CNS/ATM Planning and Evaluation Tools (CNS/ATM PET)

Presented by Lima and Mexico
ICAO Regional Offices

CNS/ATM PLANING AND EVALUATION TOOLS

- **WHY CNS/ATM PET ?**
  - MULTITUDE OF FLOWS/HOMOGENEOUS AREAS
  - MULTITUDE OF ATC FACILITIES AND SERVICES
  - MULTITUDE OF POLITICAL/ECONOMIC/OPERATIONAL CONSIDERATIONS
  - VARIED REQUIREMENTS
- **THEREFORE**
  - TO KEEP THE PLANNING PROCESS MANAGEABLE, AND
  - PROVIDE VISIBILITY AND ACCOUNTABILITY IN THE DECISTION PROCESS, **WE NEED TOOLS TO INTER-ACTIVELY DEVELOP AND EVUALATE ACCEPTABLE IMPLEMENTATION SCENARIOS**.

CNS/ATM PET

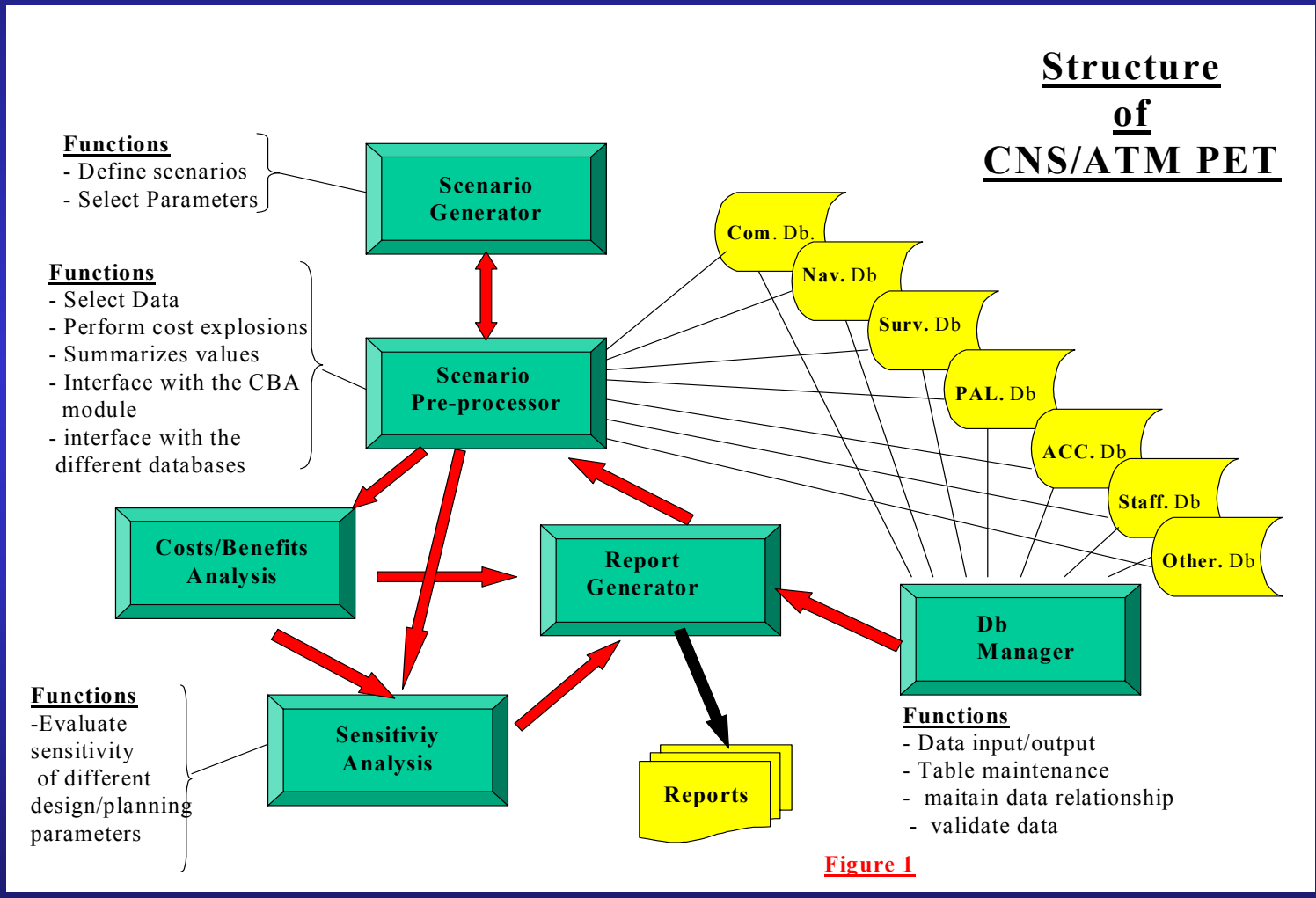
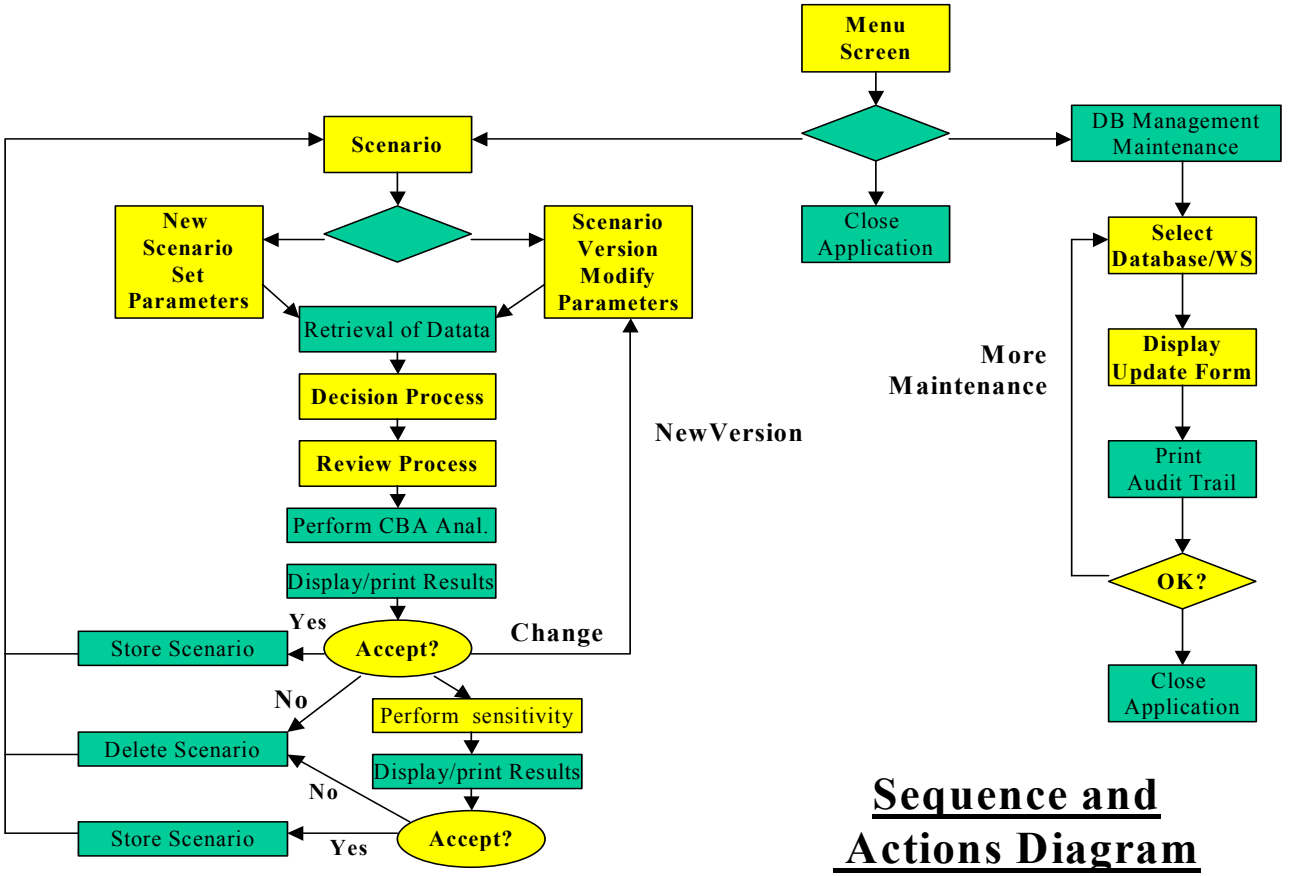


Figure 1

What Will CNS/ATM PET Do?

