

Initial Estimation of the Number of Urban Air Mobility Operations at Aerodromes to Assess Operational Limits: Additional Results

Somrick Das Biswas*, Jonah Gerardus†, Kshitij Mall‡, Daniel A. DeLaurentis§, and William A. Crossley¶
Purdue University, West Lafayette, IN, 47907

Michael D. Patterson|| and Brandon E. Sells**
NASA Langley Research Center, Hampton, VA, 23681

This document serves as a data supplement to our primary research paper titled “Initial Estimation of the Number of Urban Air Mobility Operations at Aerodromes to Assess Operational Limits” [1]. The figures, plots, and datasets presented here are intended to complement the results discussed in Ref. [1]. Readers are encouraged to consult that paper first to better understand the methodology and the broader context of the findings shared in this supplement.

In the main study [1], we evaluated potential throughput constraints at ten aerodromes across the Chicago metropolitan area, based on assumed “plausible” numbers of gates and touchdown and lift off (TLOF) pads at each site. We then estimated the number of Urban Air Mobility (UAM) operations that could be accommodated under varying inter-arrival time assumptions. The assumptions, limitations, and caveats associated with this approach are detailed in Ref. [1].

This document is organized into three sections. Section I presents aerial images for each aerodrome included in the study. Overlaid on these aerial images are the hypothesized locations of TLOF pads and their associated safety areas, along with potential approach and departure vectors. Section II provides the aerodrome throughput analysis results under instrument flight rules (IFR) operational assumptions, while Section III presents the corresponding results under visual flight rules (VFR) assumptions. Together, these sections provide supplementary data to support our work highlighted in Ref. [1].

I. TLOF Pad Locations for Chicago Area Aerodromes

Figures 1 through 9 illustrate the hypothesized layout of TLOF pads—drawn to scale—across nine aerodromes of interest. In each figure, blue squares denote the estimated positions of the TLOF pads along with their safety areas, measuring 200 ft by 200 ft. This spacing reflects the minimum required separation to enable simultaneous vertical takeoff and landing (VTOL) aircraft operations, per FAA guidelines [2]. The actual TLOF pads are 50 ft by 50 ft squares centered within these blue areas. Shaded grey regions mark exclusion zones adjacent to active runways in which takeoff and landing of VTOL aircraft is prohibited. (Once airborne, VTOL aircraft may be allowed to fly over these areas.) An exception is in Fig. 6 showing the Vertiport Chicago Heliport, where the grey area represents space rendered unusable for ground-level TLOF pad placement due to a nearby elevated rail viaduct. Arrows indicate the intended approach and departure paths for each TLOF pad, following FAA regulatory guidance [3].

*Graduate Research Assistant, School of Aeronautics and Astronautics, AIAA Student Member, sdasbis@purdue.edu

†Graduate Research Assistant, School of Aeronautics and Astronautics, AIAA Student Member, jgerardu@purdue.edu

‡Post Doctoral Research Associate, School of Aeronautics and Astronautics, AIAA Member, mall@purdue.edu

§Bruce Reese Professor of Aeronautics and Astronautics, AIAA Fellow, ddelaure@purdue.edu

¶Uhrig & Vournas Head and Professor of Aeronautics and Astronautics, AIAA Fellow, crossley@purdue.edu

|| Aerospace Engineer, Aeronautics Systems Analysis Branch, AIAA Associate Fellow

** Aerospace Engineer, Aeronautics Systems Analysis Branch, AIAA Member

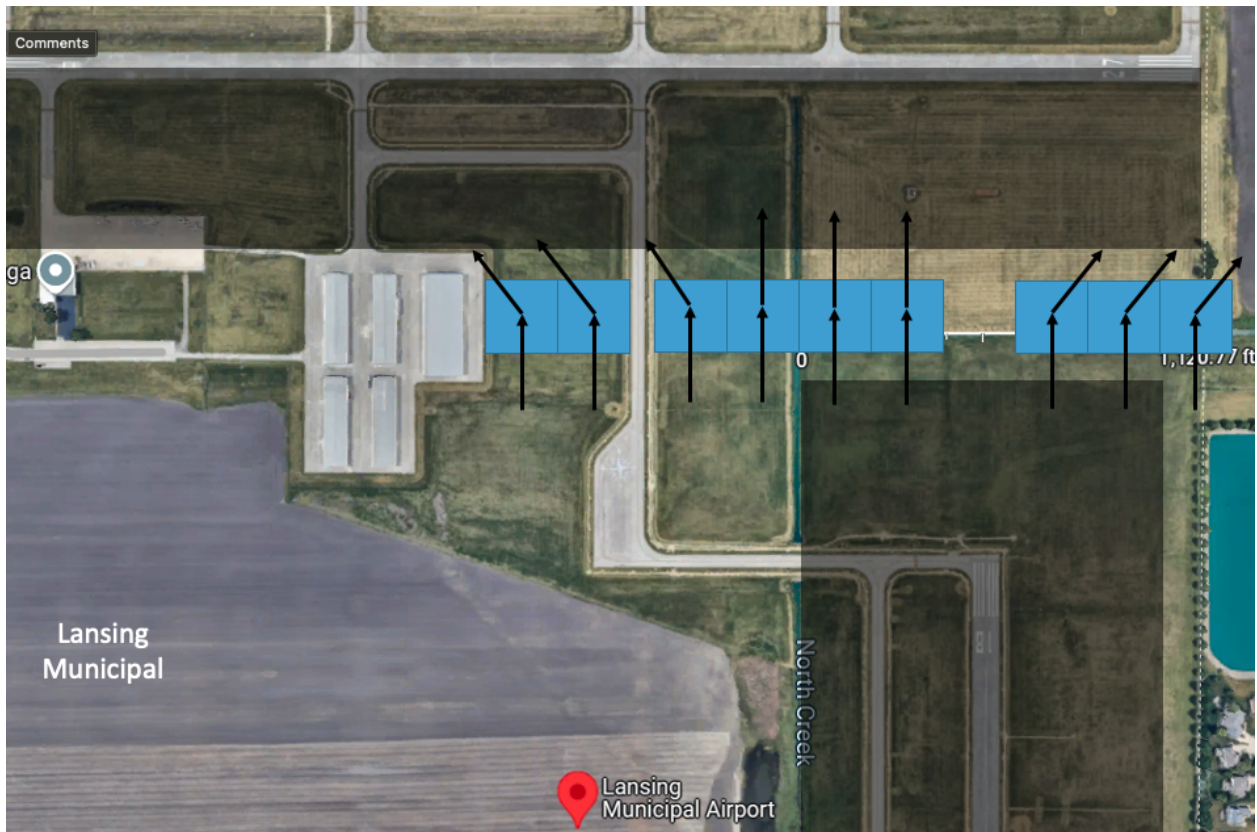


Fig. 1 TLOF pad locations for Lansing municipal airport (KIGQ). Several TLOF pads can be situated here, due to the large footprint of the airport. Maps data: Imagery ©2025 Google, Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025

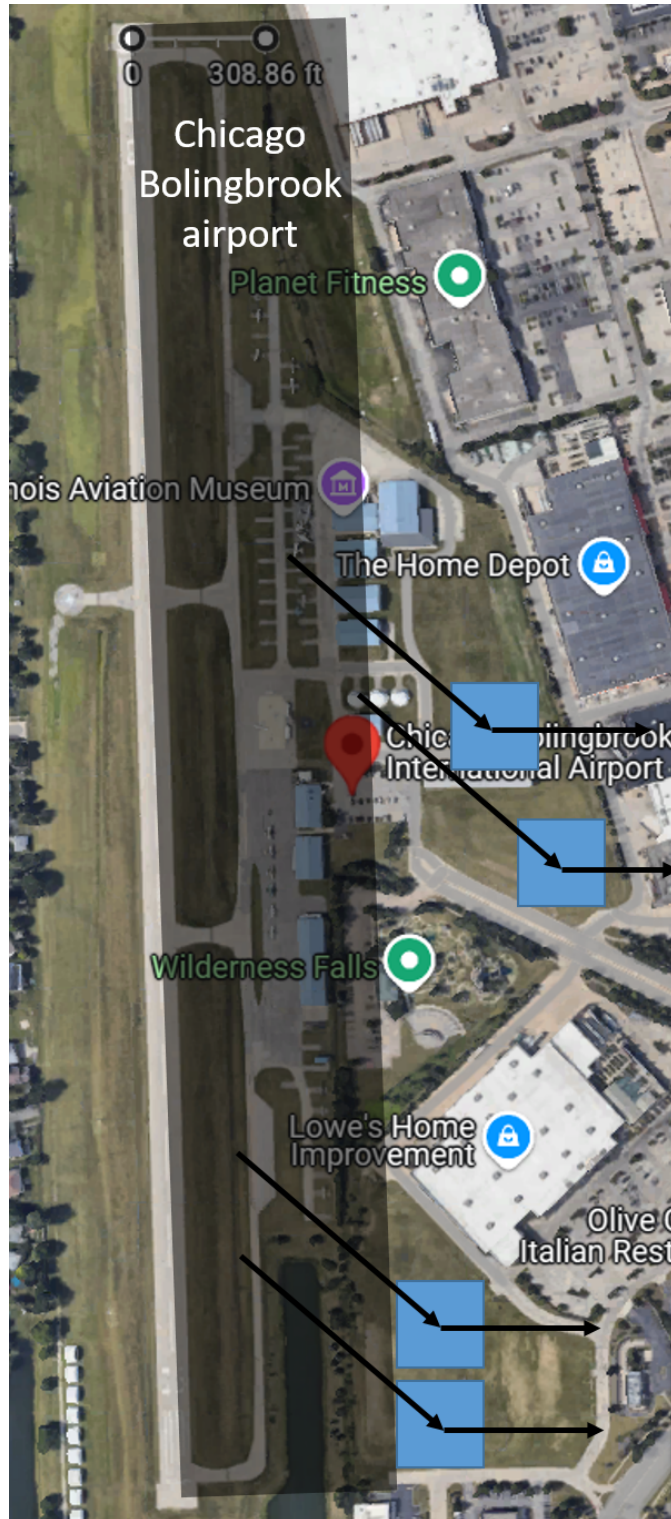


Fig. 2 TLOF pad locations for Chicago Bolingbrook airport (K1C5). The runway is located quite close to the terminal buildings and the taxiways, which prevents constructing TLOF pads near the airside facilities. Maps data: Imagery ©2025 Vexcel Imaging US, Inc., Imagery ©2025 Airbus, Maxar Technologies, Vexcel Imaging US, Inc., Map data ©2025

