



SIP/2004-WP12  
Business case

# Special Implementation Project

## Financial Analysis and Funding

(Presented by Chaouki Mustapha  
Economist, ICAO)

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implementation of CNS/ATM systems  
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# Objective of the financial analysis

- To provide the proof of the financial profitability and viability of a project

# Content of a financial analysis

- The financial analysis section of a business case shows the expected cash flow implications of the project proposal, in terms of both revenues and expenditures
- It includes assumptions, methods and rationale for the estimation of revenues and expenditure

# Expenditures

- Lifecycle costs are to be considered

# Expenditures

- Capital costs:
  - ✓ Land
  - ✓ Facilities
  - ✓ Equipment
  - ✓ Software
- Other non-recurring costs:
  - ✓ Project staff, consultants and contractors including studies, procurement, travel, documentation, etc.
  - ✓ training costs

# Expenditures

- Recurring costs:
  - ✓ Operation
  - ✓ Maintenance
  - ✓ Lease and rental costs

# Revenues

- For air navigation service providers, revenues correspond to the user charges collected from airspace users;
- For airspace users, the cost savings resulting from flight efficiency is considered as a cash inflow (revenue).

# Methods & Techniques

- Accounting rate of return (ARR)
- Pay-back period
- Net Present Value (NPV)
- Benefit-to-cost ratio (profitability index)
- Internal rate of return (IRR)



# Accounting rate of return (ARR)

The accounting rate of return measures the return of a project in terms of income, as opposed to using a project cash flow.

Accounting rate of return = Average  
income / Investment

# Pay-back period

The time required to recover the original investment

Pay-back period = Original investment /  
Annual cash inflow

# Net Present Value (NPV)

Net Present Value = difference in the present value of the cash inflows and outflows associated with a project

# Benefit-to-cost ratio (profitability index)

Benefit-to-cost ratio = Ratio of the present value of the cash inflows to the present value of the cash outflows associated with a project

# Internal rate of return (IRR)

- The discount rate which equates the present value of cash inflows to the present value of cash outflows

# Analysis process

- Main assumptions and parameters
  - ✓ Project time horizon
  - ✓ Analysis base year
  - ✓ Traffic forecasts
  - ✓ Cost of capital
  - ✓ Efficiency rate
  - ✓ Average a/c operating cost
  - ✓ Cost recovery period

# Analysis process (cont'd)

- Air navigation service provider
  - ✓ Cash flow streams of expenditures
  - ✓ Cash flow streams of revenues based on the expected user charges
  - ✓ Net present value
  - ✓ Benefit to cost ratio
  - ✓ Pay-back period

# Analysis process (cont'd)

- Airspace users
  - ✓ Cash flow streams of expenditures
  - ✓ Cash flow of streams of benefits based on the expected flight efficiency
  - ✓ Net present value
  - ✓ Benefit to cost ratio
  - ✓ Pay-back period



# Sensitivity analysis

- To examine how variations in the parameters of the analysis affect results
- Uses the extreme values (maximum and minimum) of the range of each parameter separately

# Funding

# Funding requirements

- The cash flow analysis provides an excellent forecast of when funding is needed
- Typically, cash disbursements are high at the beginning of the project life cycle and diminish gradually

# Sources of funds

- Government funds
- Accumulated profits
- Bonds
- Loans
  - ✓ Public (World Bank, UNDP, etc.)
  - ✓ Private (Private banks and financial institutions)
- Equity capital (institutions, individuals, etc.)

# Outcome of the analysis

- Statement of financing needed
  - ✓ Amount of funds
  - ✓ Timing
- Sources and application of funds

# **The Spreadsheet Model**

# The Models Objectives

## Objectives:

- To develop a user-interactive model for business case analysis covering the details of cash-flow analysis, life-cycle costs and life-cycle benefits for both the service provider and user (airlines).
- The model accepts user-specific inputs and provides instantaneous output.

# Structure

- The business case analysis model consists of three inter-related modules
- Each module is developed as an Excel Worksheet
- The entire analysis is performed considering both the service provider and the airlines



# Module I – User Input Template for Service Provider Section

Microsoft Excel - Terra Nova Business Case Analysis

File Edit View Insert Format Tools Data Window Help

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2		<b>SERVICE PROVIDER</b>										
3			Total F&E \$M	O&M/yea r as % F&E								
4		<b>GROUND COSTS</b>										
5		COMMUNICATIONS	\$170	5%								
6		NAVIGATION	\$6	5%								
7		SURVEILLANCE	\$41	5%								
8		ATM	\$94	5%								
9		Leased Comm/year (\$ million)		\$10								
10		<b>IMPLEMENTATION</b>	Begin	End	LC yrs							
11		COMMUNICATIONS	2005	2010	15							
12		NAVIGATION	2005	2010	15							
13		SURVEILLANCE	2005	2010	15							
14		ATM	2005	2010	15							
15		<b>USER FEES</b>										
16		Begin Year	2010									
17		End Year	2020									
18		% Return	25%									

  

TERRA NOVA CNS/ATM			
Service Provider - Business Case Analysis Summary			
Service Provider	Constant 2001 \$ M	Current- Year \$M	Present Value \$M
Revenues (User Fees)	1,207	1,710	447
Total Expenses	733	990	358
Acquisition Costs	311	365	202
Recurring costs	422	625	156
Net Income	474	720	89
Benefit-to-Cost Ratio			1.3
Net Present Value			\$89M
Payback Period (Breakeven Point) in Years			8
Net Return			25%

# Module I – User Input Template for Airlines Section

Microsoft Excel - Terra Nova Business Case Analysis

File Edit View Insert Format Tools Data Window Help

	A	B	C	D	E	F	G	H	I	J	K	L
19												
20		<b>AIRLINES</b>										
21				Growth								
22		<b>Aircraft Qty</b>	575	5%								
23		<b>Flight-hrs in 2001</b>	1.5	5%								
24		<b>Cost/Flight-Hour</b>	\$3,250									
25		<b>% Opr. Efficiency Improvement</b>	3%	reduced fit. time								
26												
27			Total F&E \$M	O&M/year as % F&E								
28		<b>AVIONICS COSTS</b>										
29		COMM	\$0.39	5%								
30		NAVIGATION	\$0.25	5%								
31		SURVEILLANCE	\$0.15	5%								
32		<b>IMPLEMENTATION</b>	Begin	End	LC yrs							
33		COMM	2005	2010	15							
34		NAVIGATION	2005	2010	15							
35		SURVEILLANCE	2005	2010	15							
36												
37		<b>Finance Rates</b>										
38		Cost of Capital (discounting rate to estimate Present Value)	7.0%									
39		Inflation (to estimate Current-Year dollar value)	2.5%									
40		Base Year (To estimate Constant-Year dollar value)	2001									

  

TERRA NOVA CNS/ATM			
Airlines - Business Case Analysis Summary			
Airlines	Constant 2001 \$ M	Current-Year \$M	Present Value \$M
Revenues (Opr Eff)	5,636	9,337	2,126
Total Expenses	2,434	3,333	1,078
Acquisition Costs	657	775	422
Recurring costs	1,777	2,558	656
Net Income	3,202	6,004	1,047
Benefit-to-Cost Ratio	2.0		
Net Present Value	\$1047M		
Payback Period (Breakeven Point) in Years	6		
Net Return	97%		

# Business Case – Break even chart (parametric)