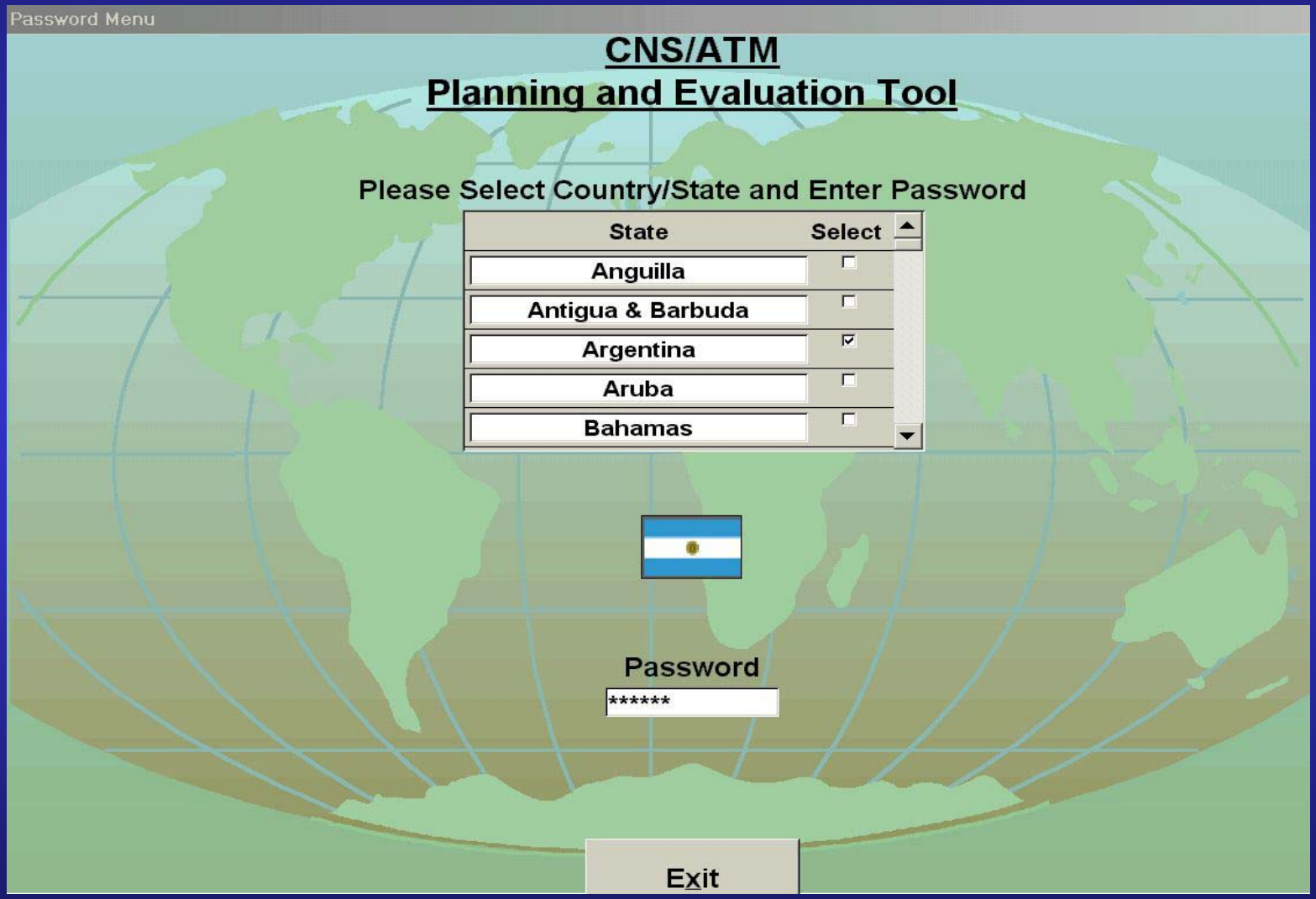
- ✓ ASSIST IN THE SELECTION OF THE BEST TECHNICAL SOLUTION
- ✓ ASSIST IN THE DETERMINATION OF THE BEST IMPLEMENTATION TIMING
- ✓ ASSIST IN THE DETERMINATION OF THE BEST IMPLEMENTATION OPTION
- ✓ DETERMINE VIABILITY OF THE PROJECT
- ✓ DETERMINE MOST CRITICAL ELEMENTS OF THE PROJECT (SENSITIVITY)
- ✓ Assist in the development of Business Case.

