

Benefit Cost Analysis As A Tool For FAA Capacity Project Evaluations

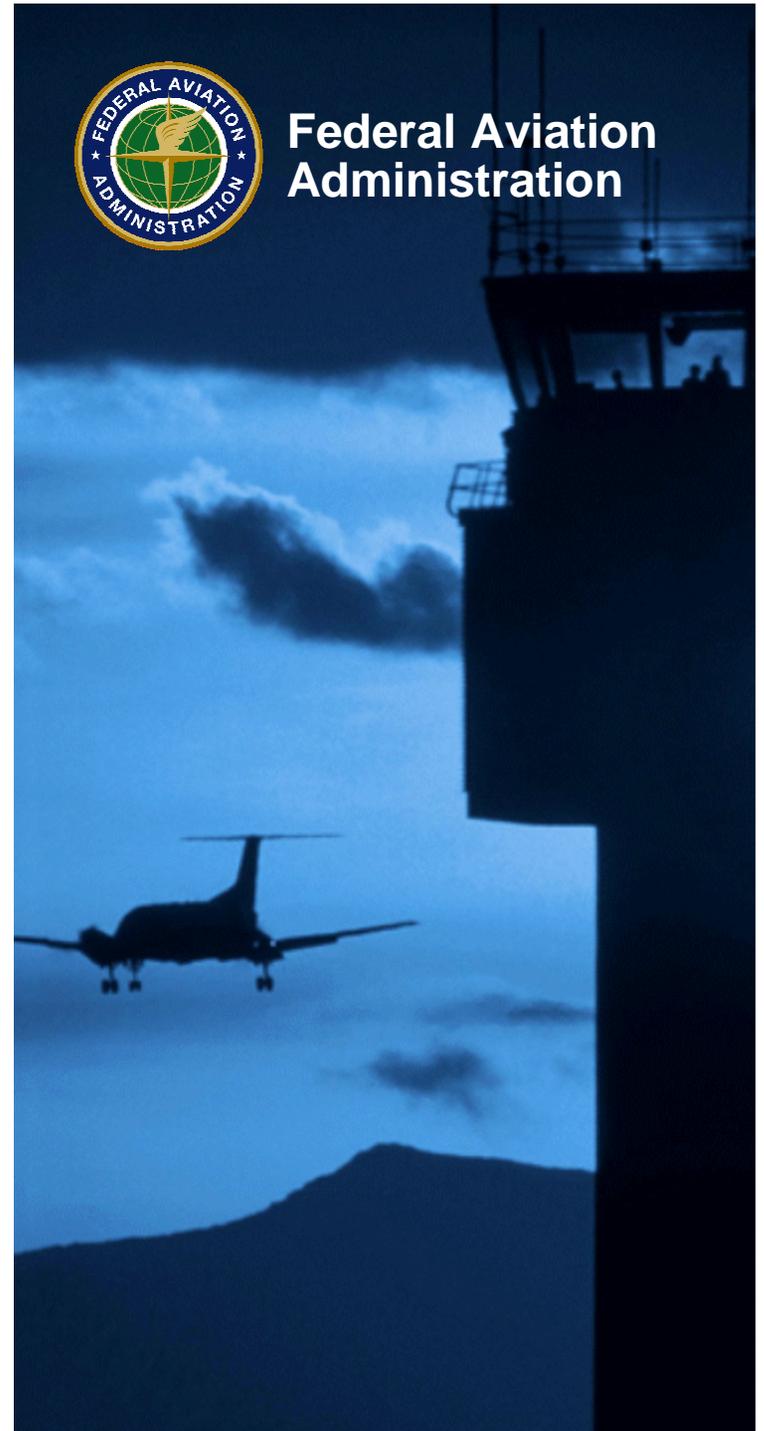
Presented to: Western Pacific Regional Conference

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Federal Aviation
Administration



Presentation Objectives

- Understand background: Intent of Congress / FAA policy
- Discuss evaluation of FAA's BCA Policy: Capacity definition and \$5 M discretionary funds
- Describe recommendations for proposed BCA policy
- Discuss update to BCA process best practices
- Describe policy outlining planning information needed for FAA review of a BCA



