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# Benefit-Cost Analysis of a Replacement Airport

by

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Principal



# Outline

- Unison Consulting, Inc.
- Background / legal basis
- U.S. FAA guidelines on airport BCA
- BCA steps
- Benefits & costs
- The case of a replacement airport for St. George Municipal Airport in Utah

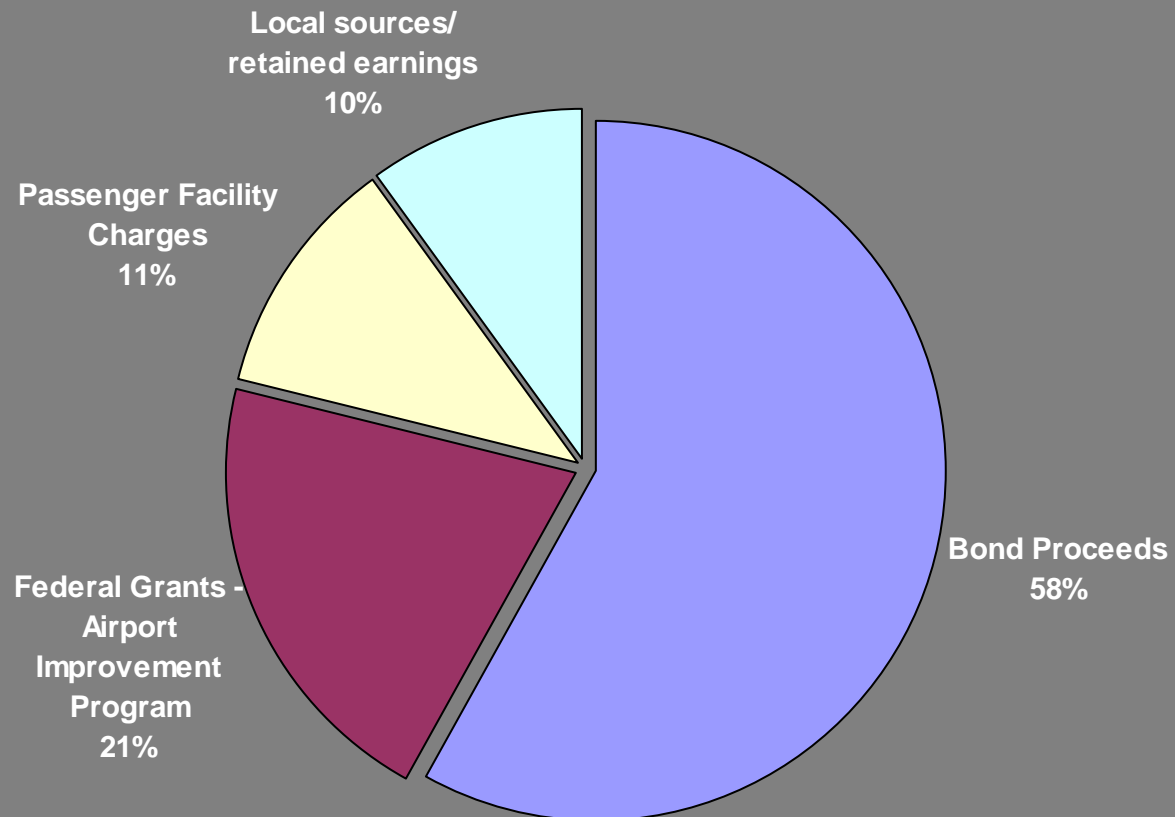
# Corporate Overview

## Who We Are?

- UCG Associates, Inc. dba Unison Consulting, Inc. is an Airport Consulting Firm providing services in:
  - Airport Finance & Economics
  - Airport Retail Planning & Management
  - Program Management
  - Information Systems
- Office Locations – United States
  - Chicago, Illinois
  - St. Louis, Missouri
  - Orange County, California
  - San Antonio, Texas
- 44 employees

# Background: U.S. airport funding sources

21% comes from the Federal Airport Improvement Program (AIP) grants



# Background: FAA BCA requirement

- Capacity projects requiring \$5 million or more in AIP discretionary grants
- All capacity projects requesting AIP multi-year grant commitments under a Letter of Intent (LOI)
- Airport capacity projects are those that:
  - Preserve an infrastructure
  - Improve upon an existing infrastructure
  - Create new infrastructure



# Background: FAA BCA exemptions

- Reconstruction of critical airfield structures at large and medium hub airports
- Reconstruction of primary runways and associated taxiways and aprons at small airports
- Airport projects undertaken solely for:
  - Safety
  - Security
  - Conformance with FAA standards
  - Environmental mitigation



# FAA guidelines on airport BCA

- Objective - to allow FAA to determine if:
  - There is adequate information to show project need and consequences
  - Benefits justify costs
  - Proposed project maximizes net benefits to society
  - The BCA uses best available data



# FAA guidelines on airport BCA

- Focus: costs and benefits – monetary and non-monetary – to aviation system users (i.e. airport sponsor, airlines, passengers and shippers)
- Rationale: AIP funds are paid from the Airport and Airway Trust Fund, funded by aviation user taxes
- Excluded: regional economic impacts, especially multiplier effects





