

## **General Aviation Airport Design for Aircraft Typically Used by the University of Michigan Medical Center**

### **Medical Center Aircraft**

Currently the Medical Center operates two aircraft a Cessna Citation II and a Westwind 1123. The Citation II is the primary aircraft with the Westwind 1123 being used as the primary backup transport. Typical passengers and fuel loads bring both aircraft to near their maximum allowed flying weight when flying organ harvest missions. These missions have reach out a distance as far as some locations in Mexico, the return time is the critical parameter from any location. All harvested organs have a limited time during which they are suitable for use. One example organ time limit is four hours for a heart, from the time it is remove from a donor to the time it is transplanted into a recipient. Given this kind of time constraint every second counts and is why small business jets are best suited for this transportation job.

These aircraft are operated under the same Federal Aviation Rules(FAR's) as the airlines use for commercial flights. Further, these rules are exceeded in practice as the individual aircraft operators require for the safest operation. The Cessna Citation II is considered by the FAA a B approach category because it is allowed to approach an airport runway at speeds above 91 knots and below 121 knots. The aircraft pilots for reasons of safety operate the aircraft as a C approach category aircraft, i.e. approach speeds between 121 knots and 166 knots. This added safety margin is reflected in the for a longer runway for landing the aircraft. The Westwind is listed in FAA documents as a C approach category is also for safety reasons is operated as a D category.

The commercial flight rules add to all other considerations for calculation of takeoff runway length for a given set of weather conditions. The most restrictive of the following is the limiting factor:

- Maximum allowed takeoff weight for given conditions
- Takeoff field requirements dictated by weight, current air temperature, humidity
- Brake energy requirements derived from manufacturers charts
- Second takeoff segment, i.e. during climb
- Takeoff Correction Factors, Federal Aviation Rules, determined by FAA
- Maximum tire ground speed limit before failure

Landing has another set of rules that restrict the aircraft to safe operation:

- Maximum certified landing at weight
- Aborted landing, approach climb requirements
- Available length of runway for a given set of conditions
- Corrections for wet, slush, snow, or ice covered runway
- Runway gradient or slope