BCA Background

Legislative/Executive Actions

- **1993** – Congressional concerns: FAA needed to develop better investment criteria to better target AIP funds to the needs of the national airport system
- **1994** – Executive Order 12893, “Principles for Federal Infrastructure Investments”: Requires systematic analysis of transportation projects benefits and costs
- **1994** – Statutory requirements included in AIP legislation: Established BCA requirement for use of discretionary funds and Letters of Intent



BCA Background

FAA Policy Initiatives

- 1994 – Federal Register: Established BCA requirement for capacity projects > \$10 M
- 1997 – Federal Register: Transferred responsibility to sponsor, Lowered threshold to \$5 M
- 1999 – Federal Register: Issued final BCA guidance
- 2003 – Draft BCA Best Practices: Incorporation of BCA Procedures into the Airport Planning Process
- 2006 - Planning Information Needed for FAA Headquarters Review of Benefit Cost Analysis (BCA)
- 2007 – Draft PGL, “Revised BCA Guidance”¹: Would supercede 1999 Policy & 2003 Best Practices



BCA Team Evaluation

Construction cost increases

- Used Bureau of Labor & Statistics highway construction data

	1999	2006	Increase
Consumer Price Index (CPI)	\$5 M	\$6.2M	24%
Construction Costs (steel, concrete, asphalt)	\$5 M	\$7.9M	57%

Conclusions

- With inflation impacts, threshold increase would restore level of risk FAA faced in 1999
- Increase to \$10M would negate the need to revisit threshold for some time

BCA Team Evaluation

Risk to FAA

- If no change in threshold, # potential BCAs would double

- Need to improve BCA review times

Table 2

	Potential BCAs (2007 - 2011)		
	Threshold > \$5 M	Threshold > \$10 M	BCAs Avoided
AAL	15	6	9
AEA	16	9	7
ACE	4	2	2
AGL	11	5	6
ANE	3	3	0
ANM	11	7	4
ASO	8	5	3
ASW	9	5	4
AWP	15	4	11
Total	92	46	46
Avg. per year	18.4	9.2	

Table 3

Fiscal Year submitted	Completed Reviews			Ongoing Reviews		
	Total # BCAs	Average Project Cost (\$M)	Average BCA review Time (Months)	Total # BCAs	Average Project Cost (L&M) \$M	Average BCA review Time (Months)
1999	8	\$71	10	0	\$0	0
2000	17	\$96	10	0	\$0	0
2001	11	\$101	7	0	\$0	0
2002	14	\$69	11	1	\$20	52
2003	3	\$55	8	1	\$53	30
2004	10	\$58	7	3	\$98	22
2005	5	\$637	6	5	\$20	13
2006	0	-	-	1	\$18	5
	68	\$121	9	11	\$44	20

Conclusion

- Number of future BCAs would be kept to a manageable level

BCA Team Evaluation

Risk to FAA

- For BCAs conducted < \$10 million
- Potential risk (\$24 M) was low

Completed BCAs (1999-2006)				
	# BCAs	# BCAs (non concurrence)	Average Project Cost (\$M)	Cumulative Agency Risk (\$M)
BCA (Costs < \$10M)	7	3	8	24
BCA (Costs > \$10M)	61	5	101	505

- For BCAs conducted > \$10 million
- Potential risk (\$505 M) was high

Completed BCAs (1999-2006)				
	# BCAs	# BCAs (non concurrence)	Average Project Cost (\$M)	Cumulative Agency Risk (\$M)
BCA (Costs < \$10M)	7	3	8	24
BCA (Costs > \$10M)	61	5	101	505

Conclusion

- FAA decision makers can better utilize resources to perform more timely BCA reviews and limit the risks when deciding on costly projects

BCA Team Evaluation

Other Conclusions

- Raise threshold to \$10 million discretionary funds - would allow FAA to focus on projects that would clearly have potential capacity benefits
- FAA will be more judicious in designating projects as capacity projects
- FAA will reevaluate the review process so that better investment criteria can be applied that is specific to proposals at non primary airports.



