Commission on the basic principles of how aircraft work and standard flight operations at general aviation airports like 21D

Topics:

1. Fundamentals of Flight
2. Pilot certificates
3. Typical Aircraft
4. Towered and Non-Towered Airport Traffic
5. 21D Specific Operations

Meeting 3: Stakeholders and Common Issues and Solutions

Purpose: Educate the Commission on who has a stake in the airport and typical concerns and solutions at general aviation airports like 21D

Topics:

1. Stakeholders
2. Concerns: Noise, Environmental and Safety
3. Solutions: NAP, Engagement, Regulations, Pilot in Command
4. 21D Specific Stakeholders Issues and Solutions

Session 2: Outline

- Fundamentals of Flight
- Pilot certificates
- Typical Aircraft
- Towered and Non-Towered Airport Traffic
- 21D Specific Operations
- MAC FlightTracker

1. Fundamentals of Flight

How Airplanes Work

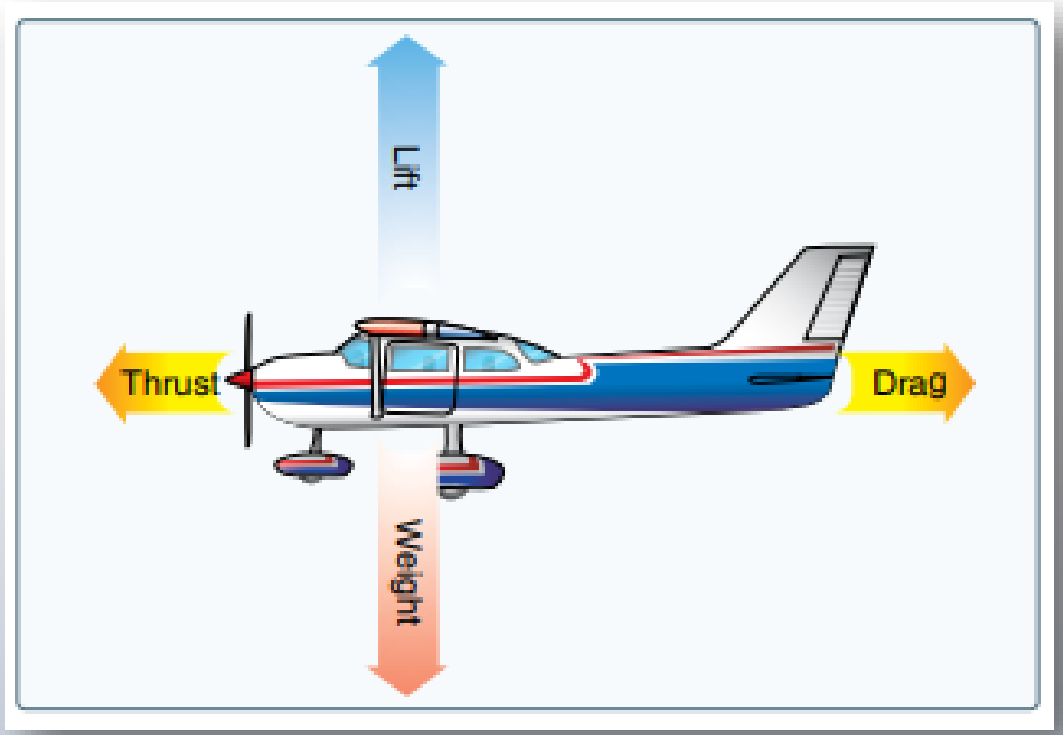
Forces of flying: Thrust, Drag, Lift, and Weight.

Most aircraft operating at Lake Elmo Airport are powered by at least one engine.

Aircraft powered by an engine are designed to move forward (thrust) at a speed that allows lift to be generated by air flowing over the surfaces that counteract the weight and drag of the aircraft and its contents.

The shape and movement of aircraft surfaces affect the way air interacts with the aircraft.

The differential of airflow over the top and bottom of wings is essential for lift; and flaps change the shape of wings to aid lift or create drag when needed.