CNS/ATM PET

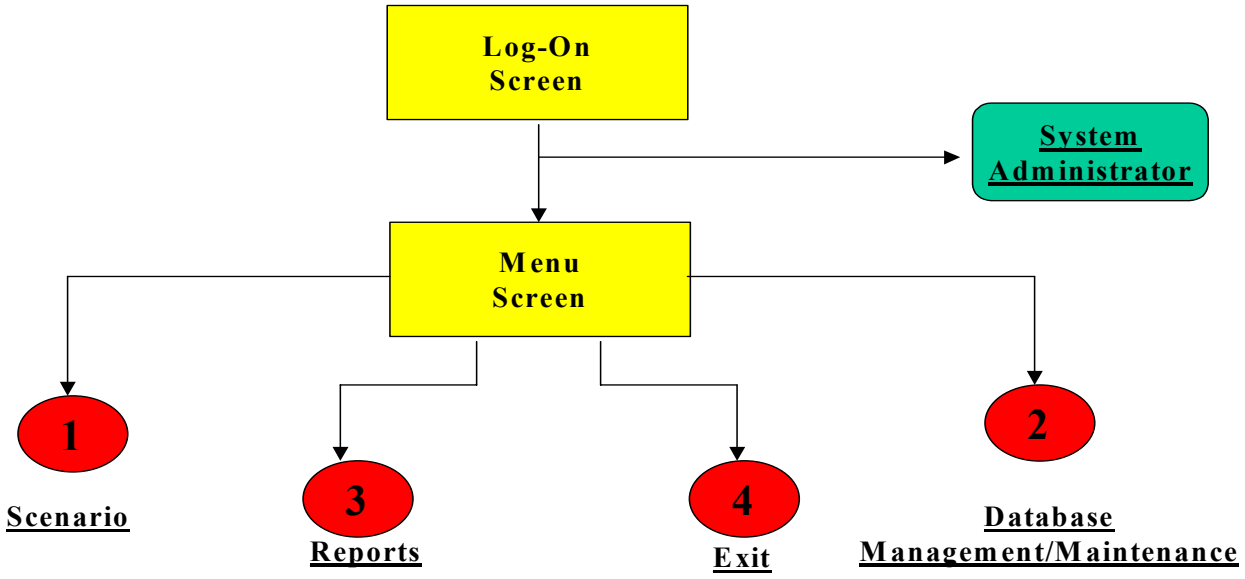


Sequence and Actions Diagram

CNS/ATM PET

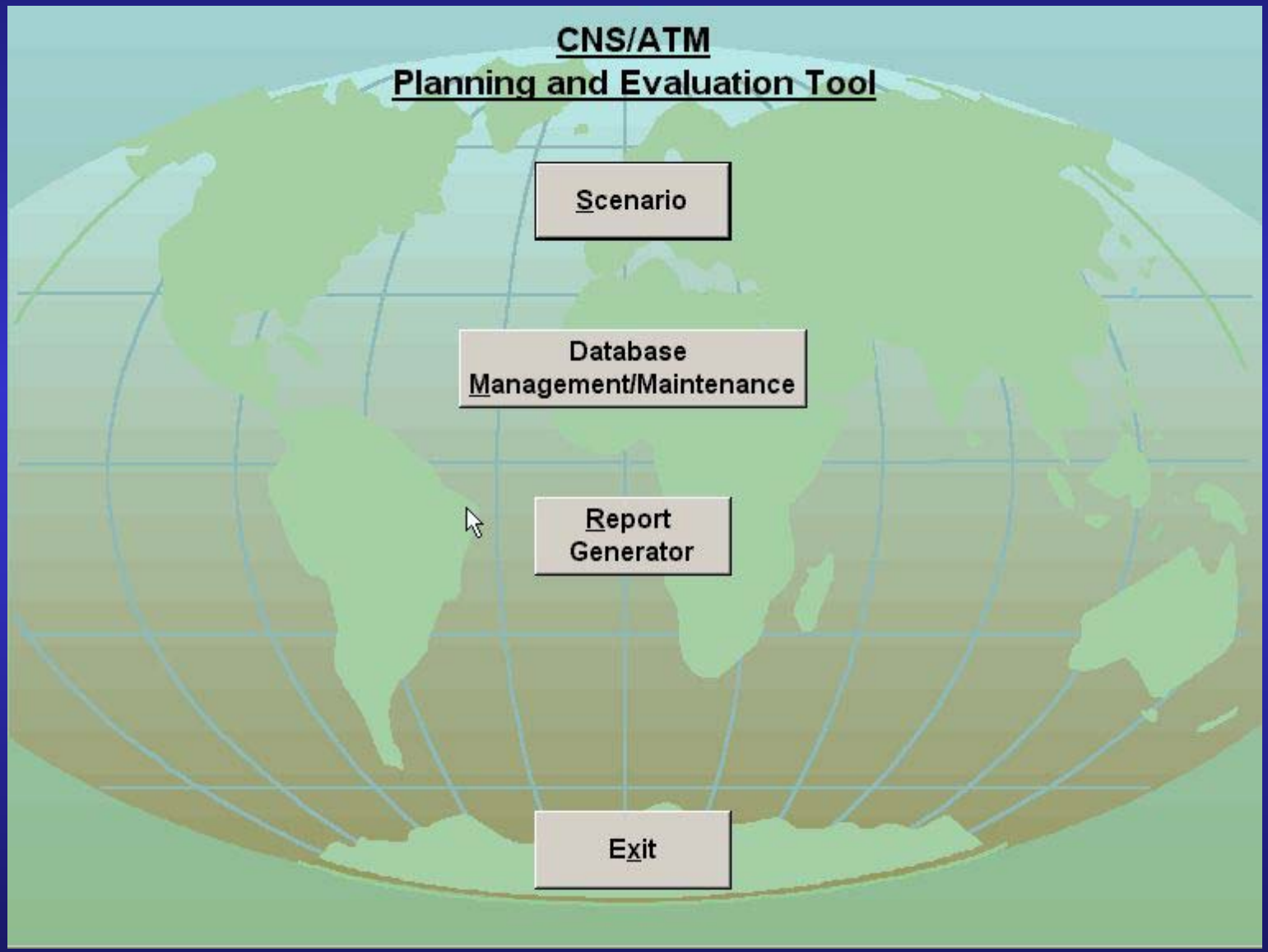

Password Menu
CNS/ATM
Planning and Evaluation Tool
Please Select Country/State and Enter Password
State
Select
Anguilla
Antigua & Barbuda
Argentina
Aruba
Bahamas
Password
******
Exit

CNS/ATM PET



Screen Display Sequence And Actions

CNS/ATM PET


CNS/ATM
Planning and Evaluation Tool
Scenario
Database
Management/Maintenance
Report
Generator
Exit

CNS/ATM PET

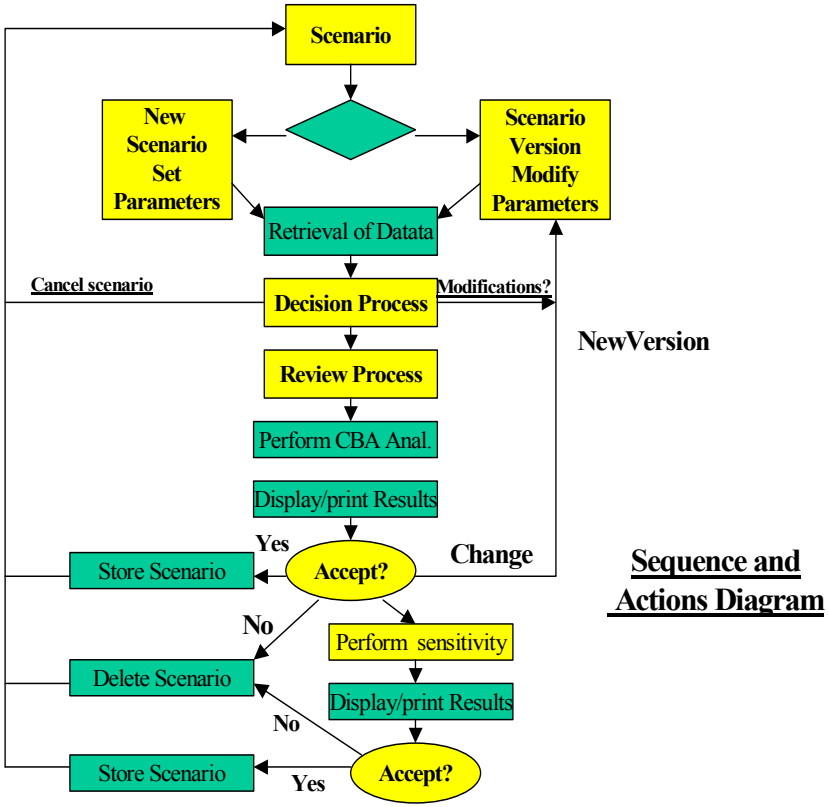
What will CNS/ATM PET do?