BCA Team – Status of Draft PGL

- Draft PGL , “Revised BCA Guidance” coordinated with regional offices and HQ legal staff on February 12, 2007
- Comments received from three regions and counsel
- Team reviewed response to comments and revised Draft PGL
- HQ legal staff requested PGL not be issued until Chicago OMP grant appeal is reviewed by the DC District court



Common BCA Issues

- **Base Case Cost Determinations**
- **BCAs for terminal buildings (non hubs)**
- **Determining capacity benefits at small airports (small hub, non hub)**



Base Case Cost Determinations

- Costs for bringing the airport infrastructure into compliance with the FAA standards (i.e. Runway Safety Areas)
- May need to determine maximum financially feasible cost for RSA improvements as part of the base case exercise
- FAA Order 5200.9, titled, “Financial Feasibility And Equivalency Of Runway Safety Area Improvements And Engineered Material Arresting Systems”.

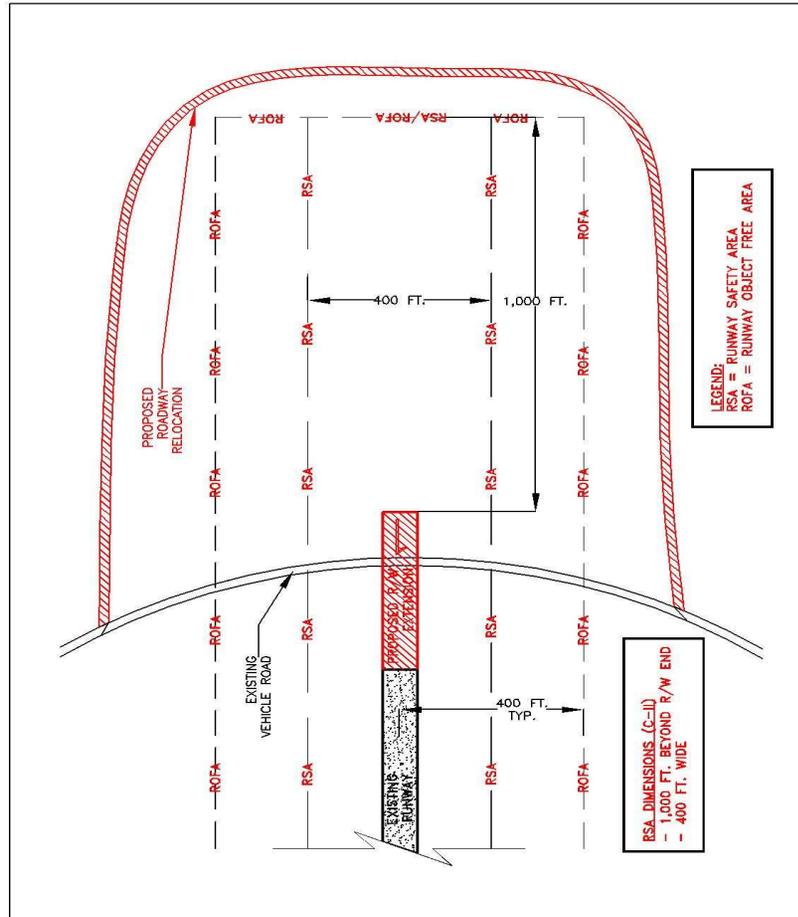


FIGURE 1B – CAPACITY IMPROVEMENTS
*TOTAL PROJECT COSTS – R/W EXTENSION & RSA IMPROVEMENTS TO MEET C-II STANDARDS = \$60M

Base Case Cost Determinations

Approach #1: Used in BCAs

- Examples: Erie, Gary, Hagerstown, West Va.
- Locations with current non standard safety areas
- Runway extension project that would also improve runway safety areas
- The costs to improve the current non standards situation can be decreased from the total project costs
- Capacity costs = Total costs - base case costs

FAA Review: evaluate sponsor's base case assumptions (airport reference code, project costs, EMAS Order, etc)

Approach #2: Used as alternative funding option

- Example: Panama City
- Base case costs = Costs avoidance
- FAA support limited to the safety and standards needs at the existing site



