#9

Sea-Tac
Airspace Update Study
July 1992

Comparison of 1988 Airspace Update Study, 1992 Terminal Development Plan, and The 1991 Enhancement Plan: Looking at Statistical Differences.

Each of these three studies present significantly differing statistics on delay projections for Sea-Tac.

PASSENGER PROJECTIONS

The Airspace Update study, AUS, predicts 26 Million Annual Passengers (MAP) and a total of 377,000 annual aircraft operations by the year 2000, (AUS, Summary Report, 2-1). These predictions were based on 1987 data which reports 14.5 MAP and 292,000 Annual Operations and assumes that average aircraft size will slightly increase.

These are nearly consistent with the Terminal Development Plan, TDP, statistics which predict 20 MAP and 380,000 operations in the year 2000, (p.ES-3, data taken from the Flight Plan).

The June 1991 Enhancement Plan divides annual operation rates into two scenarios: future 1 and 2. These scerarios were not associated with a time frame but rather with operational increases exclusively, representing annual operation amounts of 390,000 and 425,000 respectively. Corresponding MAP estimates are not given in this report.

DELAYS:

1. Delays due to intersection with Boeing Field

Before the AUS, no other report took care to detailed the impact that interactions with Boeing Field has on Sea-Tac arrival rates. For this reason, highlights of the Boeing Field analysis are included.

Interaction between Sea-Tac and Boeing Field occur during three weather conditions, resulting in lost capacity at Sea-Tac. The three situations are 1) IFR South Flow, 2) IFR North Flow, and 3) Visual Approaches. (AUS, Working Paper 1, p.2-10). "Operations at Boeing Field have a substantial impact on Airspace capacity at Sea-Tac," (AUS, Working Paper 1, Forecast Update, 3-39).

The primary limitation to growth is arrival capacity under IFR and marginal VFR conditions. Although these conditions occur a relatively small percent of the time (17%), the prevalence of these conditions, "during winter months, greater than 25%, can result in significant delay costs," (AUS, Summary Report, 3-4).

The report determines that .025 minutes/operation per year is lost, totalling $210,600 per year. Three proposed methods to mitigate this scenario include:

1) Require restrictions on G.A. arrivals at Boeing Field during Sea-Tac S. Flow arrival peaks and in IFR or marginal VFR conditions.
2) Create IFR 2nd arrival stream capability to Sea-Tac which does not interfere with missed approach capability at Boeing Field,
3) Create new approach procedures with a minimum low enough to allow use during Boeing Field Conflicts, (AUS,Summary Report,3-4).

Since operations at Boeing Field are expected to remain relatively constant, 400,000 operations per year, (AUS, Summary Report, 3-39), delays due to airspace interactions with Boeing Field will continue. According to the 1983 Airspace Study, they "could potentially cause upwards of 15,000 hours of annual delay to passenger aircraft, costing the airlines $19 million," (AUS, Working Paper 2, 2-3).

It should be noted that in the Enhancement plan, weather conditions other than good VFR conditions, occur 54% of the time. We do not know how the 17% which is quoted in the AUS relates to these percentages in the EP. 17% refers to a specific situation, ~~moreover~~ the weather descriptions for VFR and IFR differ between the reports.(EP,Section 1,p.3).

2. Minimizing Delays for the Short-Term

The study describes a method used in order to minimize delay time at Sea-Tac. "Flow Control", as it is called, allows delays to be absorbed enroute. One technique used when the weather is particularly severe in Seattle, is contacting the aircraft flying in to Sea-Tac before it even departs from the former airport, (AUS,Working Paper 1,2-10).

The report recommends ways to further reduce delays. Procedures include: 1) Eliminating airspace conflicts with Boeing Field; 2) adding taxiways; 3) installing an ILS on Runway 34L; 4) providing a second IFR approach stream for Southbound arrivals; and 5) reopening and extending Runway 17/35. Together these measures reduce delays by 6000 hours per year until 2000, saving $10 million per year.(AUS, Summary Report, 3-2).

3.Total Delay Estimates

The 1983 Airspace Study was updated in conjunction with the Comprehensive Planning Review, (AUS, Comprehensive Planning Review, 1-1). Updated estimates, done by FAA's Standardized Delay Reporting System (SDRS), reported 20,000 hours of delay in 1986. The new estimates represent an average of 10.5 minutes per

passenger flight as follows:

	ATC gate-hold	1.0 min
. .	Taxi-out	4.1 min
. .	Airborne	3.5 min
. .	Taxi-in	1.5 min
. .	Ramp Congestion	0.0 min
. .	Severe Weather	0.4 min

FAA estimates further indicate delay hours to rise to 31,000 by 1996, when yearly operations will be pushing 377,000, (AUS,Comprehensive Plan,Working Paper 2,A-2).

Delay estimates in the EP are over five times the AUS estimates. Upon reaching 390,00 operations per year, or in the year 2000, annual delay hours are estimated at 168,000. In the case of 425,000 annual operations, 241,000 hours of delay are anticipated associated with a cost of $347,000 million, (EP,p.V). There appears to be no connection between the two reports or explanation for the discrepancy.

4.Long-Term Delay Reductions

The AUS report proposes eight options which could reduce delays. Since, "70% of delay is due to Runway/Taxiway deficiencies," the eight action plans proposed include such improvements, (AUS,Comprehensive Plan,Working Paper 2,A-3). A discussion of the hours and money saved in each option can be found in the Summary Report under #3, "Alternative Analysis Findings and Recommendations".

Constructing a new dependent IFR parallel runway and constructing a new independent IFR runway would increase Sea-Tac capacity by 60-70% and 70-80% respectively, (AUS,Summary Report, 2-2). These would save 1,700 and 2,000 hours per year respectively, yet the latter is contingent upon the extent to which development occurs for optimizing efficiency during VFR conditions, (AUS,Summary Report, 3-13).

Re-opening runway 17/35 would save nearly 5000 hours and $6,800,000 per year, this would only be in VFR conditions, (See AUS charts on last two pages of report). This option relative to an independent and dependent runway offers significantly less overall capacity. (see charts).

In the Enhancement Plan, delays and costs are figured differently than in the AUS report. The EP does not estimate per year savings as the AUS, but calculates delay savings in terms of the Future 1 and 2 conditions. In future 2 conditions, constructing a new parallel runway for dependent operations would save 167,390 hours and $241.04 million, while constructing a runway for independent operations would save 196,570 hours and $283.06 million, (EP, Summary, V).