Scenario Generator

Assist in the construction of scenarios through the seclection of:

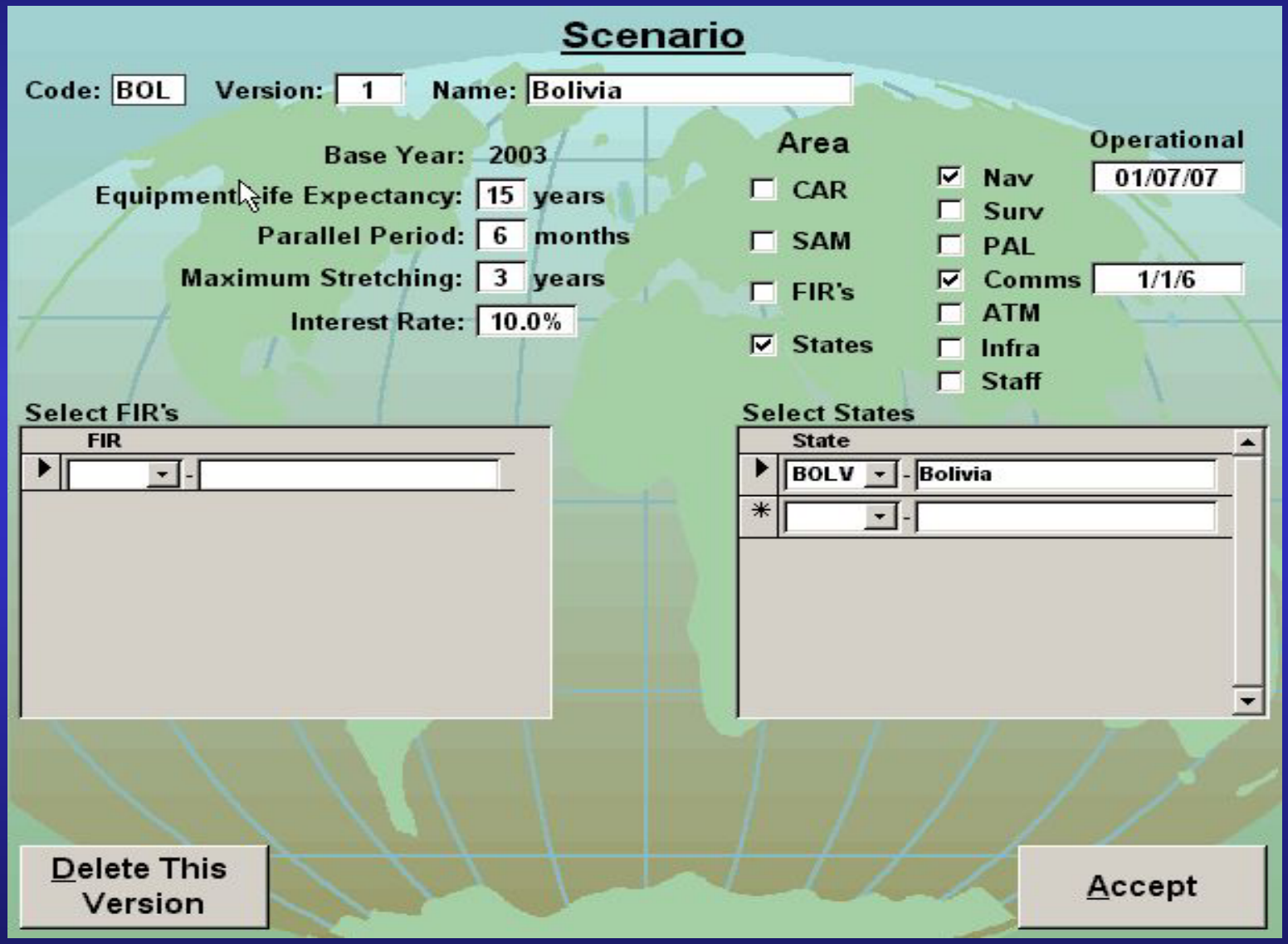
- Area/flow to be considered
- Period of implementation
- Equipment life expectancy
- Maximum stretching
- Cost of money (Interest Rate)
- Duration of parallel operation of systems.
- Selection of CNS elements to be evaluated and target date of implementation.

CNS/ATM PET



Sequence and Actions Diagram

CNS/ATM PET

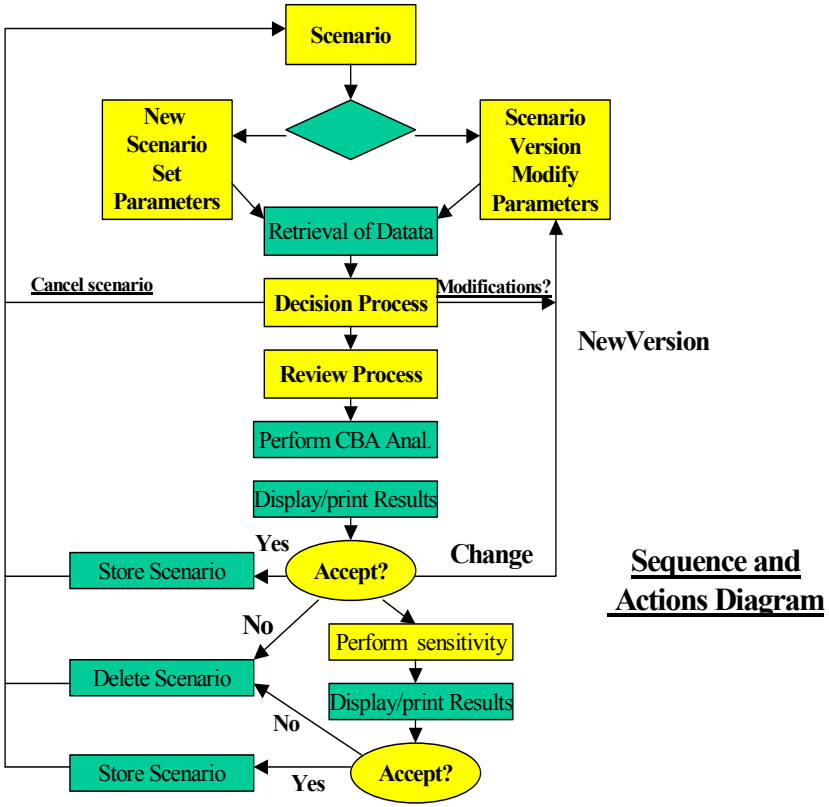

Scenario
Code: BOL
Version: 1
Name: Bolivia
Base Year: 2003
Equipment Life Expectancy: 15 years
Parallel Period: 6 months
Maximum Stretching: 3 years
Interest Rate: 10.0%
Area
CAR
SAM
FIR's
States
Nav
Surv
PAL
Comms
ATM
Infra
Staff
Operational
01/07/07
1/1/6
Select FIR's
FIR
Select States
State
BOLV - Bolivia
Delete This Version
Accept

Why Scenario Pre-Processor?

Scenario Pre-Processor will, using information in the Databases, set the stage for the evaluation of different scenarios by enabling:

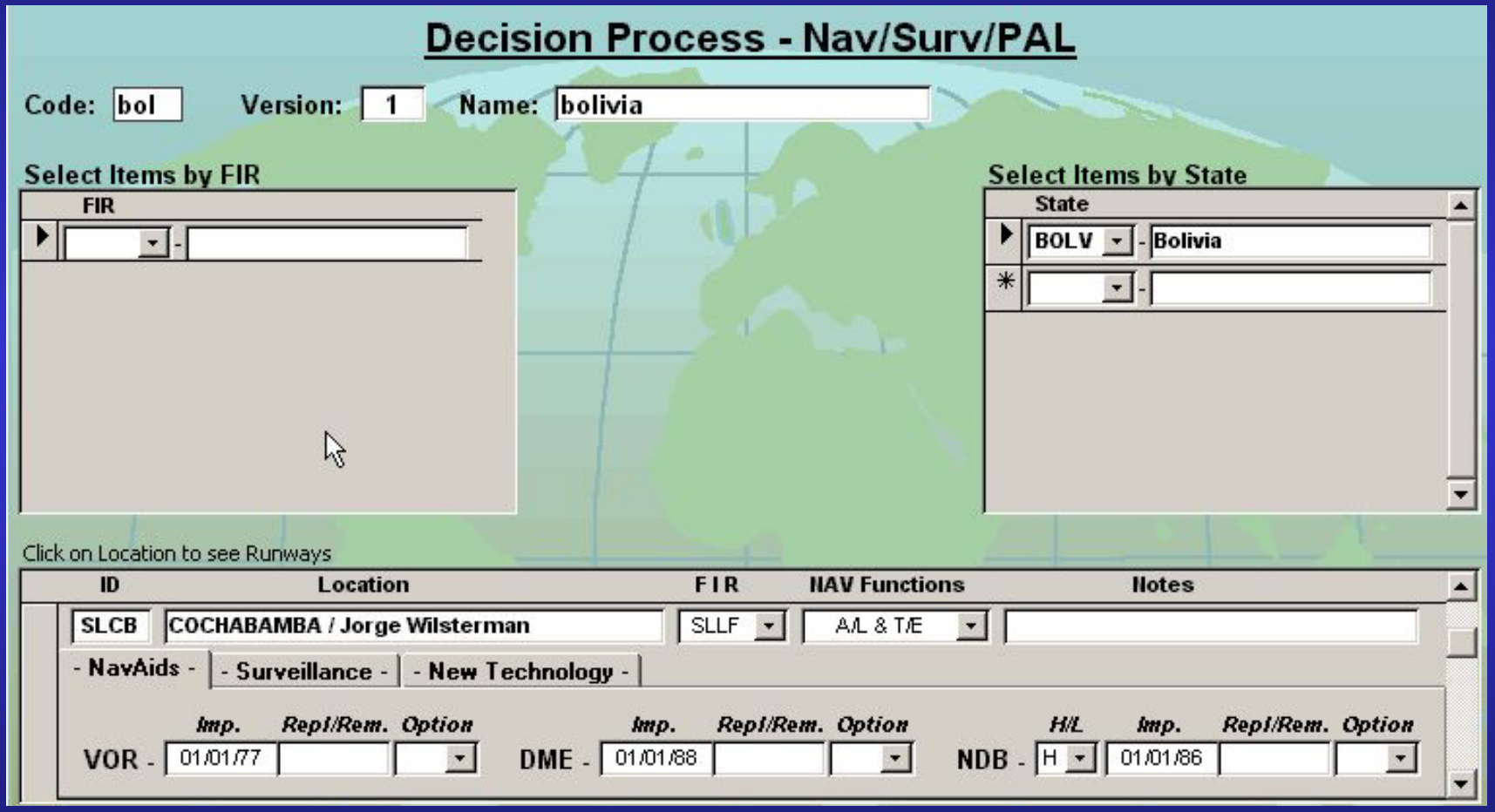
- The selection of the necessary data from the databases (States, Group of States, FIR, Group of FIRs, etc.;
- Option selection (refresh, replace with new option or cancellation)
- Performance of cost explosions for the selected elements over time;
- Summarization of values, on a per year basis for submission to the CBA