BCAs for Terminal Buildings

Approach #1: Not considered capacity

- Example: Springfield
- FAA's funding interest limited to replacement value
- FAA does not require a BCA for projects that improve an airport's compliance with safety, security, and design standards

Approach #2: Capacity

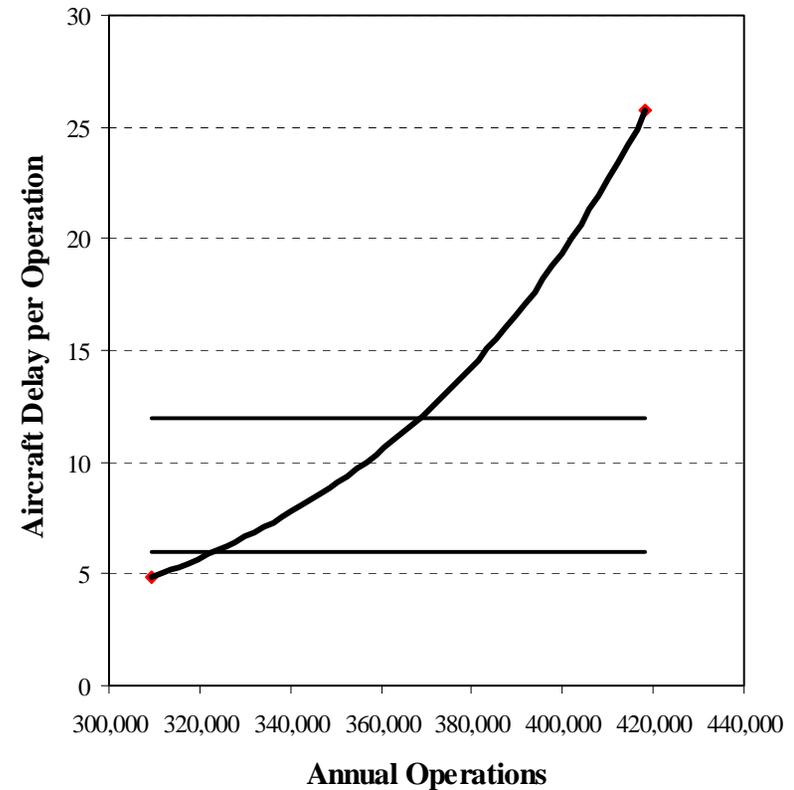
- Example: Myrtle Beach (LOI)
- Passenger's convenience (expressed in level of service) is hard to translate into passenger benefits
- Benefit = costs avoided that would permit renovation of the existing terminal
- The cost avoidance approach is acceptable and in accordance with FAA Guidance
- Satisfies BCA criteria

FAA Review: consideration of disc. funds for non-hub terminal buildings



Capacity Benefits (Small Airports)

- Typically **not** impacted by aircraft delays
- ...but longer runway creates potential benefit sources
 - **Passenger travel time savings:** e.g., new non-stop service
 - **Reduced airline operating costs:** e.g., larger aircraft-less flights
- **FAA Review:** Review underlying planning assumptions in which benefits are derived



Capacity Benefits (Small Airports)

Forecasts Review

- Sponsor forecast **is** consistent with TAF (consistency determined by being within 10% in 5-year period and 15% in a 10-year period for total enplanements and total operations).
- ...But benefits are based on critical aircraft or constrained operation.

FAA Review: (Refer to Guidance for Planners)

- Airline/user support letters or contracts for new air service:
 - o current constraints of potential user (payload/stage length), denied boardings etc.;
 - o projected number of annual ops. by specific aircraft;

Capacity Benefits (Small Airports)