Why Wind Matters

Importance of Wind to Aircraft Operations

- When taking off or landing, the aircraft is operating at critical airspeeds and pilots are focused on how the aircraft is responding to lift. Wind direction and speed matter!
- Lift results from airflow over the aircraft wing, and airflow over the wing is measured as airspeed. A direct headwind gives the aircraft a slower ground speed but faster airspeed.
- Each aircraft requires a certain threshold of airspeed for takeoffs and landings; the amount of airspeed relates to the amount of runway an aircraft will use for takeoffs and landings.
- At Lake Elmo most pilots will use Runway 14 when the wind is out of the south because the combination of wind speed and runway length makes runway 14 the safest runway

2. Pilot Certificates

Pilot Certificates

Pilot Certification in U.S. is Authorized by the Federal Aviation Administration (FAA)

Student Pilot
Entry Level; Beginners Fly Single-Engine Aircraft

Sport Pilot
Light Sport Aircraft with Limitations on Aircraft, Passengers and Airspace

Recreational Pilot
Small Aircraft within 50 miles of Airport with Limitations on Passengers and Airspace

Private Pilot
Most Common; No Compensation

Commercial Pilot
Requires Higher Level of Proficiency Training; Allows Compensation

Airline Transport Pilot
Highest Level of Proficiency and Extensive Training; Required for Airline Captains

Pilot Certificates (Continued)

The FAA Requires Flight Proficiency Exercises for All Pilot Certifications and Ratings, Including Nighttime Operations

- Pilots learn how to fly in accordance with FAA Visual Flight Rules (VFR), which apply to specific weather conditions defined by the FAA as Visual Meteorological Conditions (VMC).
- Instrument Flight Rules (IFR) require advanced training and proficiency for pilots operating in Instrument Meteorological Conditions (IMC), and in airspaces requiring use of IFR procedures.
- Pilots may also obtain endorsements to operate different categories and classes of aircraft such as helicopter, multi-engine, sea plane, etc.

Aircraft Categories and Their Classes

Category	Class(es)
Airplane	- Single-Engine Land (SEL) - Multi-Engine Land (MEL) - Single-Engine Sea (SES) - Multi-Engine Sea (MES)
Rotorcraft	- Helicopter - Gyroplane
Glider	- Glider
Lighter-than-Air	- Balloon - Airship
Powered Lift	- Powered Lift (e.g., tiltrotor aircraft like the V-22 Osprey)
Powered Parachute	- Powered Parachute – Land - Powered Parachute – Sea
Weight-Shift-Control	- Weight-Shift-Control – Land - Weight-Shift-Control – Sea

Sources: FAA Airman Certification Standards

3. Typical Aircraft Using Lake Elmo

Typical Aircraft at Lake Elmo

95% of aircraft operating at Lake Elmo Airport are fixed-wing and single-engine aircraft.

