

Flow Evaluation Team

-FET-



CDM

Collaborative
Decision Making

Ernie Stellings, NBAA
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Previous FET Tasking on Capacity (2010-13)

The CDM Stakeholders Group (CSG) developed and delivered tasking to the Flow Evaluation Team (FET) to provide a recommendation on Flow Constrained Area (FCA) Capacity estimation. The task provided to the FET was as follows:

“Continue concept exploration to develop decision support tool for use with Airspace Flow Program (AFP) and Collaborative Trajectory Options Program (CTOP).”

FET TASKING (2010-13)

Current problems in the System:

- Lack of a method to determine practical and achievable capacity and throughput of a Flow Constrained Area (FCA).
- The current system relies on inaccurate historical tables of volume or a simplified averaging calculation.
- The current system does not take into account any constraints in the system
- The current system does not consider airspace complexity
- The current system does not provide an evaluation of risk associated with using different throughput values.



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Task 85/AFP Capacity and Strategies July 2018

In July 2018, the CSG assigned task 85 to the FET. The team was tasked with reviewing the current AFP strategies and methods for determining AFP capacity.

From the Tasking document:

An Airspace Flow Program (AFP) is effective in providing safe and efficient structure and control when an area of airspace is constrained by volume or convective weather. Determining the correct capacity, duration and throughput of aircraft to be included in an AFP is not an exact science and requires intuitive knowledge of the airspace. Additional consideration is the systemic impact of an AFP on other traffic management initiatives. With the emergence of new technologies and airspace modernization, **there is a need to review the current process for determining capacity of an AFP** and to review the strategies utilized when an AFP is implemented.

FET TASKING - 85

The output of tasking 85 was a white paper entitled: “**CAPACITY ESTIMATION TO SUPPORT THE USE OF AFPS**” (July 2020)

As part of its completion of Task 85, the FET has gathered information from a number of research and development groups to gain insights into the state of the art regarding the estimation of the capacity of AFPs

These groups will provide a briefing on their own methodology in addressing airspace capacity in the next segment.



FET TASKING - 85

In addition to input from the members of the FET representing traffic flow management and airline operations staff, seven organizations provided presentations and written documentation regarding their efforts to develop software to estimate the capacity of AFPs. This included input from ATCSCC, IMSG, Metron Aviation, MIT Lincoln Labs, Mosaic ATM and NASA.

Several of them will follow the lunch break

FET TASKING - 85

Conclusion 1. The assessment of the FET is that there would be value in the integration of a capacity estimation algorithm into a decision support tool for the generation of AFPs and display of recommended throughput rates in clear weather and recommended reductions in throughput rates as a result of convective weather.



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Conclusion 2. A review of current AFP rate estimation algorithms leads to the second conclusion: None of the available technologies consider all of the relevant factors in estimating the throughput rate for an AFP. As a result, such algorithms need to be embedded in decision support tool where the algorithmically-generated rate estimate is treated as one input to support the expert judgment of the traffic managers.

The algorithmically-generated rate could, for example, increase consistency and accuracy by providing an anchoring point from which the traffic manager further raises or lowers the rate based on consideration of those factors not considered by the algorithm.



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Conclusion 3. There is a need for an additional criterion regarding its design: The traffic manager must be able to develop and apply a mental model regarding the factors the algorithm does and does not consider, so that the traffic manager can appropriately adjust the rate estimate based on factors not considered by the algorithm.



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Conclusion 4. If the traffic manager needs to dynamically create multiple new AFPs (vs. predefined AFPs that can be opened for re-use), there needs to be a well-designed interface to support easy and effective specification of these AFPs. The assessment of the FET is that the current interface for creating AFPs does not meet this requirement.



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Recommendations. Based on the above conclusions and the review of the state of the art, there would be considerable added value if an effective tool could be incorporated into FAA software to support decision making by traffic managers when setting the rates for AFPs.

As indicated in the review of the state of the art below, a variety of approaches have been developed by different organizations that, while not yet fully mature or sufficiently evaluated to integrate into widespread operational use, there is sufficient promise for the FAA to proceed toward the development and operational use of such a tool.

The next session will provide you with some of their methodology at addressing this issue.