



# Analysis of Air Traffic-Related Incidents at a Non-Towered Airport

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## Abstract

Non-towered airports, which are also called uncontrolled airports, refer to airports without control towers or airports with control towers that are not being operated (Federal Aviation Administration [FAA], 2018). According to the FAA (2022), there are nearly 20,000 non-towered airports in the United States, and approximately 500 airports are towered. At non-towered airports, aircraft information, such as position and altitude, is broadcasted by pilots through radio communications. As pilots use aircraft instruments and visual references to determine aircraft position and altitude, aircraft near misses or runway incursions may happen due to misinformation, miscommunications, or other human errors. In this study, the researcher reviewed incident reports that were collected by a non-towered airport in Minnesota. The researcher analyzed the potential causes of these incidents. Recommendations are proposed by the researcher to improve air traffic and airport safety at non-towered airports.

Keywords: non-towered airport, air traffic, incident analysis, safety

## Background

According to the FAA (2022), there are nearly 20,000 non-towered airports in the United States, and approximately 500 airports are towered. At non-towered airports, aircraft information is broadcasted by pilots through radio communications. As pilots use aircraft instruments and visual references to determine aircraft position and altitude, aircraft near misses or runway incursions may happen due to misinformation, miscommunications, or other human errors. In this study, the researcher analyzed the potential causes of incidents at a non-towered airport in Minnesota and proposed recommendations for improving safety at non-towered airports.



Figure 1. A runway accident at northwest regional airport (52F), a non-towered airport (Aero News Network, 2008)

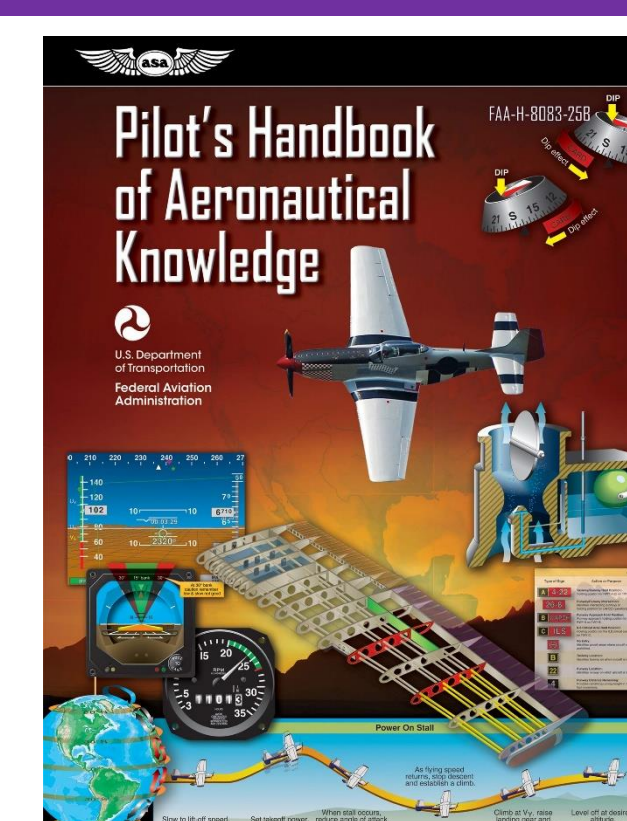
## Methodology

# 1



Review of relevant journal papers, conference proceedings, and other scholarly publications.

# 2



Review of government publications, such as Federal Aviation Regulations (FARs), FAA advisory circulars, pilot handbook, etc.

# 3



Review and analysis of incident reports collected by the non-towered airport.

At non-towered airports that have high volume of flight training, inexperienced student pilots may make improper decision in the flight pattern, such as breaking up and re-entry maneuver (Figure 4), or crossing hold position when the traffic is on the final leg.



Figure 4 (left). An exemplary incident resulted from inexperienced student pilots

## Results

The analysis of incident reports indicates that the most common reason for air traffic-related incidents at the non-towered airport is failure of traffic separation due to lack of communication. Because pilots may not be able to identify the traffic location and did not make radio calls.

Another common cause of air traffic-related incidents is failure of Instrument Flight Rules (IFR) training traffic and Visual Flight Rules (VFR) traffic pattern separation under Visual Meteorological Conditions (VMC). The most common conflicted area is the intersection of the base leg of VFR traffic and the final leg of instrument approach, as shown in Figure 2.