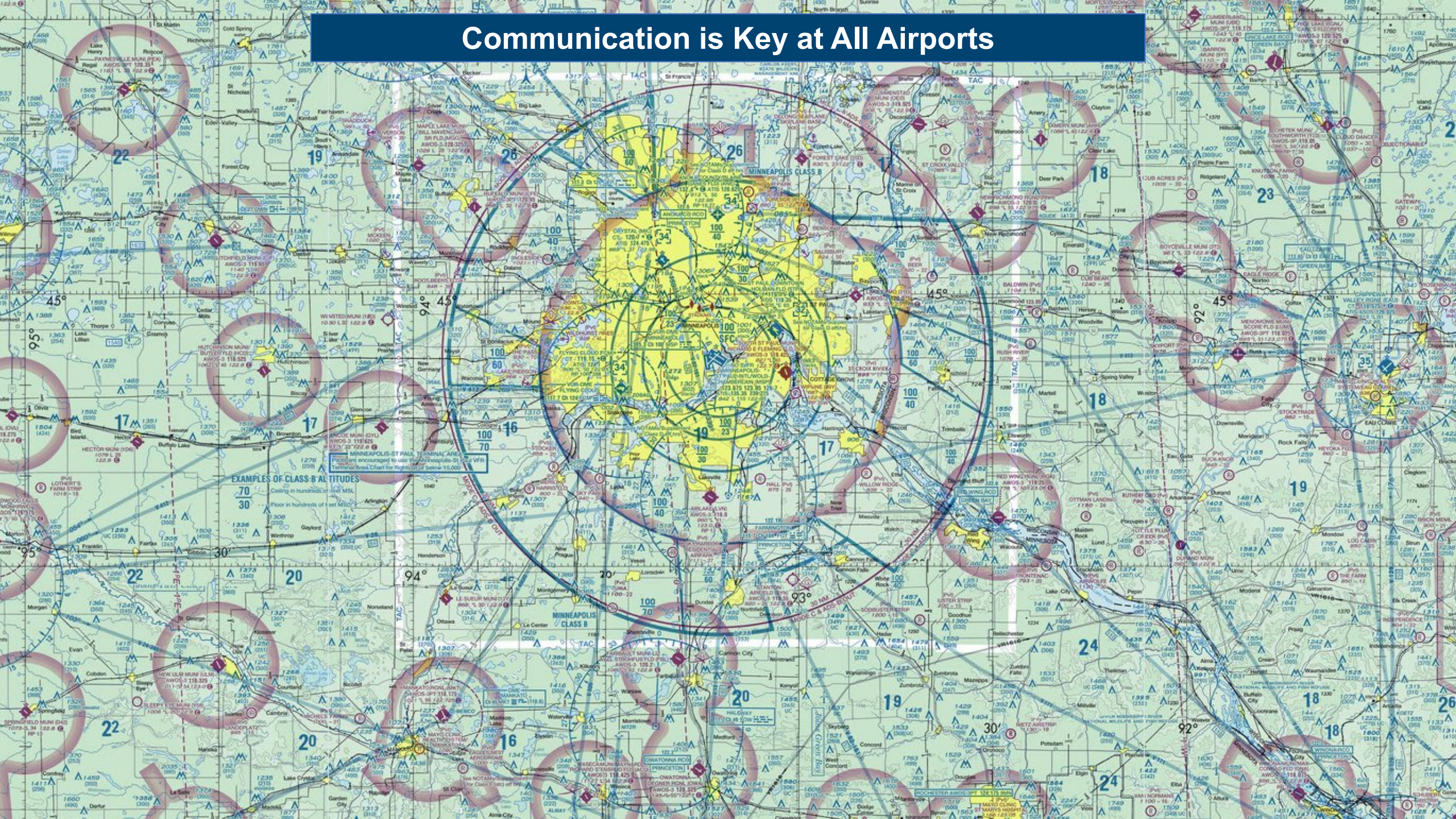
Typical Business and Travel Aircraft

Typical Recreational Aircraft

Typical Training Aircraft

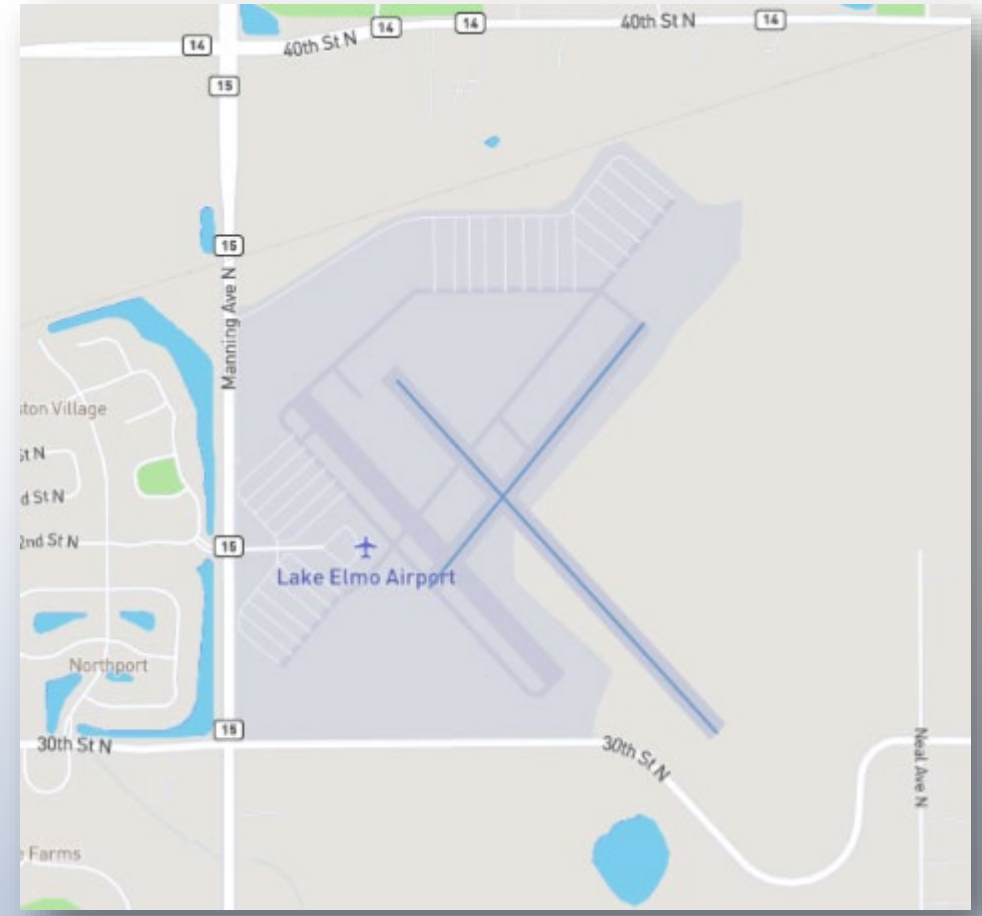
4. Towered and Non-Towered Airports

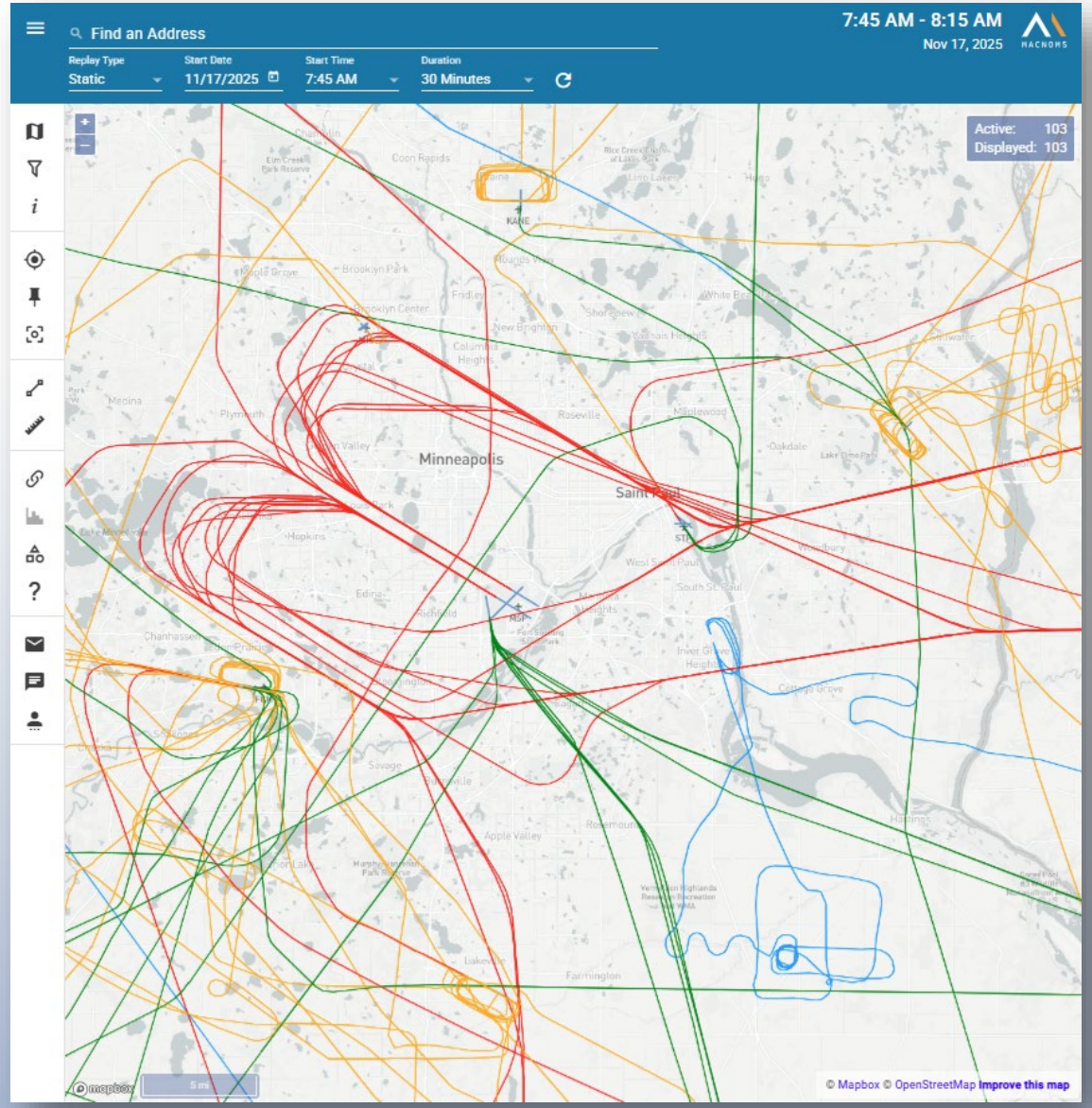
Communication is Key at All Airports



5. Lake Elmo Airport (21D) Specific Operations

Lake Elmo Airport Specific Operations





MAC FlightTracker Demonstration:

https://macnoms.com/

Summary and Next Steps

Today's Education Session:
Aircraft and Flight Operations

"Educate the Commission on the basic principles of how aircraft work and standard flight operations at general aviation airports like 21D"

Next Education Session:
Stakeholders and Common Issues and Solutions

"Educate the Commission on who has a stake in the airport and typical concerns and solutions at general aviation airports like 21D "