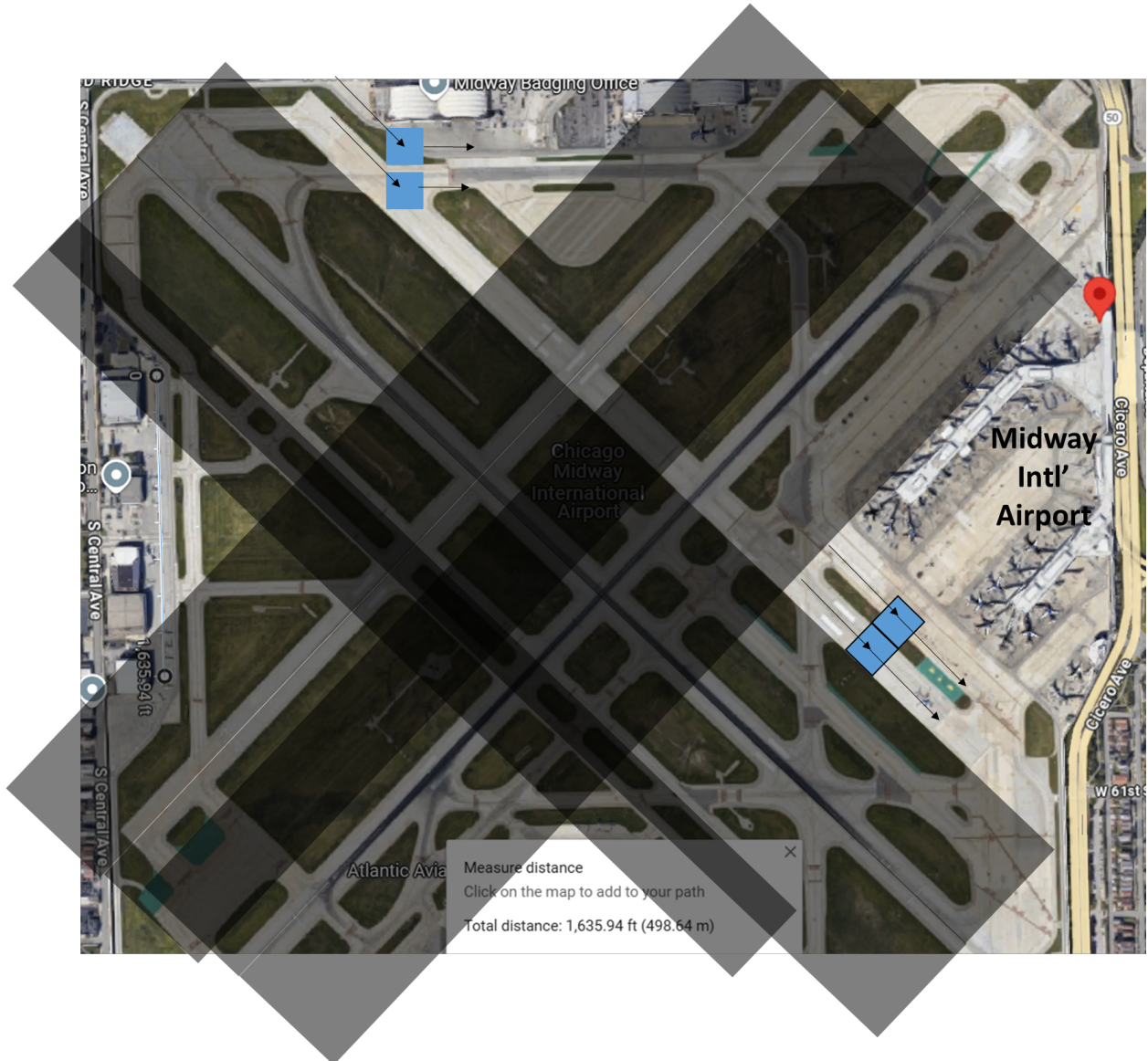


Fig. 3 TLOF pad locations for Midway airport (KMDW). Despite having a large land area, the runway exclusion zones and the requirement for independent approach and departure vectors constrain the number of pads. Maps data: Imagery ©2025 Vexcel Imaging US, Inc., Imagery ©2025 Airbus, Maxar Technologies, Vexcel Imaging US, Inc., Map data ©2025

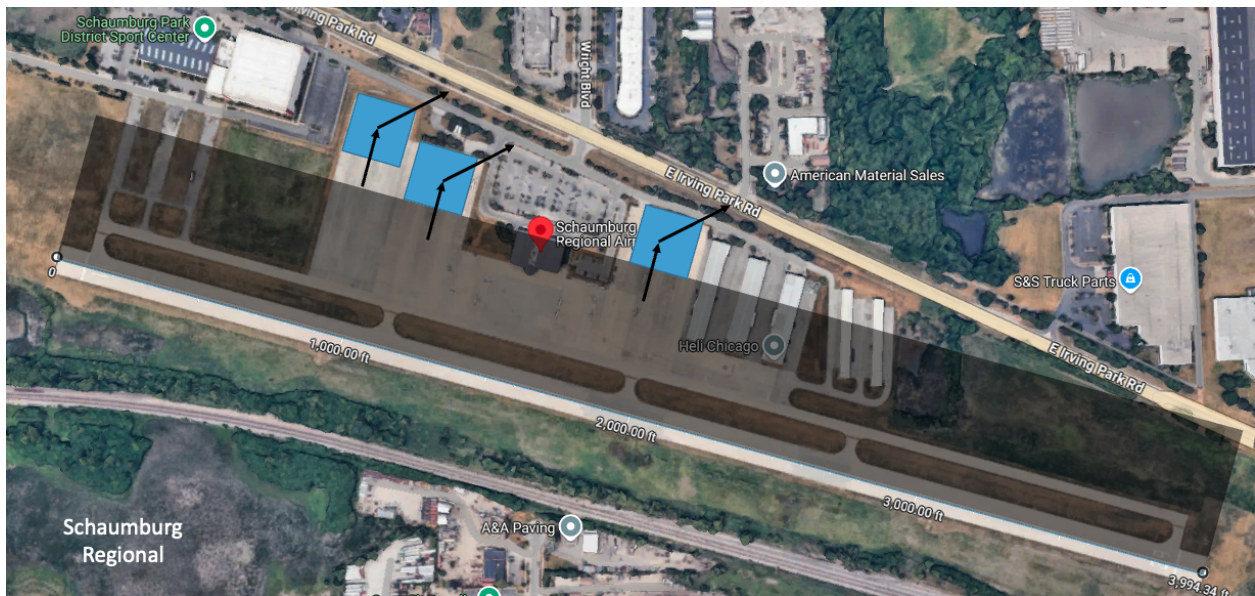


Fig. 4 TLOF pad locations for Schaumburg regional airport (K06C). There are only three pads due to the close proximity of the runway and buildings that block potential approach/departure paths. Maps data: Imagery ©2025 Google, Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025



Fig. 5 Chicago Executive airport (KPWK) showing the location of six TLOF pads, each with independent approach and departure vectors. Maps data: Imagery ©2025 Google, Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025

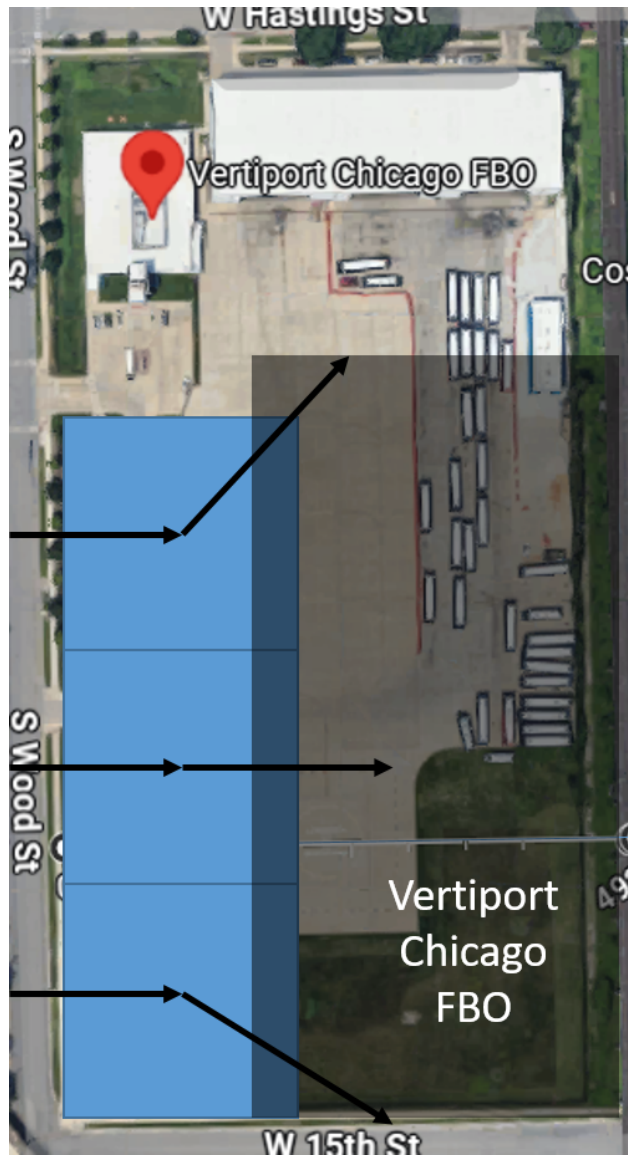


Fig. 6 TLOF pad locations for Vertipoint Chicago Heliport (43IL). The black shaded section represents a 400 ft distance from railway tracks, which are located just outside of the right side of the figure. The black shaded area overlaps with the safety areas, not the TLOF pads themselves. Maps data: Imagery ©2025 Google, Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025

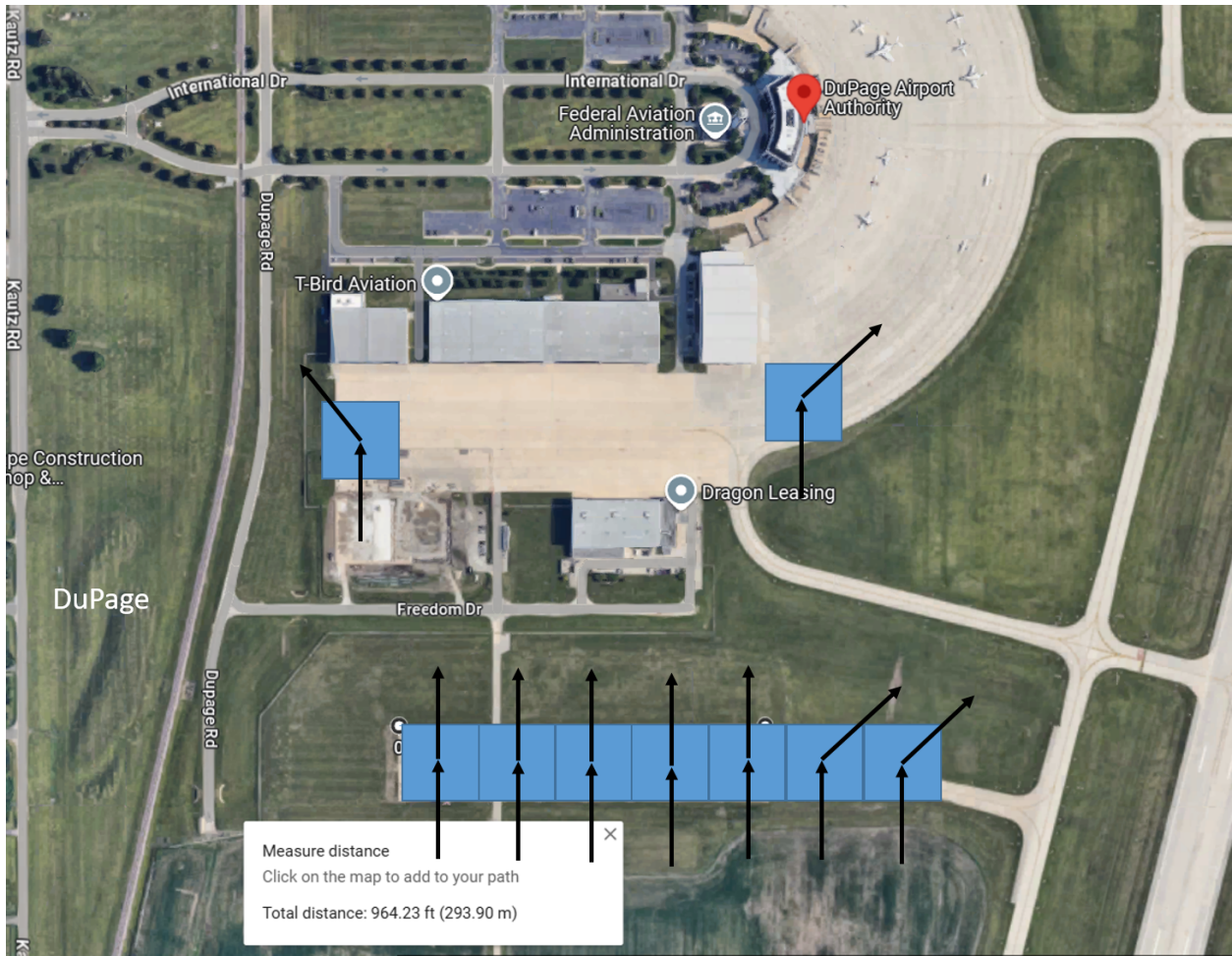


Fig. 7 TLOF pad locations for DuPage airport (KDPA). The large amount of space available here leads to this location having several TLOF pads, with more possible. Maps data: Imagery ©2025 Google, Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025



Fig. 8 TLOF pad locations for Kenosha Regional airport (KENW). Maps data: Imagery ©2025 Google, Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025