CNS/ATM PET



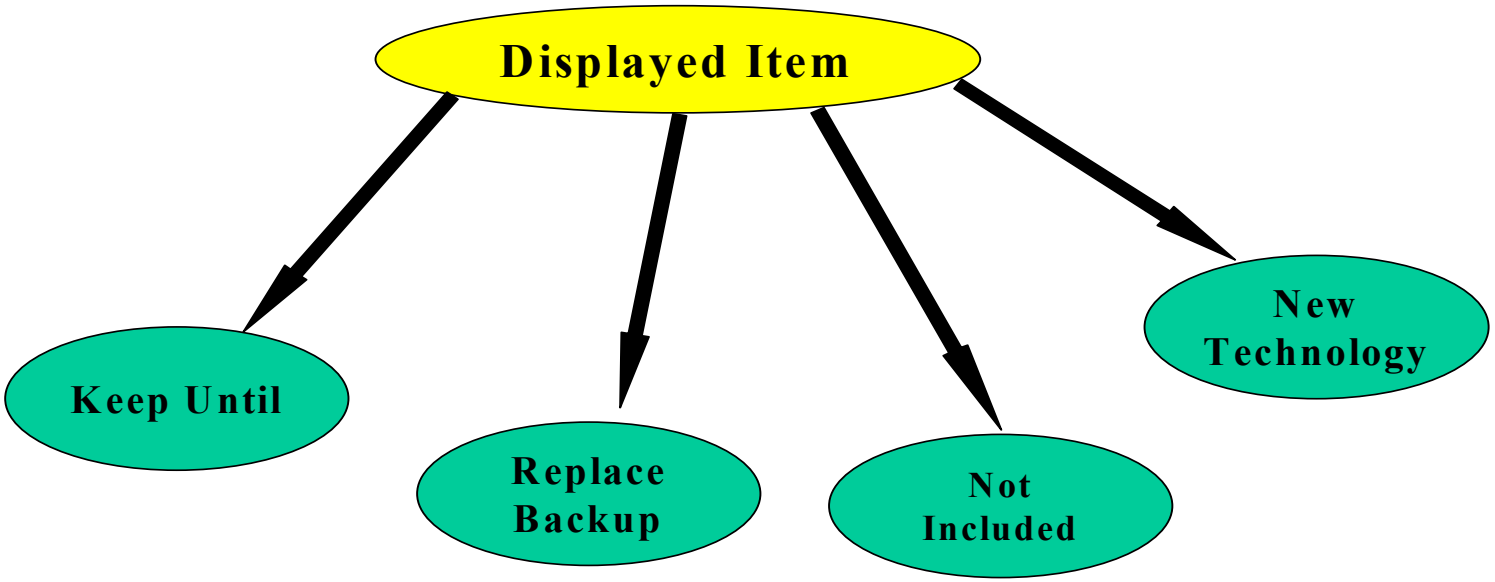
Sequence and Actions Diagram

CNS/ATM PET

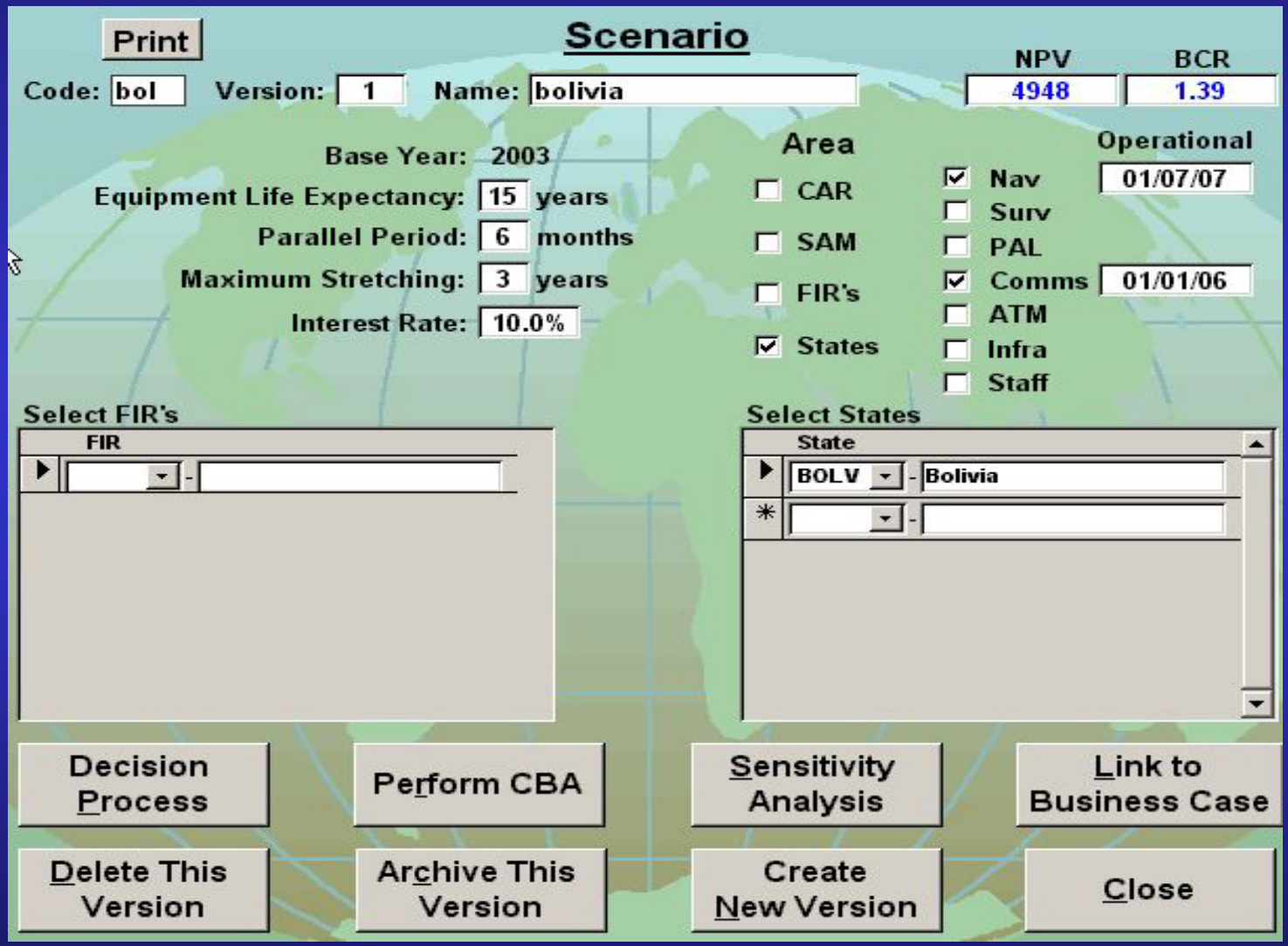

Decision Process - Nav/Surv/PAL
Code: bol
Version: 1
Name: bolivia
Select Items by FIR
FIR
Select Items by State
State
BOLV - Bolivia
Click on Location to see Runways
ID
Location
FIR
NAV Functions
Notes
SLCB
COCHABAMBA / Jorge Wilsterman
SLLF
A/L & T/E
- NavAids -
- Surveillance -
- New Technology -
Imp.
Repl/Rem.
Option
VOR - 01/01/77
DME - 01/01/88
H/L
NDB - H 01/01/86