Runway Length Analysis

FAA Review: Ensure planning analysis is appropriate for benefit calculations

Runway Length Requirements										
Airline	Aircraft	Hub	Stage Length (Statute Miles)	Max Takeoff Weight (Pounds)	Takeoff Runway Length (Sea Level)				Landing Runway Length at Max. Ldg. Weight	
					@ 59 deg. (Feet)	@ 86 deg. (Feet)	@ 90 deg. (Feet)	@ 93 deg. (Feet)	Dry Rwy (Feet)	Wet Rwy (Feet)
CO	EMB145-LR	IAH	579	48,502	6,500	6,800	6,900	7,000	4,700	5,400
AA	EMB145-LR	DFW	695	48,502	6,600	6,800	7,000	7,100	4,700	5,400
DL	CRJ200	ATL	248	51,000	5,100	5,700	5,800	5,900	4,900	5,600
NW	DC-9-32	DTW	838	108,000	5,200	5,800	6,300	6,600	4,800	5,500

Capacity Benefits (Small Airports)

Passenger Time Savings

- Incremental air passengers not having to travel to other airport because of added flights
- FAA Review: Were airline user / support letters used to determine incremental benefits?

Year	Forecasted Enplaned Passengers ¹	Enplaned Passengers Affected (5%)	Additional Vehicle Trips/Year ²	Benefits			Total Benefits	Present Value of Benefits
				Value of Passenger Time ³	Value of Mileage Costs ⁴	Value of Parking Costs ⁵		
2006	189,452							\$0
2007	193,998							\$0
2008	198,654							\$0
2009	203,422	4,068	2,034	\$278,444	\$89,251	\$1,037	\$368,733	\$262,901
2010	208,304	4,166	2,083	\$285,127	\$91,393	\$1,062	\$377,583	\$251,599
2011	213,303	4,266	2,133	\$291,970	\$93,587	\$1,088	\$386,644	\$240,783
2012	218,423	4,368	2,184	\$298,977	\$95,833	\$1,114	\$395,924	\$230,431
2013	223,665	4,473	2,237	\$306,152	\$98,133	\$1,141	\$405,426	\$220,525

Capacity Benefits (Small Airports)

Denied Boardings Benefits

- FAA Review: Were denied boardings a function of runway length limitations or airline fleet planning decisions?

DATE	DAY	FLTNUM	EQUIP	AUTHCAP	SOLD	AVAIL	ORG	DEST	DEP	ARR	PHYSCAP	LOAD	SPILL
3/8/2004	Mon	401-1	M82	155	104	51	GYG	PIE	920	1250	167	67%	0
3/8/2004	Mon	408-1	M82	165	124	41	PIE	GYG	700	830	167	75%	0
3/10/2004	Wed	421-1	M82	155	152	3	GYG	PIE	1730	2100	167	98%	12
3/10/2004	Wed	420-1	M82	166	133	33	PIE	GYG	1500	1630	167	80%	0
3/12/2004	Fri	421-1	M82	155	155	0	GYG	PIE	1730	2100	167	100%	12
3/12/2004	Fri	420-1	M82	166	134	32	PIE	GYG	1500	1630	167	81%	0
3/14/2004	Sun	401-1	M82	155	155	0	GYG	PIE	920	1250	167	100%	12
3/14/2004	Sun	408-1	M82	166	137	29	PIE	GYG	700	830	167	83%	0
3/15/2004	Mon	401-1	M82	155	132	23	GYG	PIE	920	1250	167	85%	0
3/15/2004	Mon	408-1	M82	160	132	28	PIE	GYG	700	830	167	83%	0
3/17/2004	Wed	421-1	M82	155	157	-2	GYG	PIE	1730	2100	167	101%	12
3/17/2004	Wed	420-1	M82	160	121	39	PIE	GYG	1500	1630	167	76%	0
3/19/2004	Fri	421-1	M82	155	160	-5	GYG	PIE	1730	2100	167	103%	12
3/19/2004	Fri	420-1	M82	160	154	6	PIE	GYG	1500	1630	167	96%	7

Capacity Benefits (Small Airports)

Operational Costs Benefits

- FAA Review: Is projected fleet mix in accordance with approved forecasts?