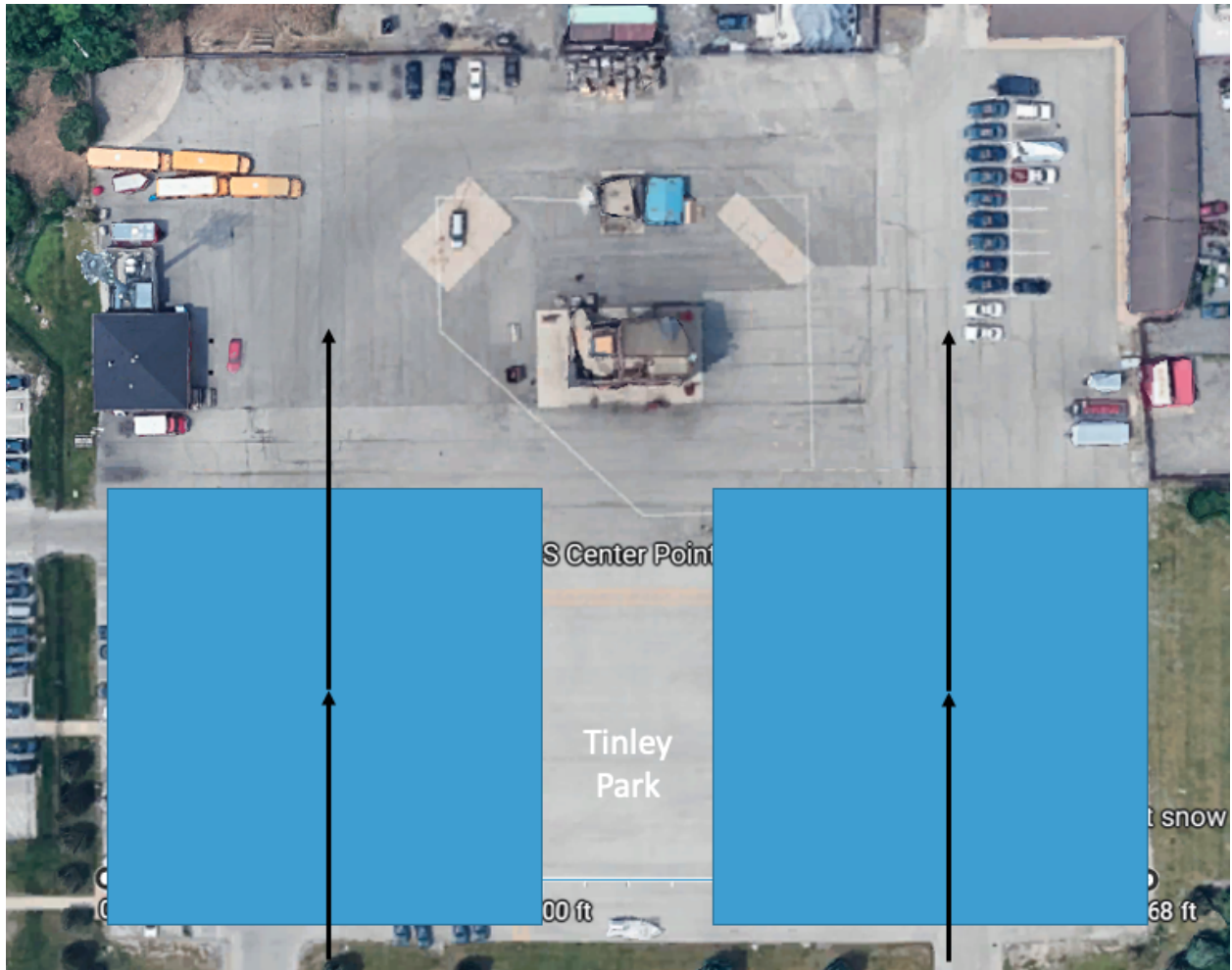
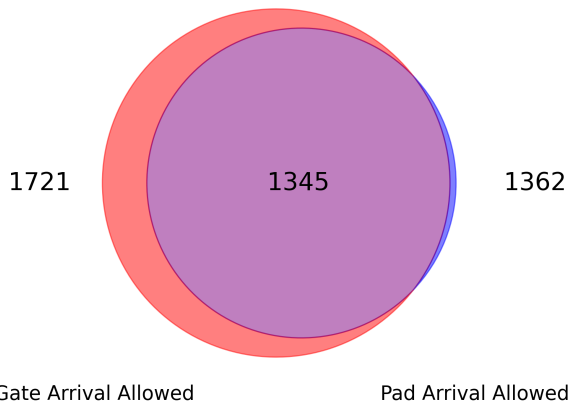


Fig. 9 TLOF pad locations for Tinley Park Heliport (TF8). Being a relatively small location, only two TLOF pads can be located here based on our methodology. Maps data: Imagery ©2025 Google, Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025

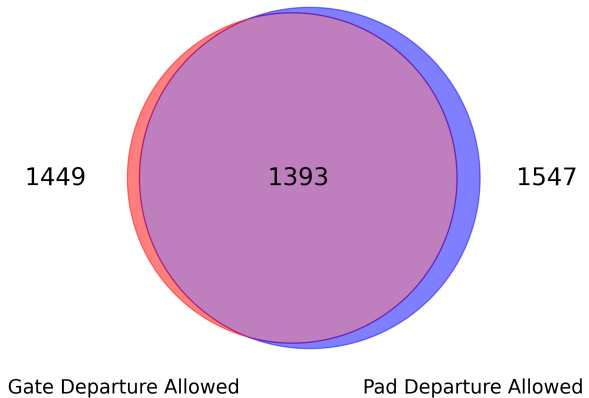
II. Flight Operations Under IFR with TLOF Pad and Gate Constraints

Figures 10 to 18 illustrate results for the nine aerodromes, assuming operations under IFR. Each figure comprises four subfigures:

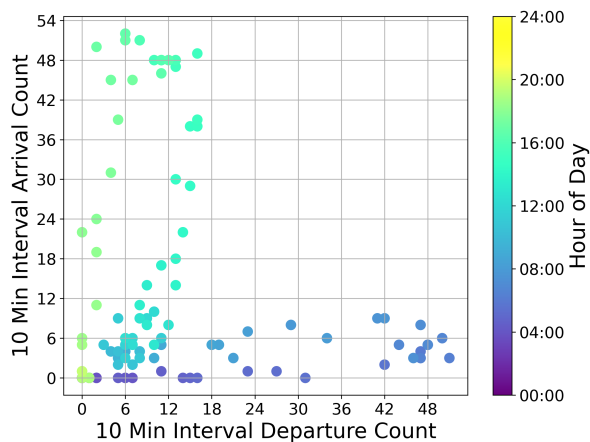
- **Subfigures (a) and (b)** present Venn diagrams for the number of arrivals and departures, respectively. Our analysis considers two operational constraints: (1) the availability of TLOF pads and (2) the availability of gates. The left circle (red) represents all operations that were assigned a gate, while the right circle (blue) represents those allocated a TLOF pad. The overlapping region (purple) indicates operations that secured both a gate and a pad; these operations that have both a TLOF pad and a gate available are termed “fulfilled operations” and may be feasible. For optimal throughput, the two circles should be similar in size with a high degree of overlap. Disparities in circle size indicate an imbalance between the number of gates and TLOF pads, leading to scenarios in which one resource may be overutilized whereas the other remains underutilized. Similarly, a low degree of overlap between the circles indicates potential bottlenecks, where an aircraft may have access to a gate but not a corresponding TLOF pad, or vice versa.
- **Subfigures (c) and (d)** visualize the temporal distribution of arrivals and departures in ten-minute intervals throughout the day. Subfigure (c) shows a two-dimensional scatter plot, and subfigure (d) provides a corresponding three-dimensional bar chart. In subfigure (d), the height of each column indicates the number of ten-minute intervals with a given arrival-departure combination. For example, a bar with height of six implies that the aerodrome experiences six distinct ten-minute intervals over the course of the day with that particular number of departures and arrivals. The coloring of the bars in subfigure (d) and the dots in subfigure (c) represent the time of day during which the specific ten-minute interval occurred. The one exception is that in subfigure (d), a red bar is used to indicate the number of intervals in which zero operations occurred.



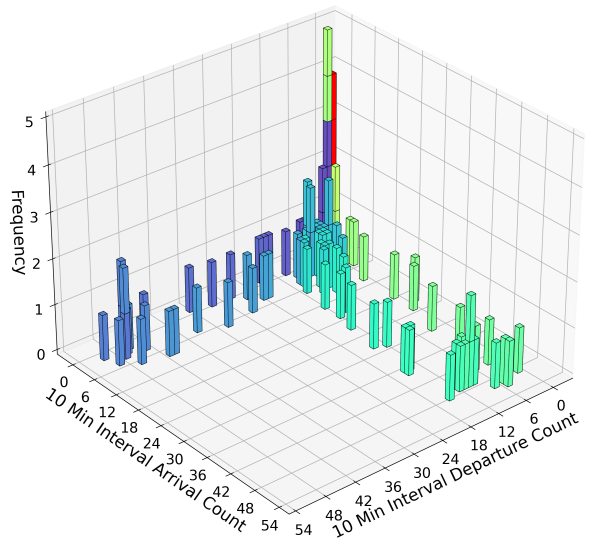
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 1,345 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 1,393 departing flights can be fulfilled based on gate and TLOF pad availability.

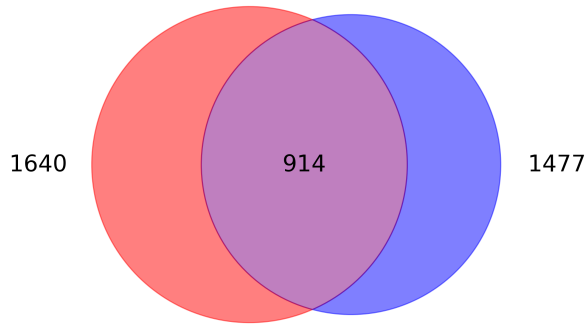


(c) Fulfilled departures and arrivals under TLOF pad and gate constraints under IFR within 10-minute intervals showing dense flight operations during the early morning and early evening.



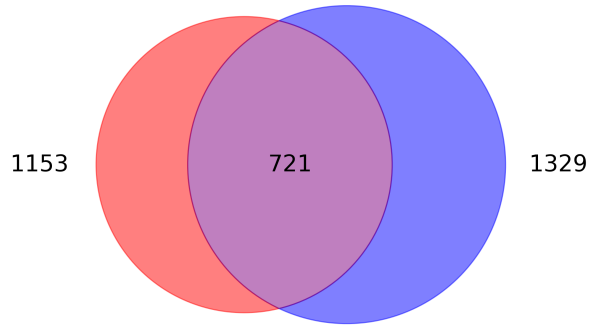
(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and early evening. The red bar indicates when there are no flight operations taking place.

Fig. 10 Flight operations at Lansing Municipal Airport (KIGQ) aerodrome with TLOF pad and gate constraints under IFR.



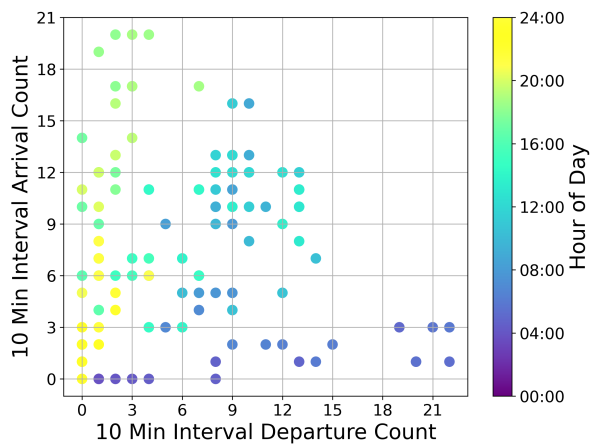
Gate Arrival Allowed Pad Arrival Allowed

(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 914 arriving flights can be fulfilled based on gate and TLOF pad availability.

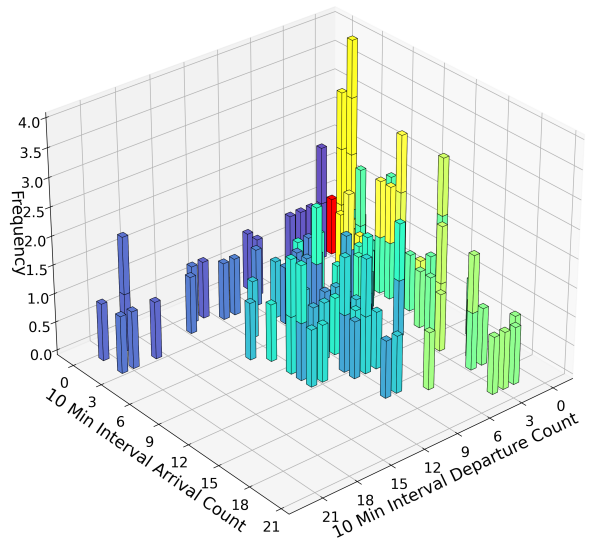


Gate Departure Allowed Pad Departure Allowed

(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 721 departing flights can be fulfilled based on gate and TLOF pad availability.

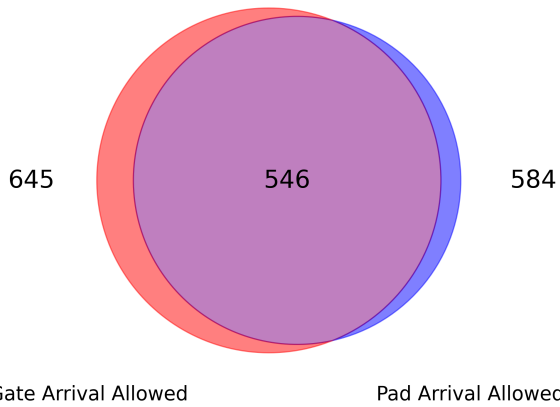


(c) Fulfilled departures and arrivals under TLOF pad and gate constraints under IFR within 10-minute intervals showing dense flight operations during early morning and early to mid afternoon.