CNS/ATM PET

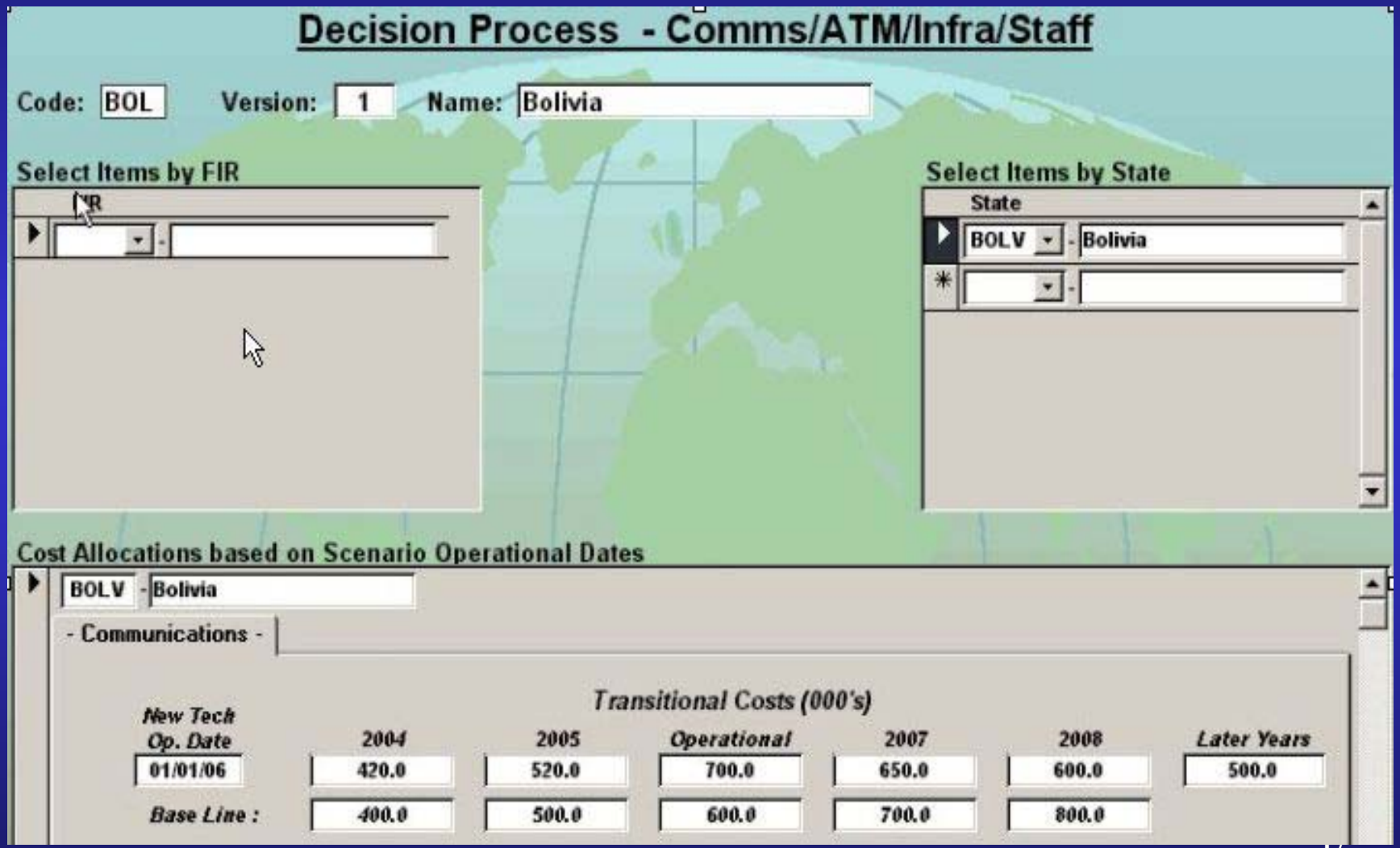
Decision Process Flow Chart Screen



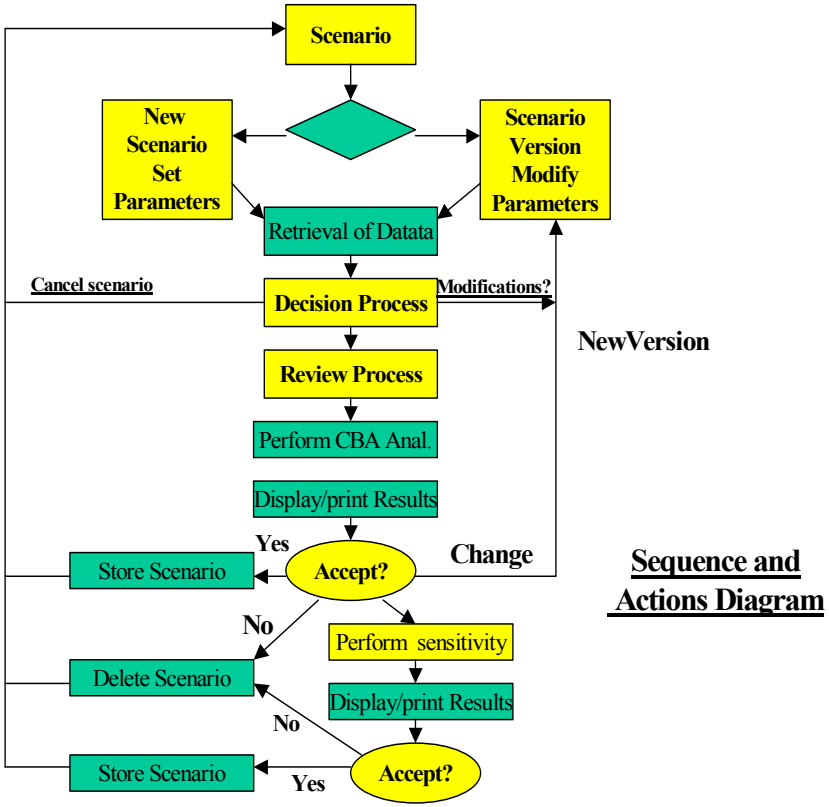
CNS/ATM PET


Print
Scenario
Code: bol
Version: 1
Name: bolivia
NPV
4948
BCR
1.39
Base Year: 2003
Equipment Life Expectancy: 15 years
Parallel Period: 6 months
Maximum Stretching: 3 years
Interest Rate: 10.0%
Area
CAR
SAM
FIR's
States
Nav
Surv
PAL
Comms
ATM
Infra
Staff
Operational
01/07/07
01/01/06
Select FIR's
FIR
Select States
State
BOLV - Bolivia
Decision Process
Perform CBA
Sensitivity Analysis
Link to Business Case
Delete This Version
Archive This Version
Create New Version
Close

CNS/ATM PET

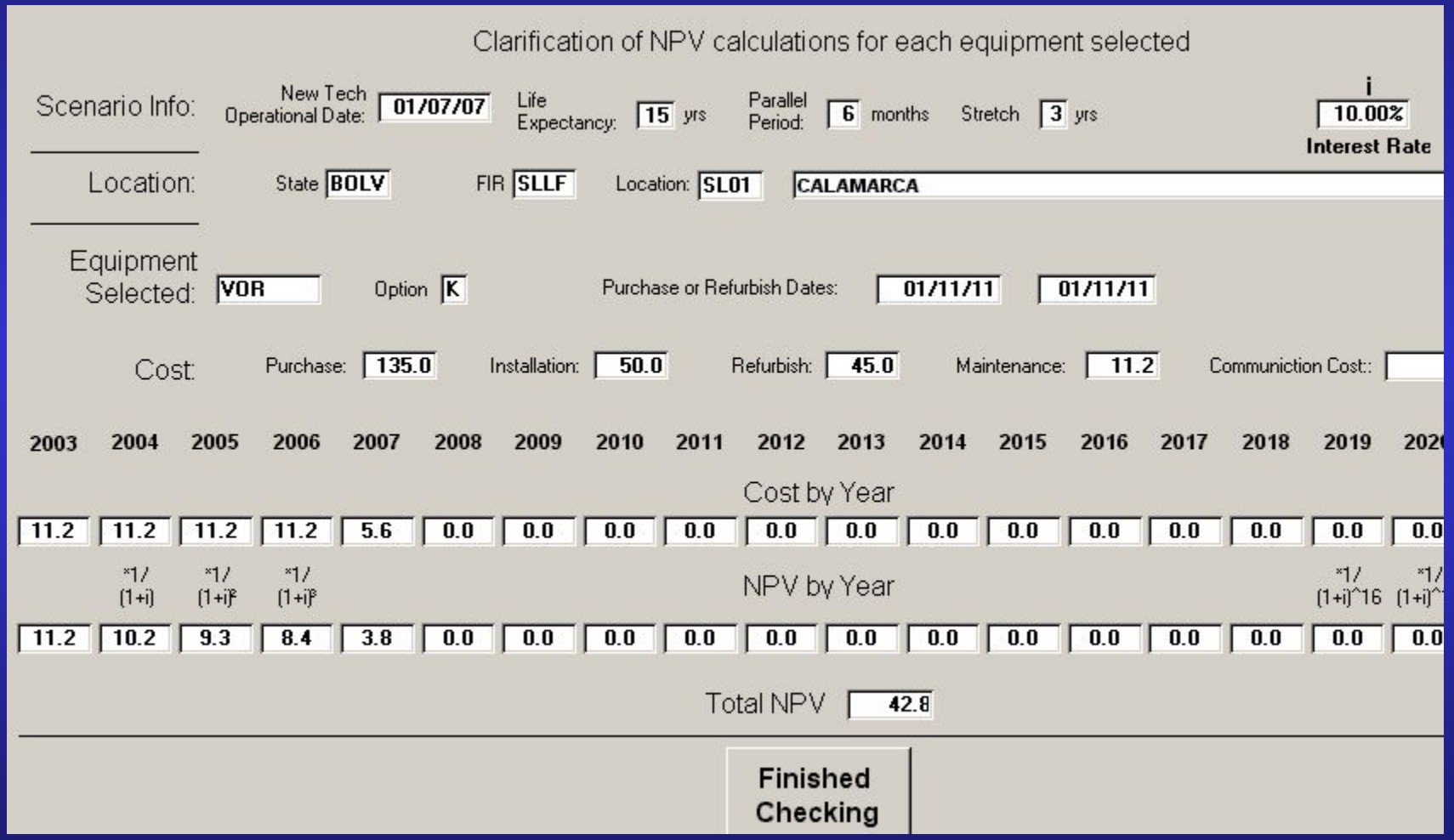

Decision Process - Comms/ATM/Infra/Staff
Code: BOL
Version: 1
Name: Bolivia
Select Items by FIR
FIR
Select Items by State
State
BOLV - Bolivia
Cost Allocations based on Scenario Operational Dates
BOLV - Bolivia
- Communications -
Transitional Costs (000's)
New Tech Op. Date
2004
2005
Operational
2007
2008
Later Years
01/01/06
420.0
520.0
700.0
650.0
600.0
500.0
Base Line :
400.0
500.0
600.0
700.0
800.0