# FAA guidelines on airport BCA

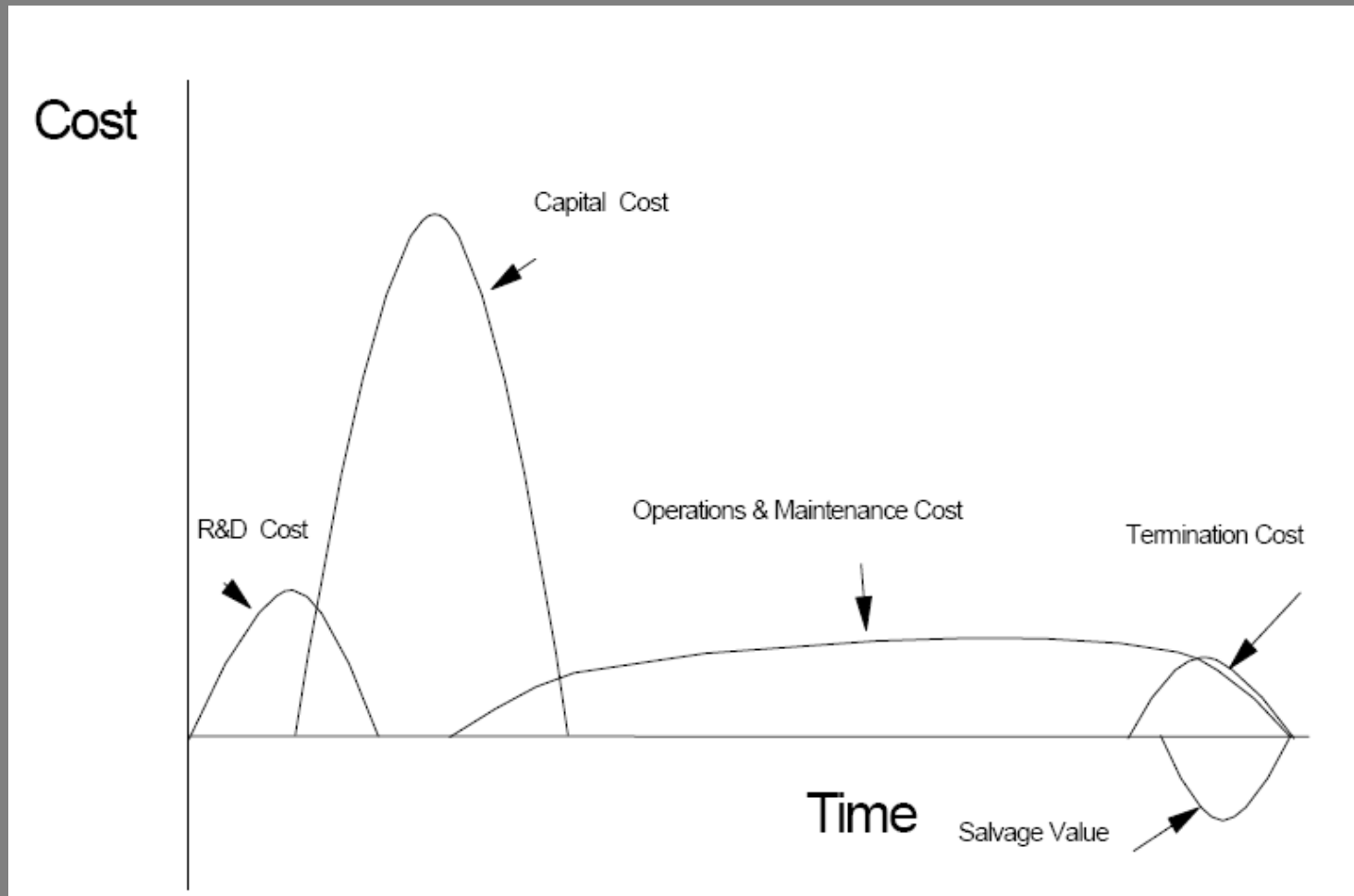
- Follows basic BCA steps:
  - Define project objectives
  - Specify assumptions
  - Identify base case (no investment)
  - Identify and screen all reasonable alternatives
  - Determine appropriate evaluation period
  - Establish reasonable level of effort
  - Identify, quantify and evaluate incremental benefits and costs
  - Compare benefits and costs: NPV, B/C ratio, IRR
  - Perform sensitivity analysis
  - Make recommendations



# FAA guidelines on airport BCA

- Follows basic BCA principles:
  - Life-cycle benefits and costs
  - Constant dollar valuation to control for inflation
  - Discounting to account for opportunity cost of capital
  - Discount rate: 7% for airport projects funded with Federal grants

# Life-Cycle Costs



Source: FAA Airport Benefit-Cost Analysis Guidance, December 1999



# Measurement of Benefits

- Cost savings to airport users associated with reduced time spent in the airport system:
  - Reduced delay
  - More efficient processing
  - Reduced idle time
  - Improved predictability of landing and take-off schedules
  - Ability to accommodate more efficient aircraft
  - Other: environmental, safety, security, design standards