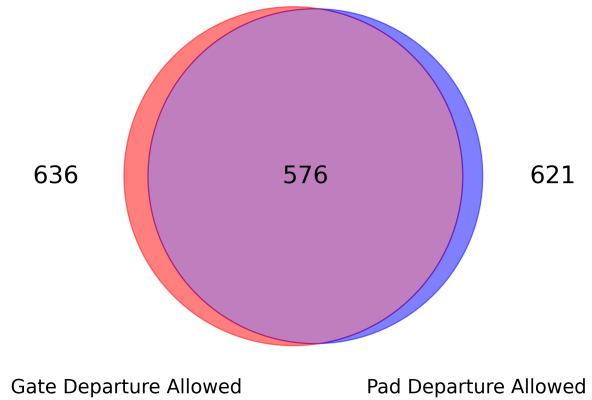


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and early to mid afternoon. The red bar indicates when there are no flight operations taking place.

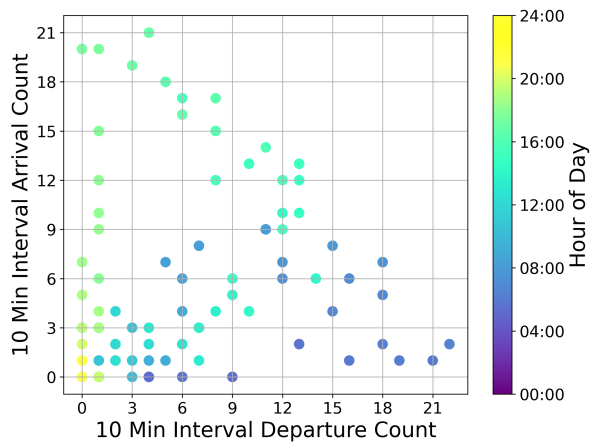
Fig. 11 Flight operations at Chicago Bolingbrook International Airport (K1C5) aerodrome with TLOF pad and gate constraints under IFR.



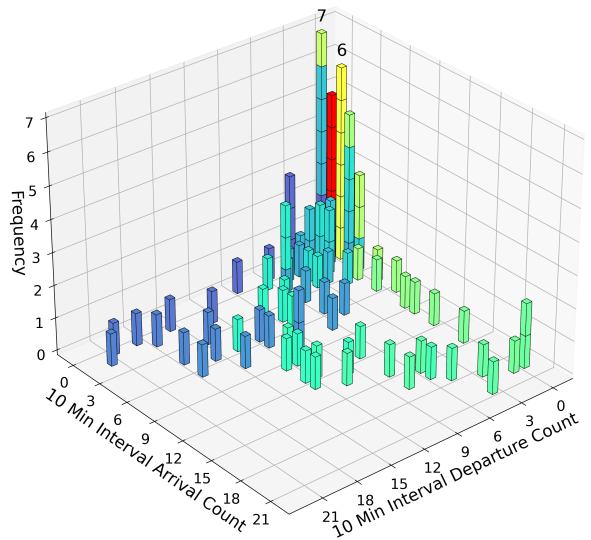
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 546 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 576 departing flights can be fulfilled based on gate and TLOF pad availability.

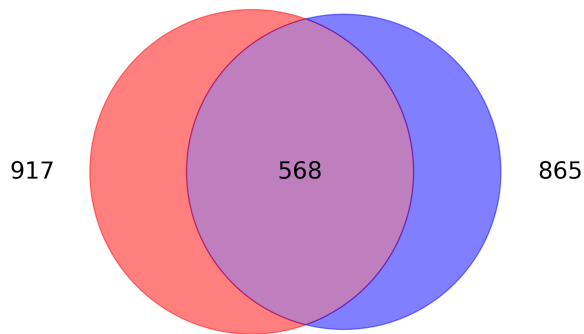


(c) Fulfilled departures and arrivals under TLOF pad and gate constraints under IFR within 10-minute intervals showing dense flight operations during mid afternoon to early evening.



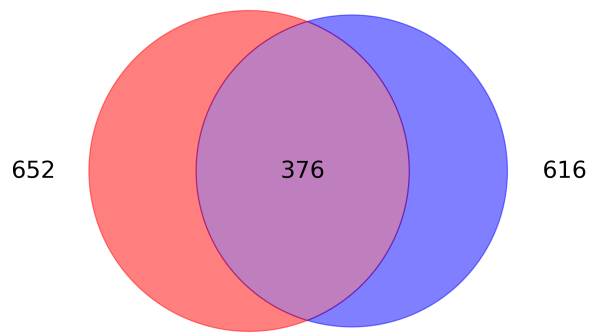
(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the mid afternoon to early evening. The red bar indicates when there are no flight operations taking place.

Fig. 12 Flight operations at Chicago Midway International Airport (KMDW) aerodrome with TLOF pad and gate constraints under IFR.



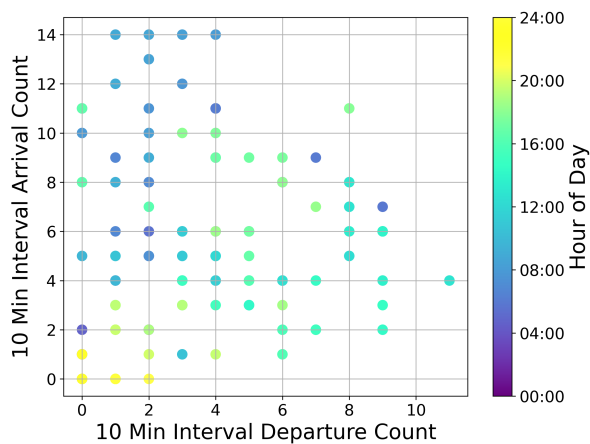
Gate Arrival Allowed Pad Arrival Allowed

(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 568 arriving flights can be fulfilled based on gate and TLOF pad availability.

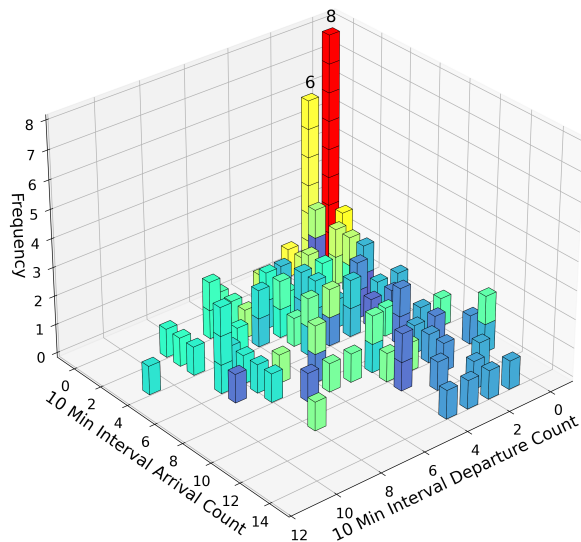


Gate Departure Allowed Pad Departure Allowed

(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 376 departing flights can be fulfilled based on gate and TLOF pad availability.

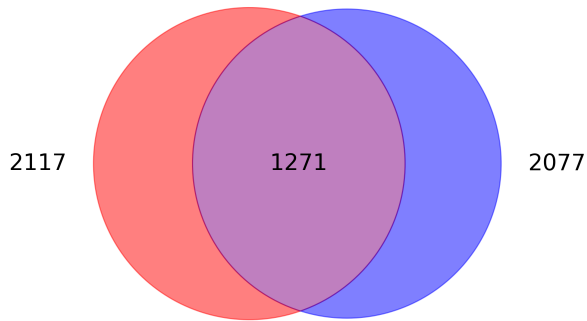


(c) Fulfilled departures and arrivals under TLOF pad and gate constraints under IFR within 10-minute intervals showing dense flight operations during early morning and early evening.



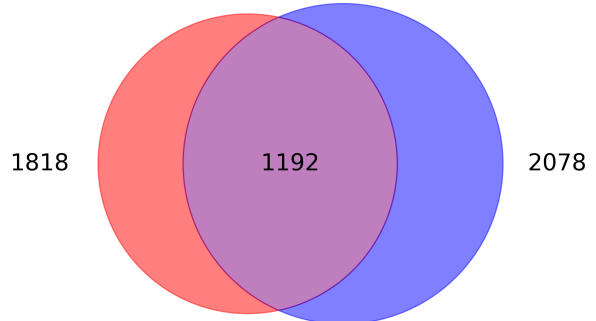
(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and early evening. The red bar indicates when there are no flight operations taking place.

Fig. 13 Flight operations at Schaumburg Regional Airport (K06C) aerodrome with TLOF pad and gate constraints under IFR.



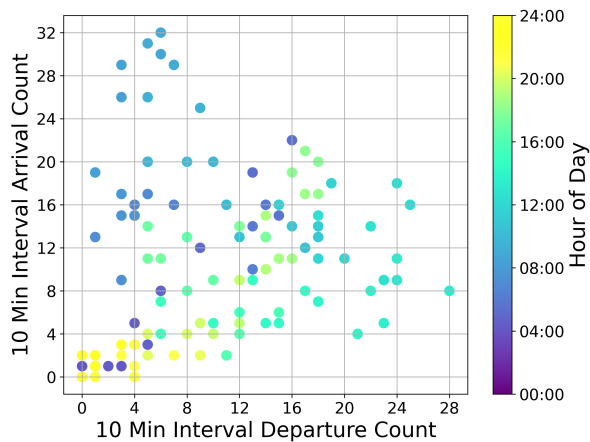
Gate Arrival Allowed Pad Arrival Allowed

(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 1,271 arriving flights can be fulfilled based on gate and TLOF pad availability.

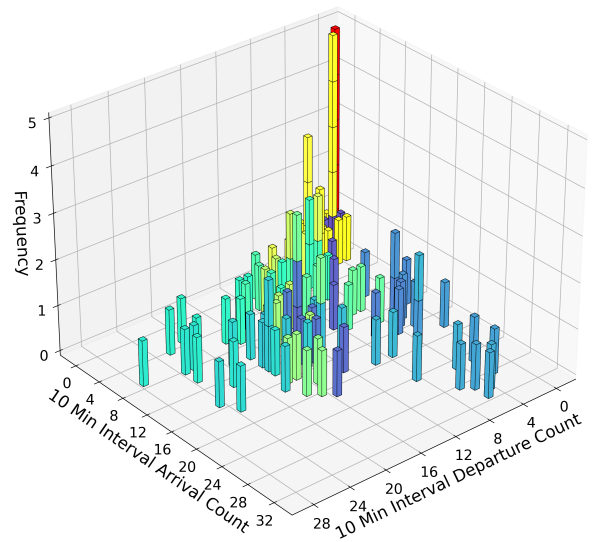


Gate Departure Allowed Pad Departure Allowed

(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 1,192 departing flights can be fulfilled based on gate and TLOF pad availability.

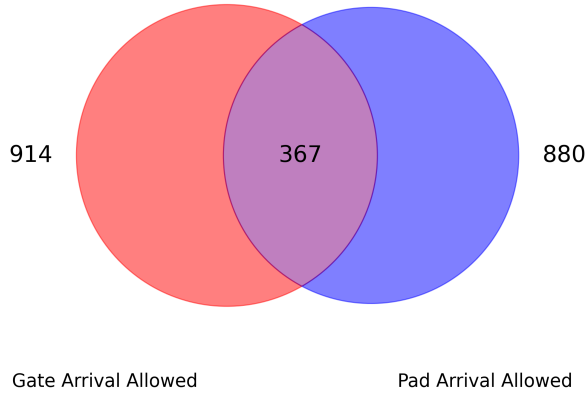


(c) Fulfilled departures and arrivals under TLOF pad and gate constraints under IFR within 10-minute intervals showing dense flight operations during early morning and late afternoon.

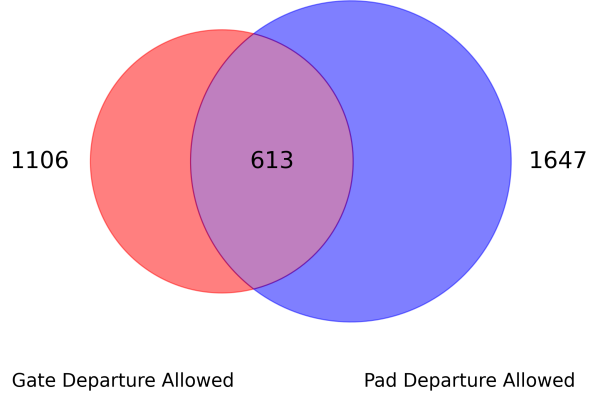


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and late afternoon. The red bar indicates when there are no flight operations taking place.