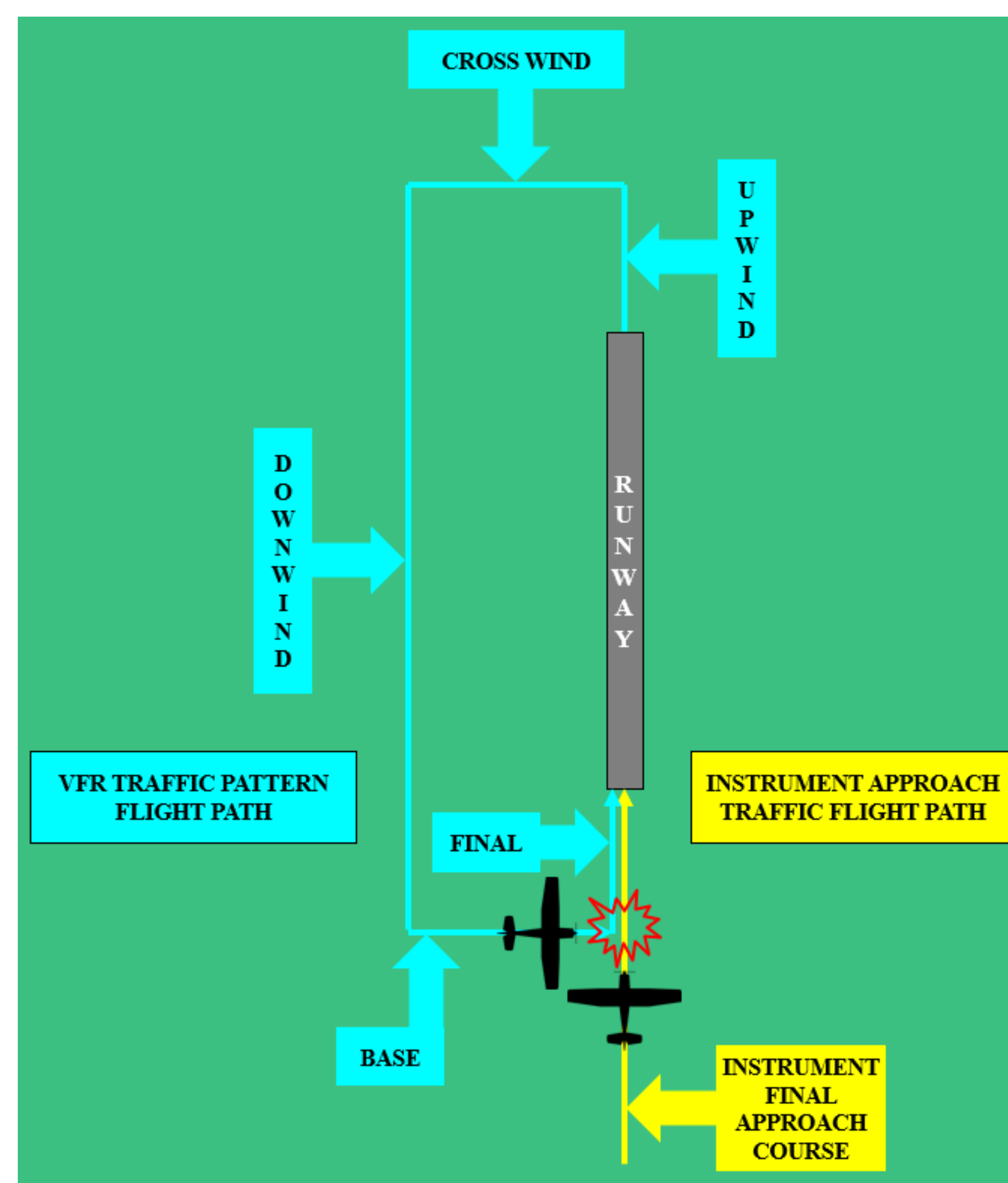


Figure 2 (left). The most common conflicted area that resulted in air-traffic related incidents at non-towered airport

Figure 3 (below). Incidents resulted from improper decisions made by pilots at non-towered airport



Some incidents were resulted from improper decisions made by pilots. As shown in Figure 3, when the mid-field cross wind entry traffic enters mid-field crosswind over the runway, the final traffic making go-around or touch and go may collide with the mid-field cross wind entry traffic.

## Recommendations

Following recommendation are proposed by the researcher based on the results of the study:

1. Establishment of Alert Area to inform that an airport has high volume of flight training.
2. Usage of Notice to Air Missions (NOTAM) to inform pilots that airport has high volume of training.
3. Establishment of an air traffic control tower to manage congested air traffic.
4. Requiring radio communications in Class E airspace during high traffic volume period

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