# Typical benefits of airfield capacity projects

- New or extended runway, taxiway, apron, or hold pad:
  - Reduced aircraft, passenger and cargo delay during normal airport operations
  - Reduced aircraft, passenger and cargo delay during reconstruction of other airport facilities
  - Improved schedule predictability:
    - Airlines can make more efficient use of equipment and crew
    - Passengers can take later flight and get to destination on time
  - Improved traffic flows reducing vectoring and taxiing distances
  - Reduced airline operating costs and passenger travel time from ability to accommodate more efficient aircraft
  - Other: environmental, safety, security, design standards



# Typical benefits of airfield capacity projects

- Reconstruction of runway, taxiway, apron or hold pad:
  - Lower facility maintenance costs
  - Avoided loss of capacity benefits associated with facility failure
- Acquisition of airside equipment (e.g. navigational aids, snow removal and maintenance equipment):
  - Reduced aircraft, passenger and cargo delay during normal airport operations
  - Greater schedule flexibility
  - Lower facility maintenance costs



# Proposed Replacement Airport for St. George Municipal Airport, Utah

- Location:
  - The City of St. George is located in the southwestern corner of Utah, approximately 303 miles southwest of Salt Lake City and 112 miles northeast of Las Vegas
- Air service area:
  - A growing population
  - A growing workforce
  - Growing tourism
- Objective:
  - To develop an airport that can safely and efficiently accommodate the anticipated increase in aviation activity



# Proposed Replacement Airport for St. George Municipal Airport, Utah

- Base case
  - Existing airport sits atop a mesa with no room to expand
  - Runway and taxiway can accommodate only small turboprop aircraft with 30 seats
  - Does not adequately handle existing demand for air service in the area – leakage to Las Vegas
  - Cannot handle the projected increase in aviation demand that would necessitate the use of larger and faster aircraft





# Proposed Replacement Airport for St. George Municipal Airport, Utah

- Alternative: construct replacement airport
- Benefit: enable airport to accommodate larger aircraft and enable airlines to expand air service in St. George
- Investment components:
  - Land acquisition and site work
  - New runway, taxiways and associated facilities
  - New terminal building and aprons
  - General aviation, cargo and support facilities
  - Access roadways

# Forecast of Aviation Activity for St. George Municipal Airport, Utah

	1998	2008	2013	2018
<b>Enplanements</b>				
Constrained	32,910	52,000	65,700	84,000
Unconstrained		52,000	107,150	191,900
<b>Annual Operations</b>				
Constrained	4,242	5,840	7,200	9,490
Unconstrained		4,490	10,220	10,220
<b>Aircraft Fleet Mix</b>				
<b>Constrained</b>				
EMB-120 (30 seats)	100%	100%	100%	100%
<b>Unconstrained</b>				
EMB-120 (30 seats)	100%	40%	40%	30%
CRJ (50 seats)		60%	60%	58%
B737 (130+ seats)				12%



# Proposed Replacement Airport for St. George Municipal Airport, Utah

- BCA technical parameters
  - Evaluation period: 27 years (7 years of land acquisition and construction plus 20 years of economic life upon completion)
  - Constant dollar valuation
  - Discount rate: 7 percent for base analysis



# Assessment of Costs - Proposed Replacement Airport

- Capital costs (three phases)
- Net operating revenues (incremental revenue minus incremental costs)



# Assessment of Benefits - Proposed Replacement Airport

- Reduced passenger air travel time – existing passengers (30% of potential demand)
  - Access to larger & faster aircraft
  - For 14.4%, access to direct flights to destinations eliminating layover at Salt Lake City
  - 74 minutes mean layover time at SLC
- Reduced passenger airport ground access time - passengers going to Las Vegas (70% of potential demand)
  - Half of them will use the replacement airport saving 2 ½ hours in airport ground access each way
- Values for passenger travel time



# Assessment of Benefits - Proposed Replacement Airport

- Airline operating cost savings
  - Variable and fixed costs
  - Larger aircraft cost more to operate per flight
  - However, fewer flights will be needed to serve the same level of enplanements
  - Result: net savings in total aircraft operating costs



# Cost-Benefit Comparison - Proposed Replacement Airport

- Cost-benefit comparison:
  - NPV of \$12.0 million
  - B/C ratio of 1.23
  - IRR of 8.6%
- Sensitivity analyses
  - Discount rate: 7%, 4%, 10%
  - Value of time: recommended, low and high
  - Enplanements: 100% of forecast, 90%, 80%
  - Project with and without GA component
  - Development phasing
  - NPV > 0 in 106 out of 162 scenarios



## Other Benefits - Proposed Replacement Airport

- Improvement in safety from the acquisition of airside navigational aids
- Improvement in passenger comfort and convenience from the use of larger aircraft
- Improvement in passenger flows and passenger comfort from larger and more modern terminal
- Improvement in traffic safety from new airport access road
- Regional economic impact from expansion in air service





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