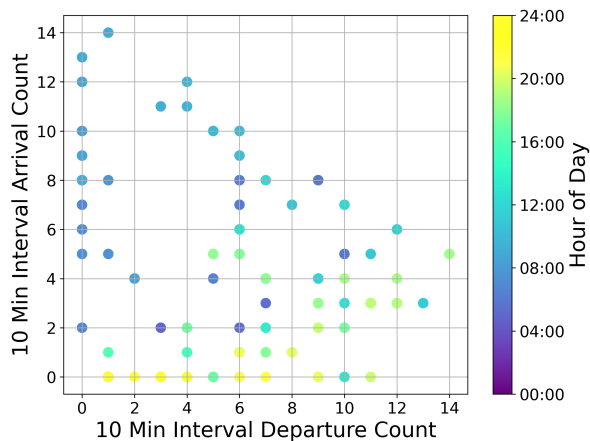
Fig. 14 Flight operations at Chicago Executive Airport (KPWK) aerodrome with TLOF pad and gate constraints under IFR.



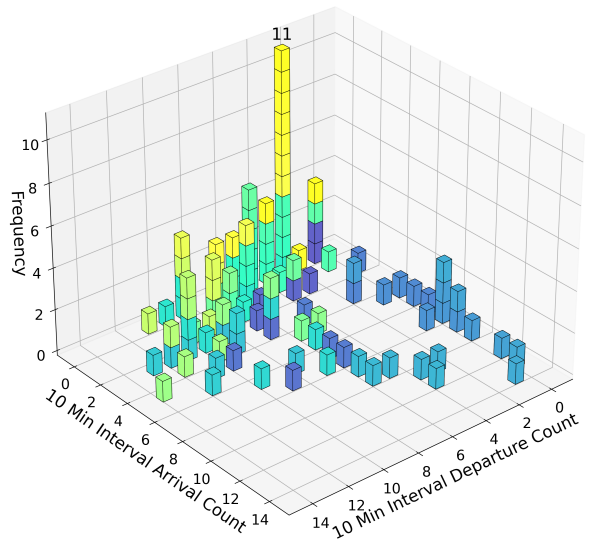
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 367 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 613 departing flights can be fulfilled based on gate and TLOF pad availability.

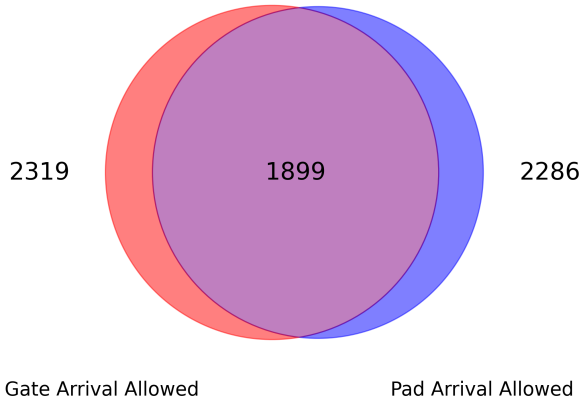


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under IFR within 10-minute intervals showing dense flight operations during the early morning and late evening.

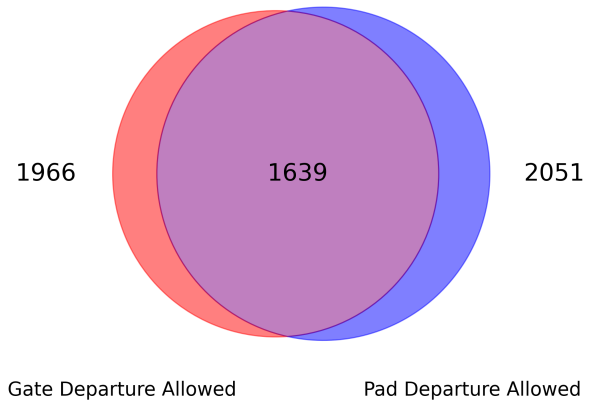


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and late evening.

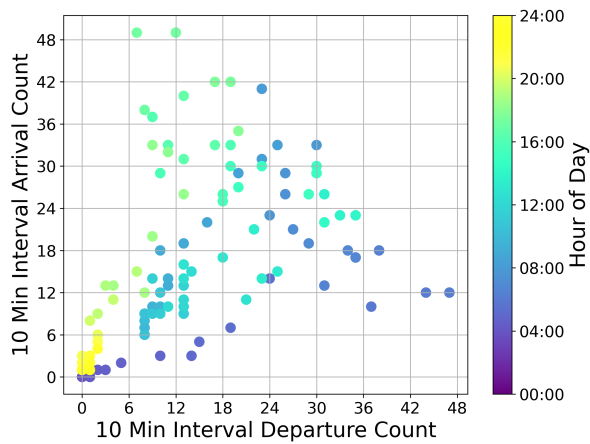
Fig. 15 Flight operations at Vertiport Chicago Heliport (43IL) aerodrome with TLOF pad and gate constraints under IFR.



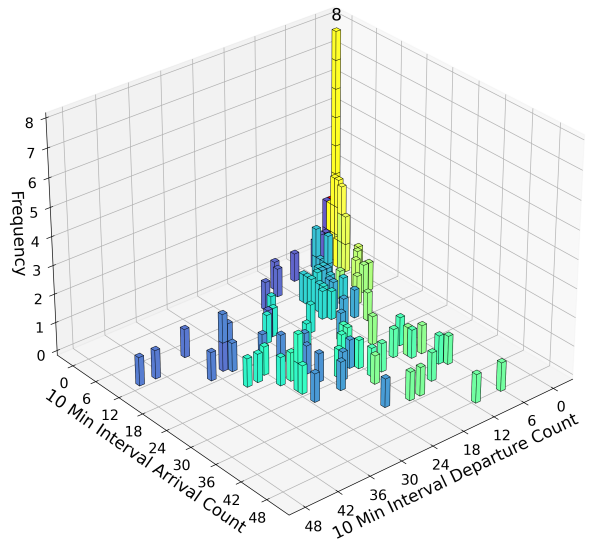
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 1,899 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 1,639 departing flights can be fulfilled based on gate and TLOF pad availability.

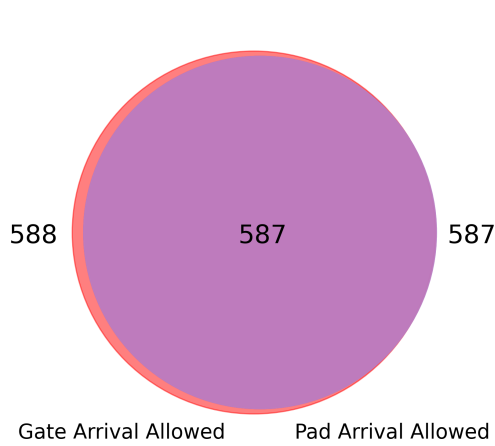


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under IFR within 10-minute intervals showing dense flight operations during the early morning and early evening.

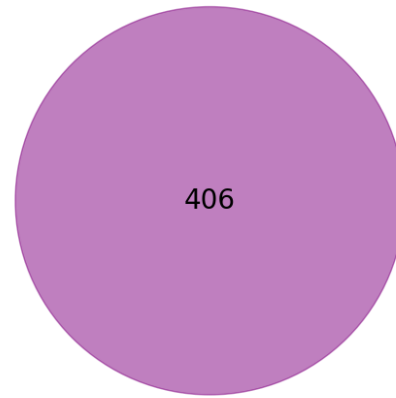


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and early evening.

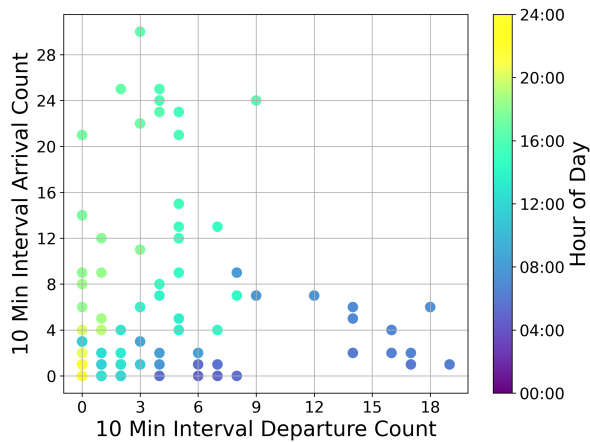
Fig. 16 Flight operations at DuPage Airport (KDP) aerodrome with TLOF pad and gate constraints under IFR.



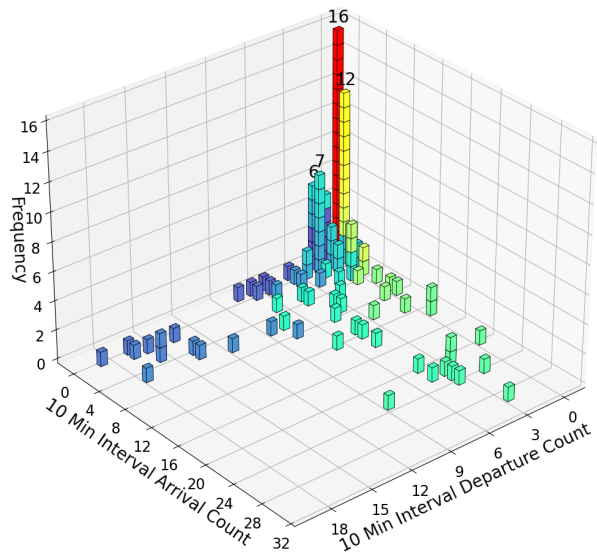
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 587 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 406 departing flights can be fulfilled based on gate and TLOF pad availability.

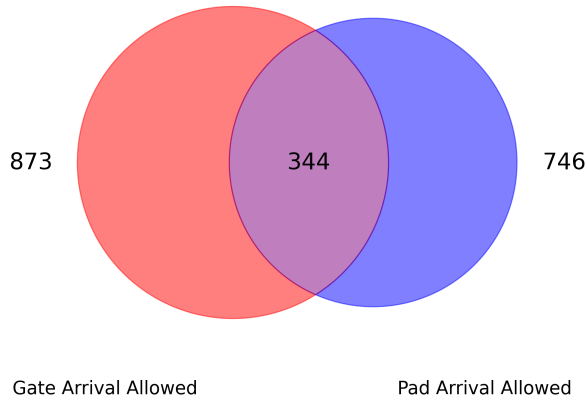


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint and IFR within 10-minute intervals showing dense flight operations during the early morning and late afternoon.

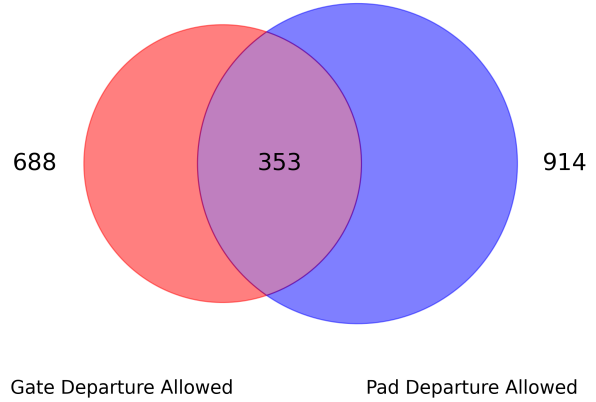


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and late afternoon. The red bar indicates when there are no flight operations taking place.

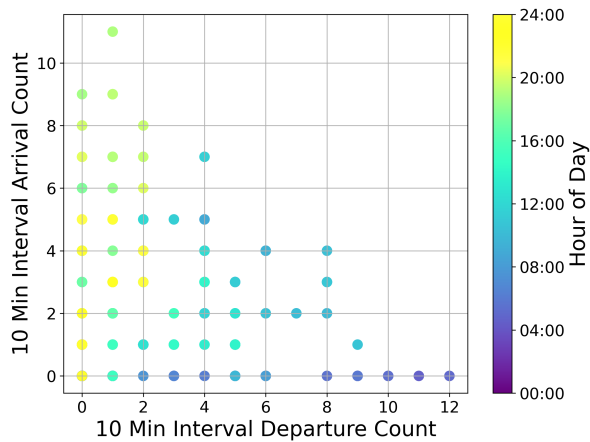
Fig. 17 Flight operations at Kenosha Regional Airport (KENW) aerodrome with TLOF pad and gate constraints under IFR.