Aircraft Operating Costs				
		Projected Fleet Mix		
		Existing Airport	Replacement Airport	
Aircraft Class	2006\$	2008-2027	2008-2017	2018-2025
EMB-20	\$ 809.20	100.0%	40.0%	30.0%
CRJ	\$ 1,315.41		60.0%	58.0%
B-737	\$ 2,678.21			12.0%
Fleet-Weighted Average Cost per Block	\$ 809.20	\$ 1,112.93	\$ 1,327.08	
Average Block to Block Time per Operat	1.3	1.3	1.3	
Fleet-Weighted Average Cost Per Opera	\$ 1,051.96	\$ 1,446.81	\$ 1,725.21	

Capacity Benefits (Small Airports)

New non stop service

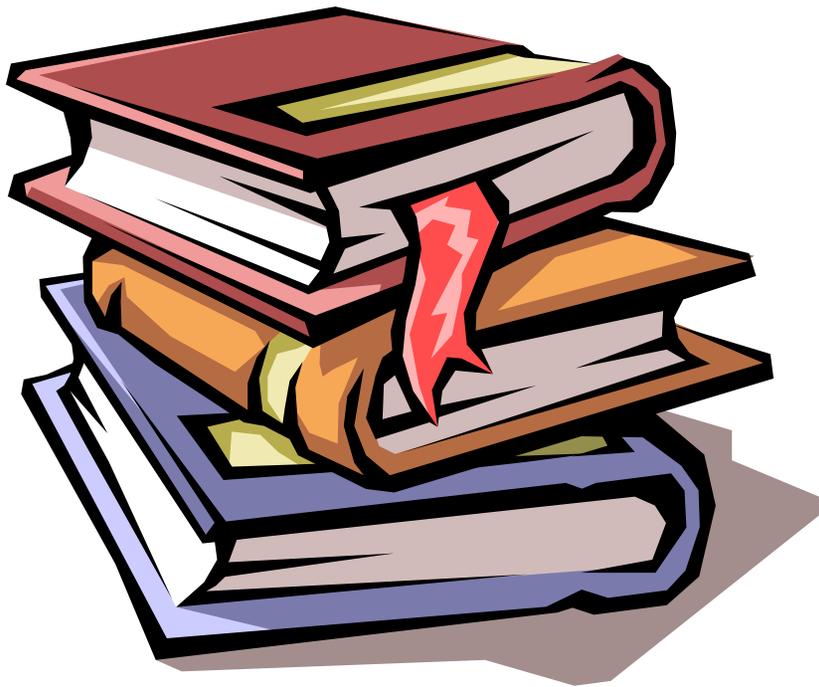
FAA Review: Are future non-stop markets consistent with sponsor's market analysis?

Origin-destination markets (a)	Percent of total origin-destination PAX (2001)	Future non-stop market	Percent of total origin-destination PAX (future)	Average travel time savings per roundtrip leg (hours)
Dallas/Fort Worth	7.9%			
Atlanta (c)	7.2%			
Washington, D.C. (d)	6.3%	X	6.3%	1.6
New York (e)	4.0%	X	4.0%	1.7
Los Angeles (f)	3.6%			
Houston (g)	3.5%			
Chicago (h)	2.9%	X	2.9%	2.0
San Francisco (i)	2.6%			
Philadelphia	2.1%			
Boston	2.1%			
Las Vegas	1.8%			
Denver	1.8%	X	1.8%	2.2
Charlotte	1.5%			
Miami-Fort Lauderdale (j)	1.5%			
Orlando	1.5%			
Nashville	1.4%			
Raleigh/Durham	1.3%			
Detroit	1.3%	X	1.3%	1.6
Austin	1.3%			
Kansas City	1.2%			
Seattle/Tacoma	1.2%			
San Diego	1.2%			
Minneapolis	1.1%	X	1.1%	1.8
Phoenix	1.1%			
San Antonio	1.1%			
Memphis	1.1%			
Total	63.6%		17.4%	1.8