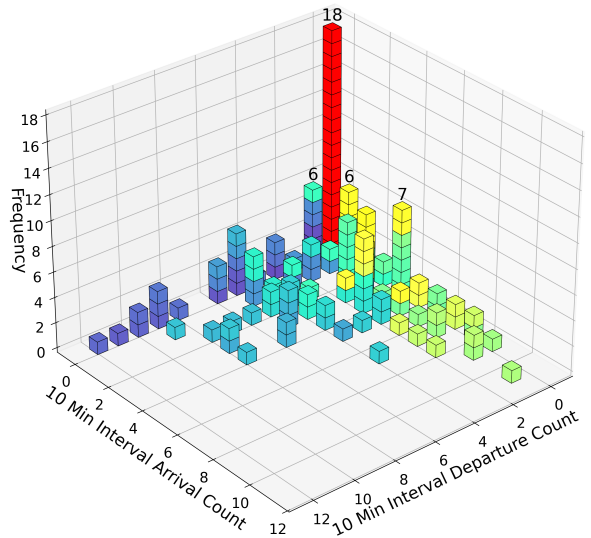
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under IFR. A total of 344 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under IFR. A total of 353 departing flights can be fulfilled based on gate and TLOF pad availability.



(c) Fulfilled departures and arrivals under TLOF pad and gate constraint and IFR within 10-minute intervals, showing lower operational intensity in the early morning and mid- to late evening.

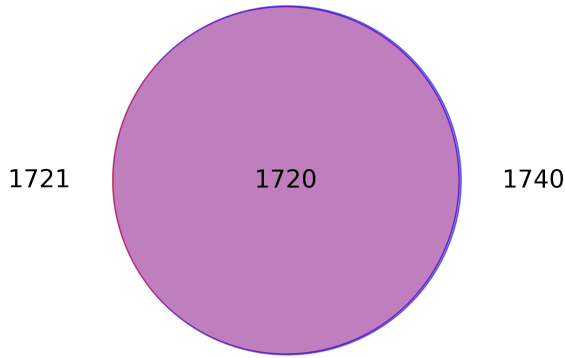


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring in the early morning and mid- to late evening. The red bar indicates when there are no flight operations taking place.

Fig. 18 Flight operations at Tinley Park Helistop (TF8) aerodrome with TLOF pad and gate constraints under IFR.

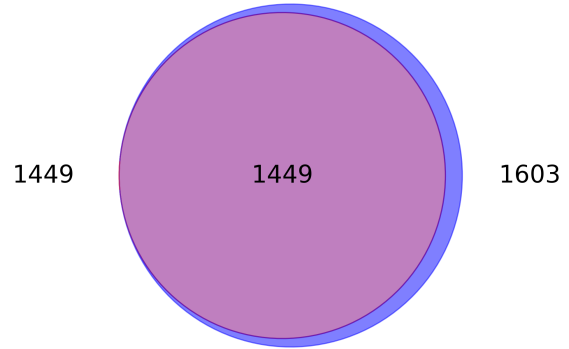
III. Flight Operations Under VFR with TLOF Pad and Gate Constraints

Similar to Section II, Figures 19 through 27 present throughput results at the nine aerodromes under VFR. Each figure consists of four sub-figures that mirror the subfigures in Figures 10 through 18 from Section II. Sub-figures (a) and (b) consist of gate and TLOF pad availability for arrivals and departures respectively, while sub-figures (c) and (d) represent the number of arrivals and departures in ten-minute intervals throughout the day in each of the nine aerodromes.



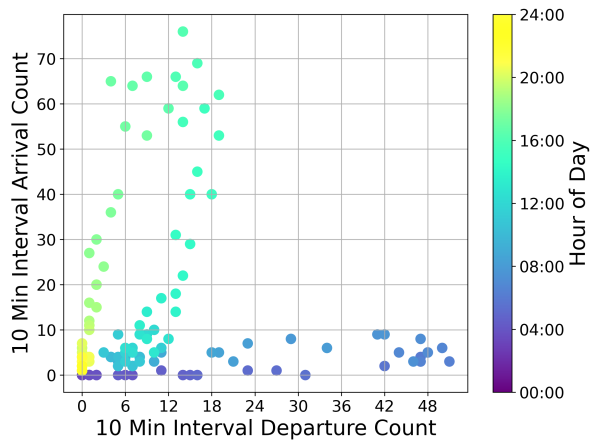
Gate Arrival Allowed Pad Arrival Allowed

(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 1,720 arriving flights can be fulfilled based on gate and TLOF pad availability.

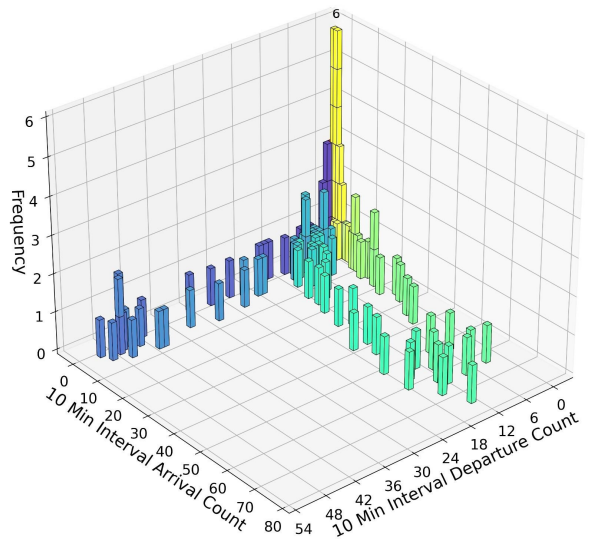


Gate Departure Allowed Pad Departure Allowed

(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 1,499 departing flights can be fulfilled based on gate and TLOF pad availability.

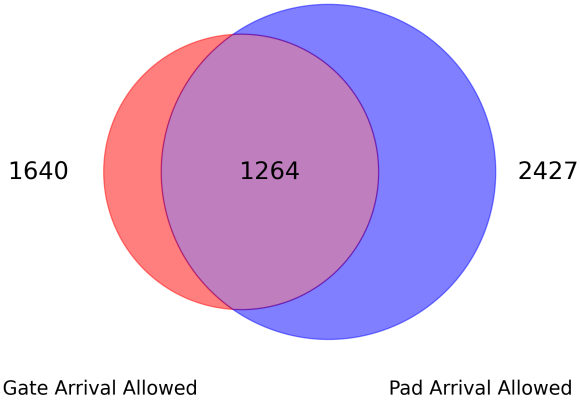


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under VFR within 10-minute intervals showing dense flight operations during the early morning and late afternoon.

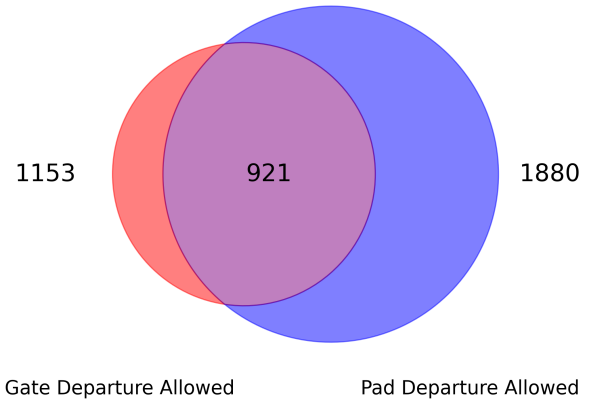


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and late afternoon.

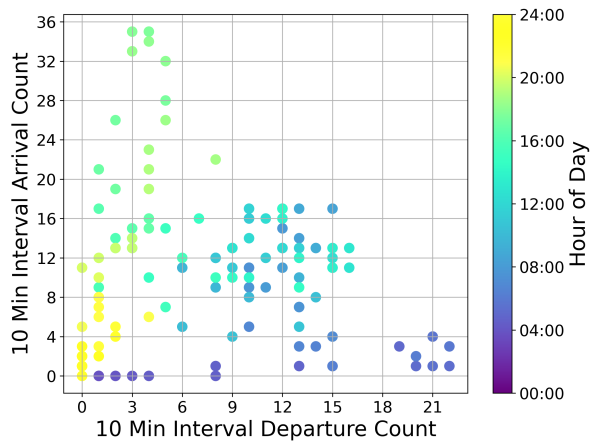
Fig. 19 Flight operations at Lansing Municipal Airport (KIGQ) aerodrome with TLOF pad and gate constraints under VFR.



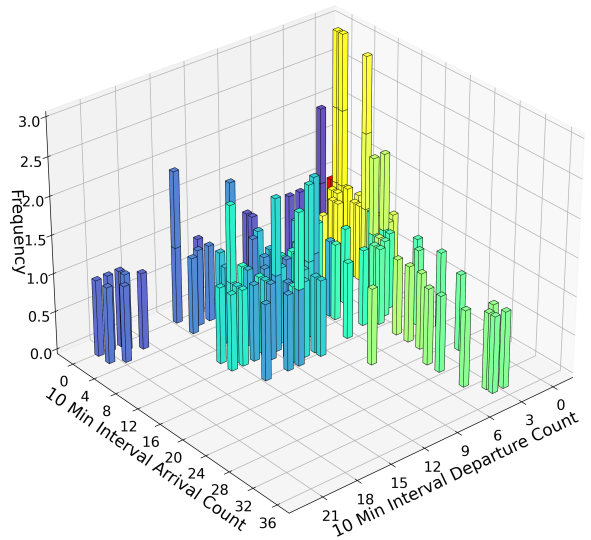
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 1,264 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 921 departing flights can be fulfilled based on gate and TLOF pad availability.

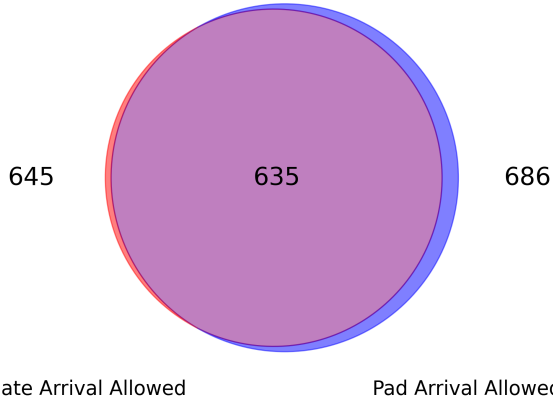


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under VFR within 10-minute intervals showing dense flight operations during the early morning and early to late evening.

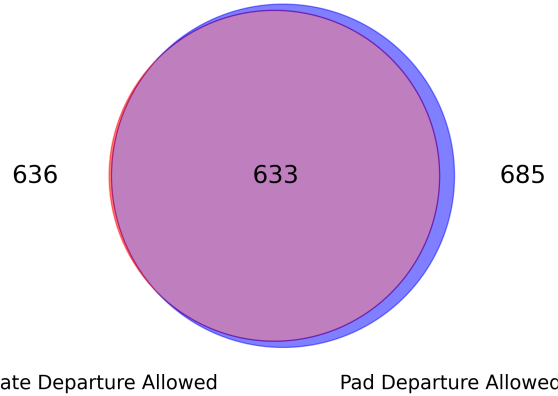


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and early to late evening. The red bar indicates when there are no flight operations taking place.

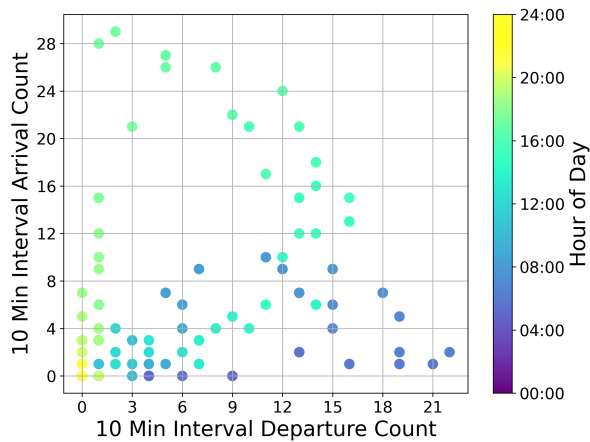
Fig. 20 Flight operations at Chicago Bolingbrook International Airport (K1C5) aerodrome with TLOF pad and gate constraints under VFR.



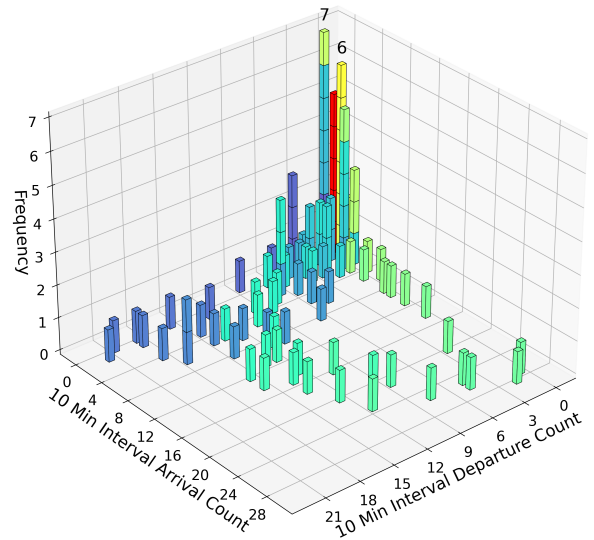
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 635 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 633 departing flights can be fulfilled based on gate and TLOF pad availability.

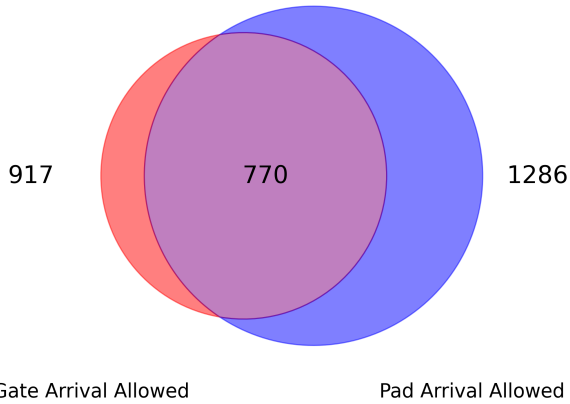


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under VFR within 10-minute intervals showing dense flight operations during the early morning and early evening.



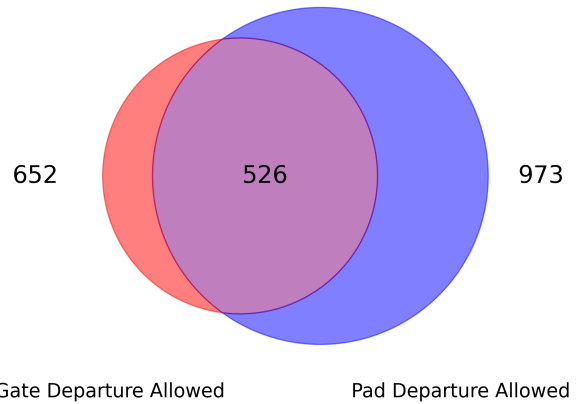
(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and early evening. The red bar indicates when there are no flight operations taking place.

Fig. 21 Flight operations at Chicago Midway International Airport (KMDW) aerodrome with TLOF pad and gate constraints under VFR.



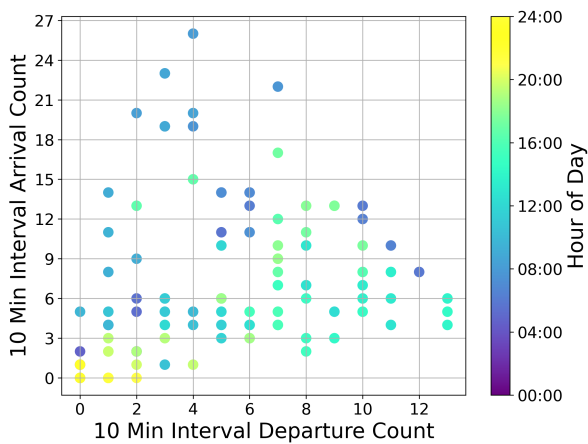
Gate Arrival Allowed Pad Arrival Allowed

(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 770 arriving flights can be fulfilled based on gate and TLOF pad availability.

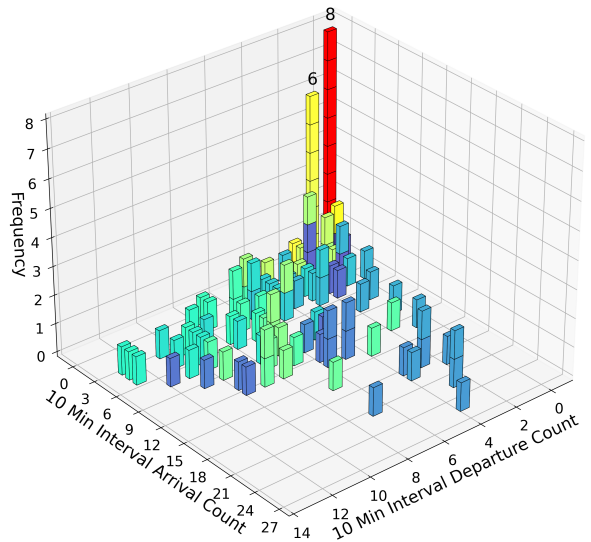


Gate Departure Allowed Pad Departure Allowed

(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 526 departing flights can be fulfilled based on gate and TLOF pad availability.

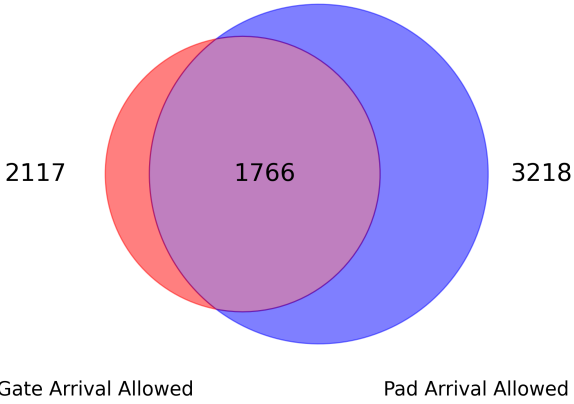


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under VFR within 10-minute intervals showing dense flight operations during the early morning and early evening.

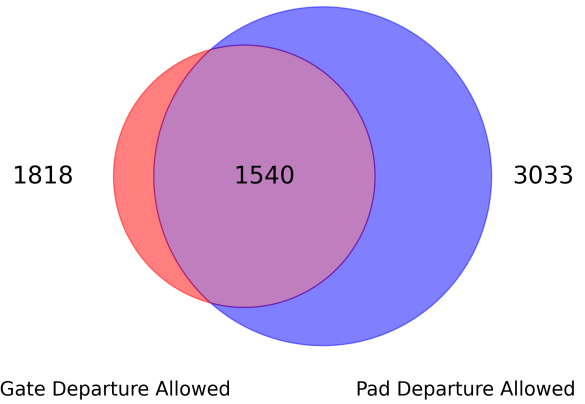


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and early evening. The red bar indicates when there are no flight operations taking place.

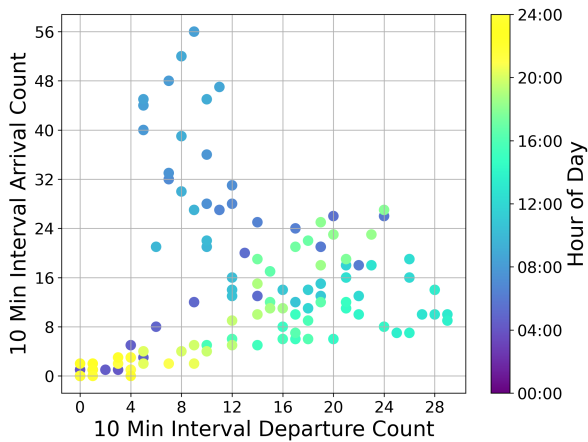
Fig. 22 Flight operations at Schaumburg Regional Airport (K06C) aerodrome with TLOF pad and gate constraints under VFR.



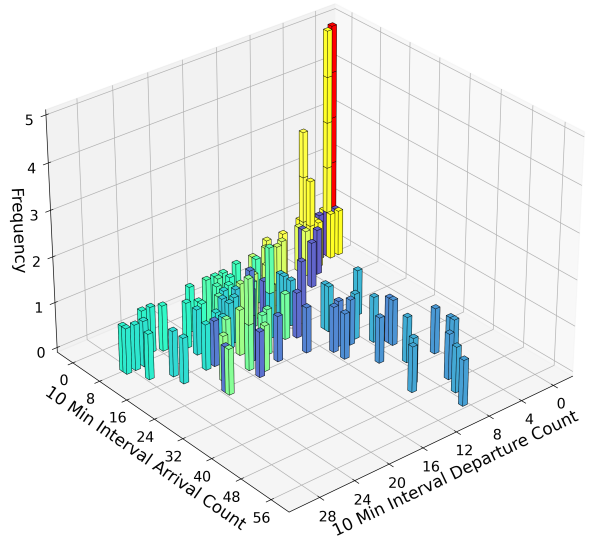
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 1,776 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 1,540 departing flights can be fulfilled based on gate and TLOF pad availability.

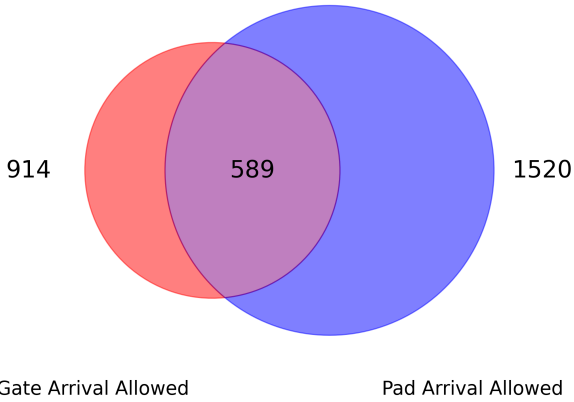


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under VFR within 10-minute intervals showing dense flight operations during the early morning and late afternoon.

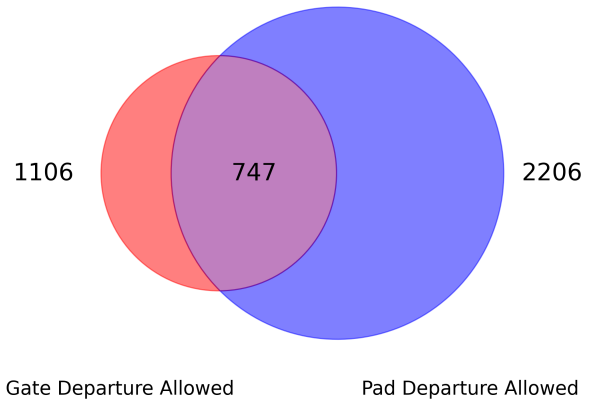


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and the late afternoon. The red bar indicates when there are no flight operations taking place.

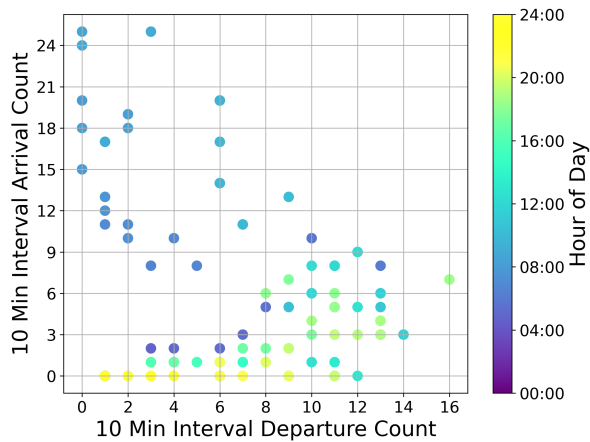
Fig. 23 Flight operations at Chicago Executive Airport (KPWK) aerodrome with TLOF pad and gate constraints under VFR.



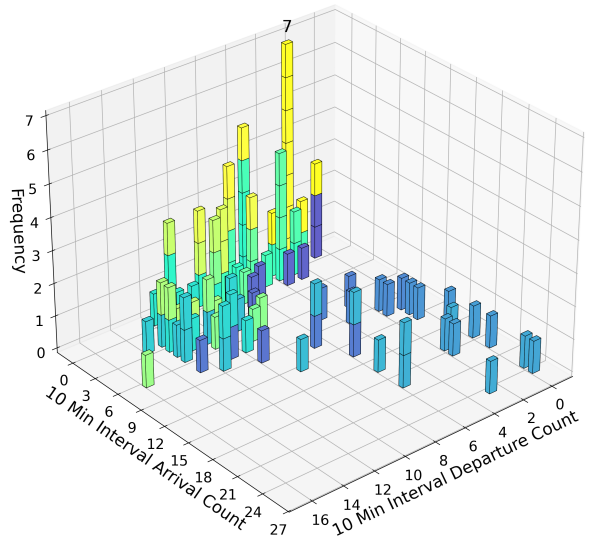
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 589 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 747 departing flights can be fulfilled based on gate and TLOF pad availability.