PLANNING INFORMATION NEEDED FOR FAA REVIEW OF BCA

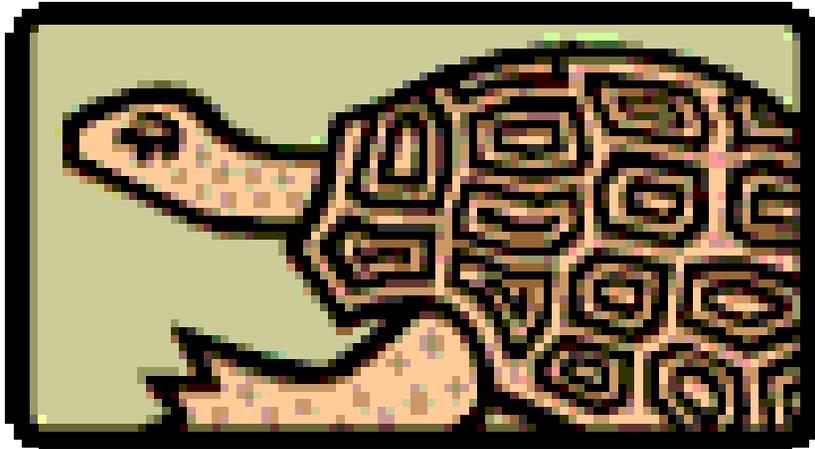


Objective



- **Describe tools available to ensure that benefit cost assessments are based on sound airport planning principles**

Challenge



- **FAA Office of Policy (APO-200) reviews BCAs primarily to assess economic issues relating to project benefits, *however*;**
- **Policy office often comments on adequacy of planning as well as benefit analysis**

Response

- **FAA developed the policy described herein to ensure adequacy of planning early on and prior to BCA submittal to HQ**



BCA Guidance

- **“Planning needed for FAA headquarters review of Benefit Cost Analysis”**
- **Guidance issued March 2006 to all FAA Airports Regional Offices**
- **Located on the web at**
http://www.faa.gov/airports_airtraffic/airports/aip/bc_analysis/media/planning_information_bca.pdf



Application of guidance

- **Guidance applies to FAA regional Airports divisions and Airport District Offices**
 - Used to ensure BCA is complete
 - Used to understand planning assumptions and analysis in BCA
- **While the Guidance is not specifically intended for airport sponsors and consultants, it can be used as a tool to ensure planning data used conforms to FAA review requirements**



What is a BCA? What isn't a BCA?

- **Is: an investment screening tool to help FAA identify whether a project warrants a substantial investment of AIP discretionary**
- **FAA review of BCA does not convey:**
 - AIP eligibility
 - Project justification
 - Approval of specific alternatives



Planning Information for BCA Review

- **Forecasts used for the BCA, including critical (design) aircraft and stage length**
- **FAA forecast approval letter**
- **Explanation if FAA approved local forecast differs from the forecast used in the BCA**
- **Explanation of the forecast used in the BCA is not consistent (i.e. 10% in 5 years, 15% in 10 years) with the latest published TAF**
- **Sensitivity analysis if the forecasts used in the BCA are not consistent with the the latest published TAF**
- **Project justification (more detail next slide)**
- **Benefit cost spreadsheets in standard software format**



Project justification

- **Project justification, including the following, as applicable:**
 - Airline user/support letters or contracts for new service as discussed earlier
 - In lieu of support letters, consider case studies of similar communities with similar characteristics
 - Special planning studies done for the project
 - Engineering studies (i.e. pavement evaluations)
 - Summary of airfield modeling results



FAA Review of Planning Data in BCAs

FAA looks at:

- Appropriateness of design aircraft
- Construction costs, schedules and methods
- Alternative analysis if part of BCA
- Consistency of proposal with ALP, MP
- Underlying planning assumptions (i.e. aircraft type and levels, local economic conditions, past and future growth)



FAA Review of Planning Data in BCAs (cont)

- Ensure BCA data and analysis consistent with data and analysis of earlier planning and environmental analysis for project
- If not, do sensitivity analysis to see if different data changes conclusions
- Conduct airspace review to show project is safe and has utility



Presentation Summary

- Discussed the Intent of Congress / FAA policy
- Gave a brief overview of evaluation of FAA's BCA Policy that set the stage for the proposal
- Described recommendations for proposed BCA policy
- Discussed update to BCA process best practices including benefit examples
- Described policy outlining planning information needed for FAA review of a BCA



That's all folks!