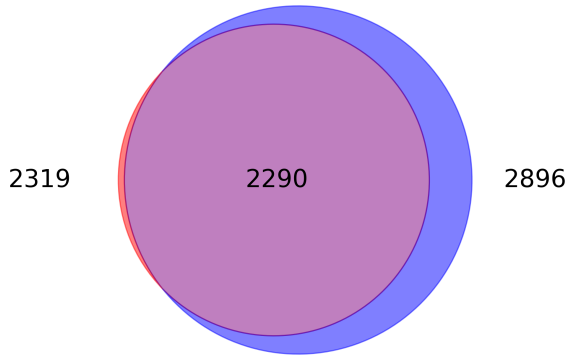


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under VFR within 10-minute intervals showing dense flight operations during the early morning and late afternoon.



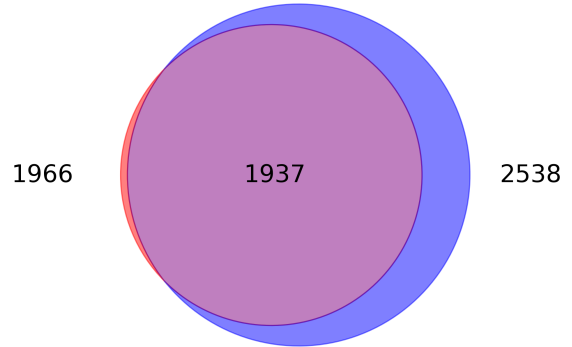
(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during early morning and late afternoon.

Fig. 24 Flight operations at Vertiport Chicago Heliport (43IL) aerodrome with TLOF pad and gate constraints under VFR.



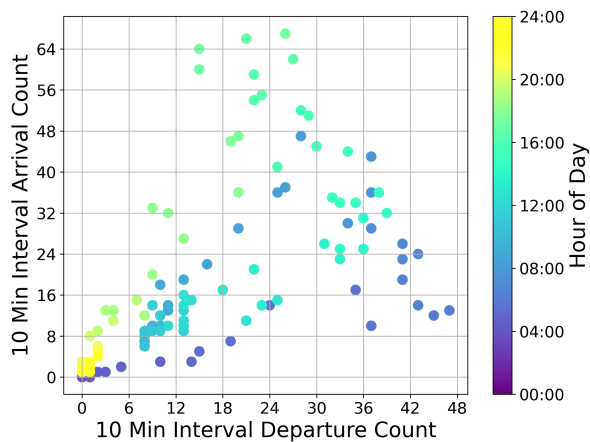
Gate Arrival Allowed Pad Arrival Allowed

(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 2,290 arriving flights can be fulfilled based on gate and TLOF pad availability.

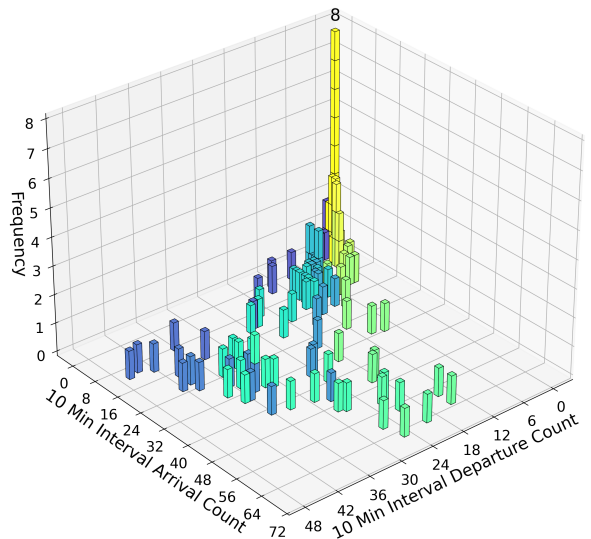


Gate Departure Allowed Pad Departure Allowed

(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 1,937 departing flights can be fulfilled based on gate and TLOF pad availability.

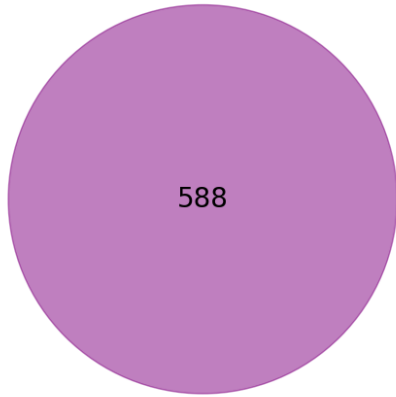


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint under VFR within 10-minute intervals showing dense flight operations during the early morning and late afternoon to early evening.

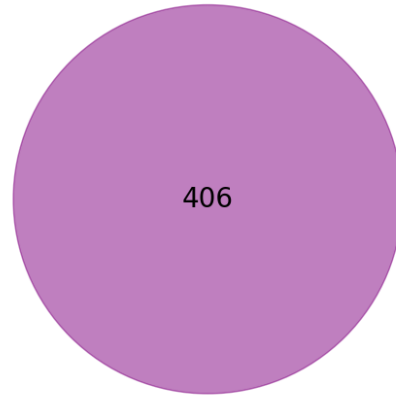


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and late afternoon to early evening.

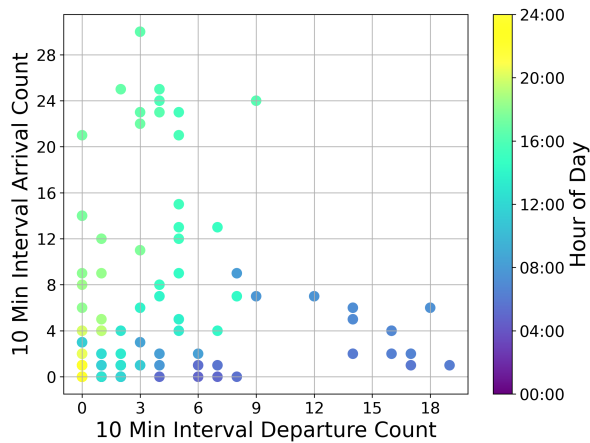
Fig. 25 Flight operations at DuPage Airport (KDP) aerodrome with TLOF pad and gate constraints under VFR.



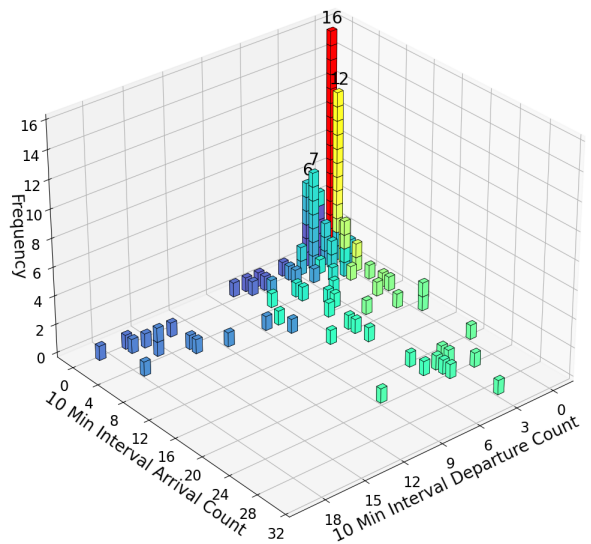
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 588 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 406 departing flights can be fulfilled based on gate and TLOF pad availability.

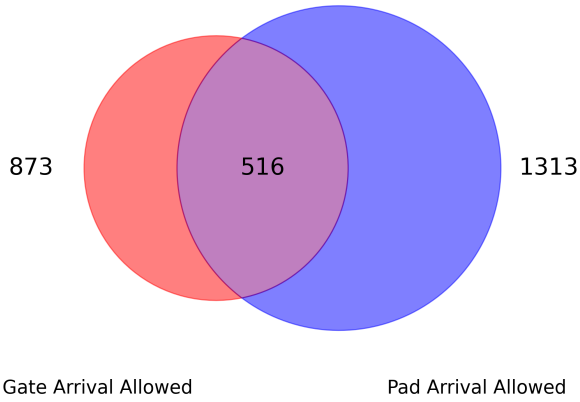


(c) Fulfilled departures and arrivals under TLOF pad and gate constraint and VFR within 10-minute intervals showing dense flight operations during the early morning and late afternoon.

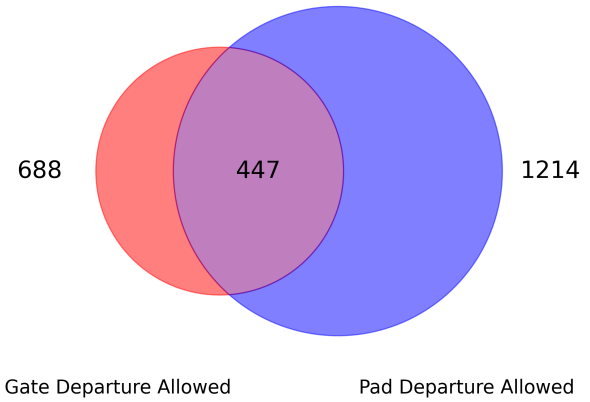


(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring during the early morning and late afternoon. The red bar indicates when there are no flight operations taking place.

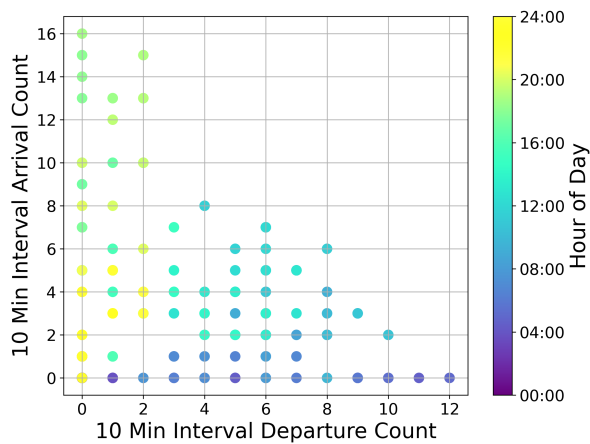
Fig. 26 Flight operations at Kenosha Regional Airport (KENW) aerodrome with TLOF pad and gate constraints under VFR.



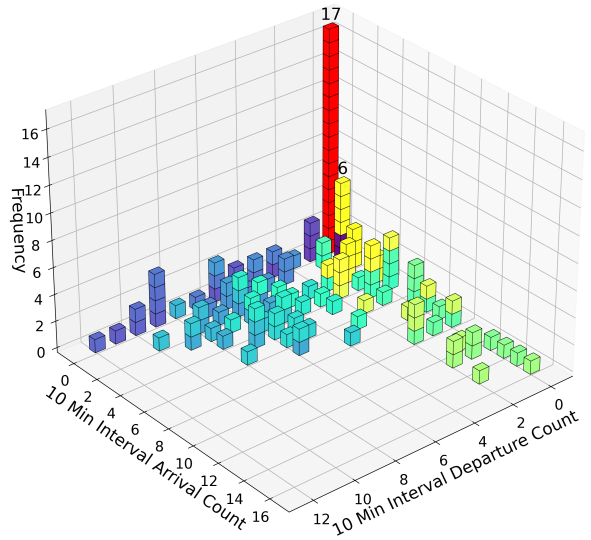
(a) Venn diagram illustrating the overlap between arrivals with available gates and available TLOF pads under VFR. A total of 516 arriving flights can be fulfilled based on gate and TLOF pad availability.



(b) Venn diagram illustrating the overlap between departures with available gates and available TLOF pads under VFR. A total of 447 departing flights can be fulfilled based on gate and TLOF pad availability.



(c) Fulfilled departures and arrivals under TLOF pad and gate constraint and VFR within 10-minute intervals, showing dense flight operations during the early morning and early evening.



(d) Frequency bar chart visualizing the fulfilled departing and arriving flights that meet both TLOF pad and gate constraints, with most operations occurring in the early morning and early evening. The red bar indicates when there are no flight operations taking place.

Fig. 27 Flight operations at Tinley Park Helistop (TF8) aerodrome with TLOF pad and gate constraints under VFR.

References

- [1] Das Biswas, S., Gerardus, J., Mall, K., DeLaurentis, D. A., Crossley, W. A., Patterson, M. D., and Sells, E., Brandon, "Initial Estimation of the Number of Urban Air Mobility Operations at Aerodromes to Assess Operational Limits," *AIAA AVIATION 2025 Forum*, 2025. Accepted.
- [2] Dermody, J. R., "Advisory Circular 150/5390-2D: Heliport Design," Tech. Rep. AC 150/5390-2D, U.S. Department of Transportation, Federal Aviation Administration, January 2023. URL https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_150_5390_2D_Heliports.pdf, accessed: 2025-05-01.
- [3] Bassey, R., "Engineering Brief #105A: Vertiport Design, Supplemental Guidance to Advisory Circular 150/5390-2D, Heliport Design," Tech. rep., Federal Aviation Administration (FAA), 2024. URL https://www.faa.gov/airports/engineering/engineering_briefs/eb_105a_vertiports, accessed: 2025-05-01.