CNS/ATM PET

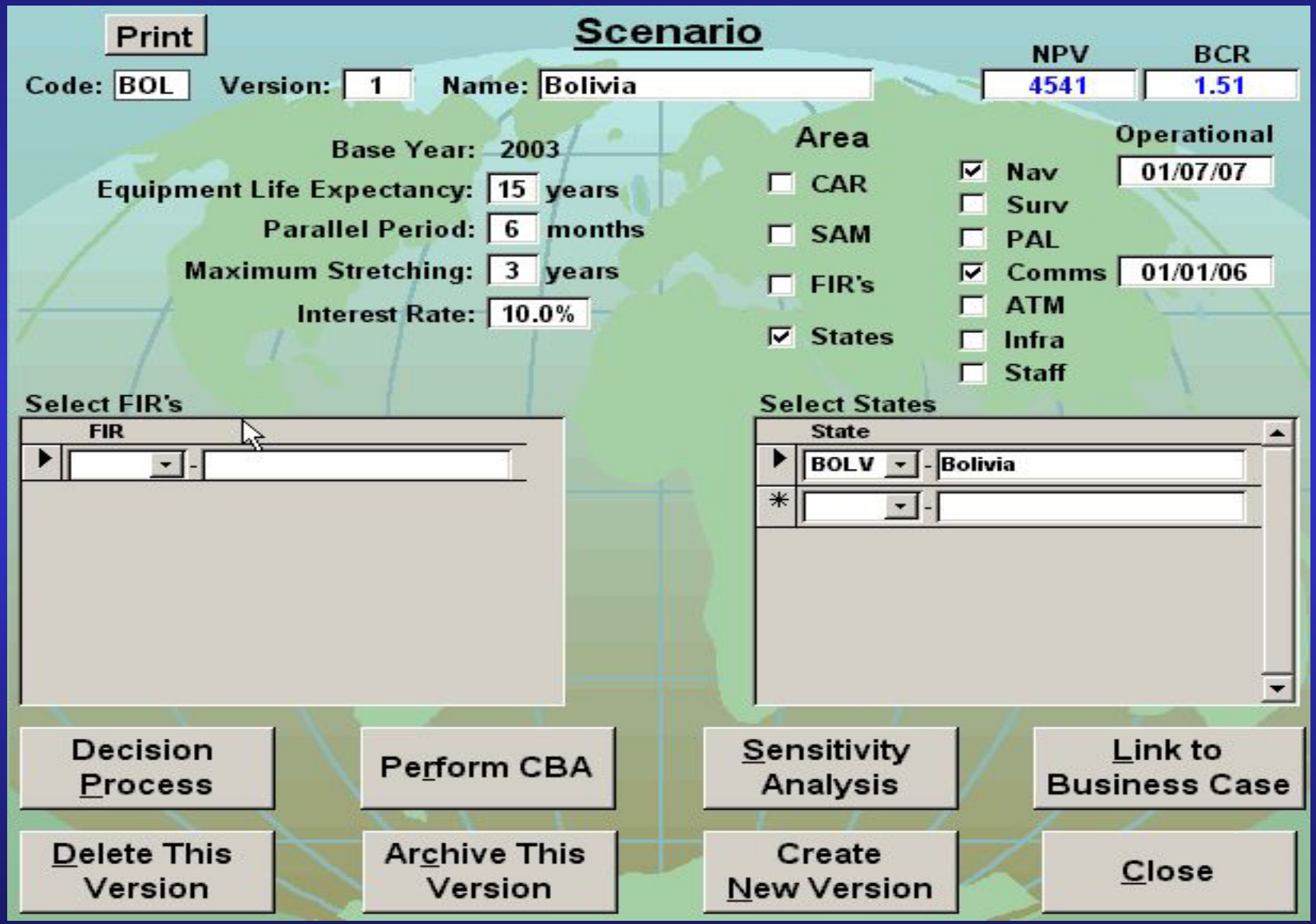


Sequence and Actions Diagram

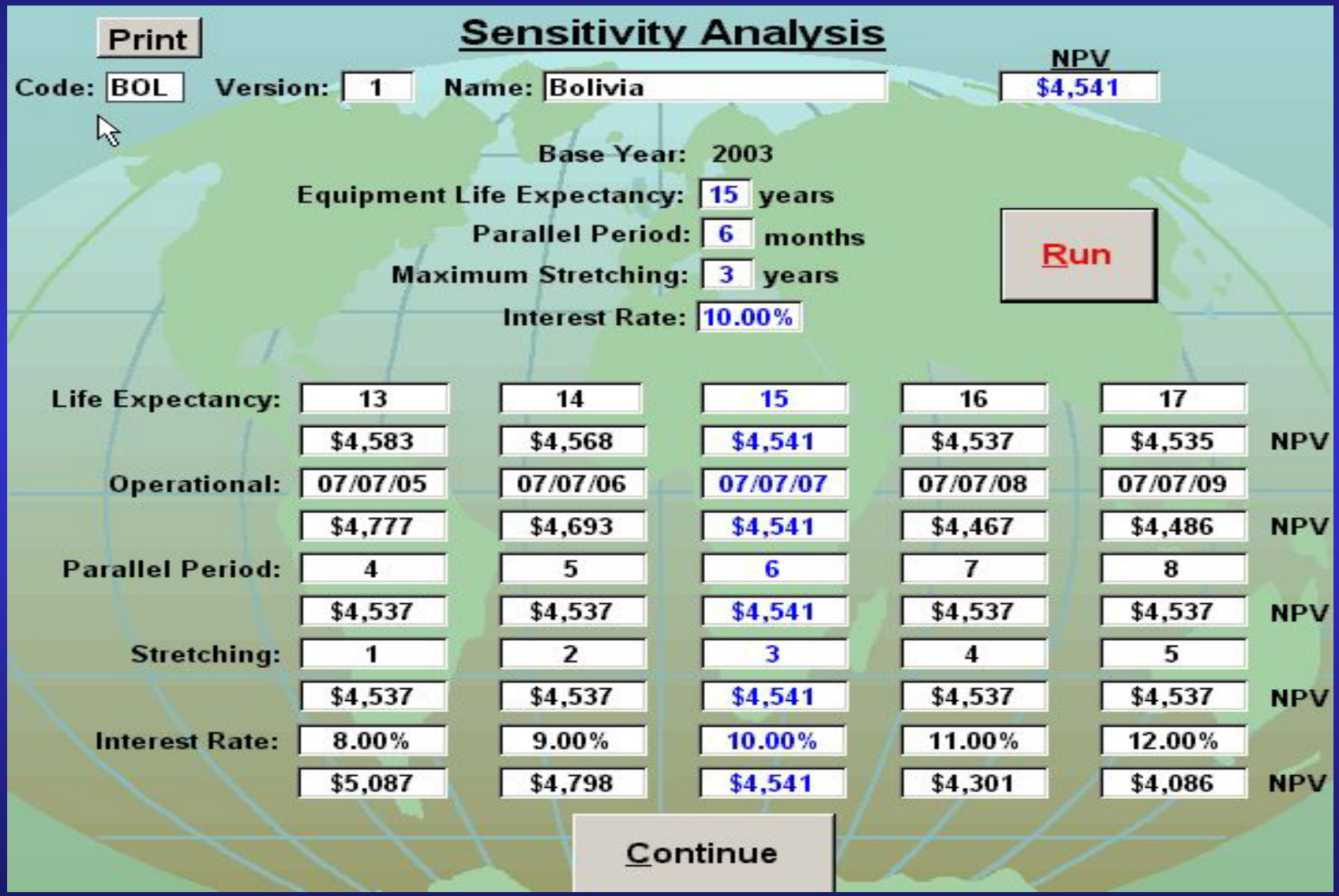
CNS/ATM PET


Clarification of NPV calculations for each equipment selected
Scenario Info:
New Tech Operational Date: 01/07/07
Life Expectancy: 15 yrs
Parallel Period: 6 months
Stretch 3 yrs
i 10.00% Interest Rate
Location:
State BOLV
FIR SLLF
Location: SL01
CALAMARCA
Equipment Selected:
VOR
Option K
Purchase or Refurbish Dates: 01/11/11 01/11/11
Cost:
Purchase: 135.0
Installation: 50.0
Refurbish: 45.0
Maintenance: 11.2
Communiction Cost::
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 202
Cost by Year
11.2 11.2 11.2 11.2 5.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
*1/ (1+i) *1/ (1+i)² *1/ (1+i)³
NPV by Year
*1/ (1+i)^16 *1/ (1+i)^
11.2 10.2 9.3 8.4 3.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Total NPV 42.8
Finished Checking

CNS/ATM PET


Print
Scenario
NPV
BCR
Code: BOL
Version: 1
Name: Bolivia
4541
1.51
Base Year: 2003
Equipment Life Expectancy: 15 years
Parallel Period: 6 months
Maximum Stretching: 3 years
Interest Rate: 10.0%
Area
CAR
SAM
FIR's
States
Operational
Nav 01/07/07
Surv
PAL
Comms 01/01/06
ATM
Infra
Staff
Select FIR's
FIR
Select States
State
BOLV - Bolivia
Decision Process
Perform CBA
Sensitivity Analysis
Link to Business Case
Delete This Version
Archive This Version
Create New Version
Close

CNS/ATM PET

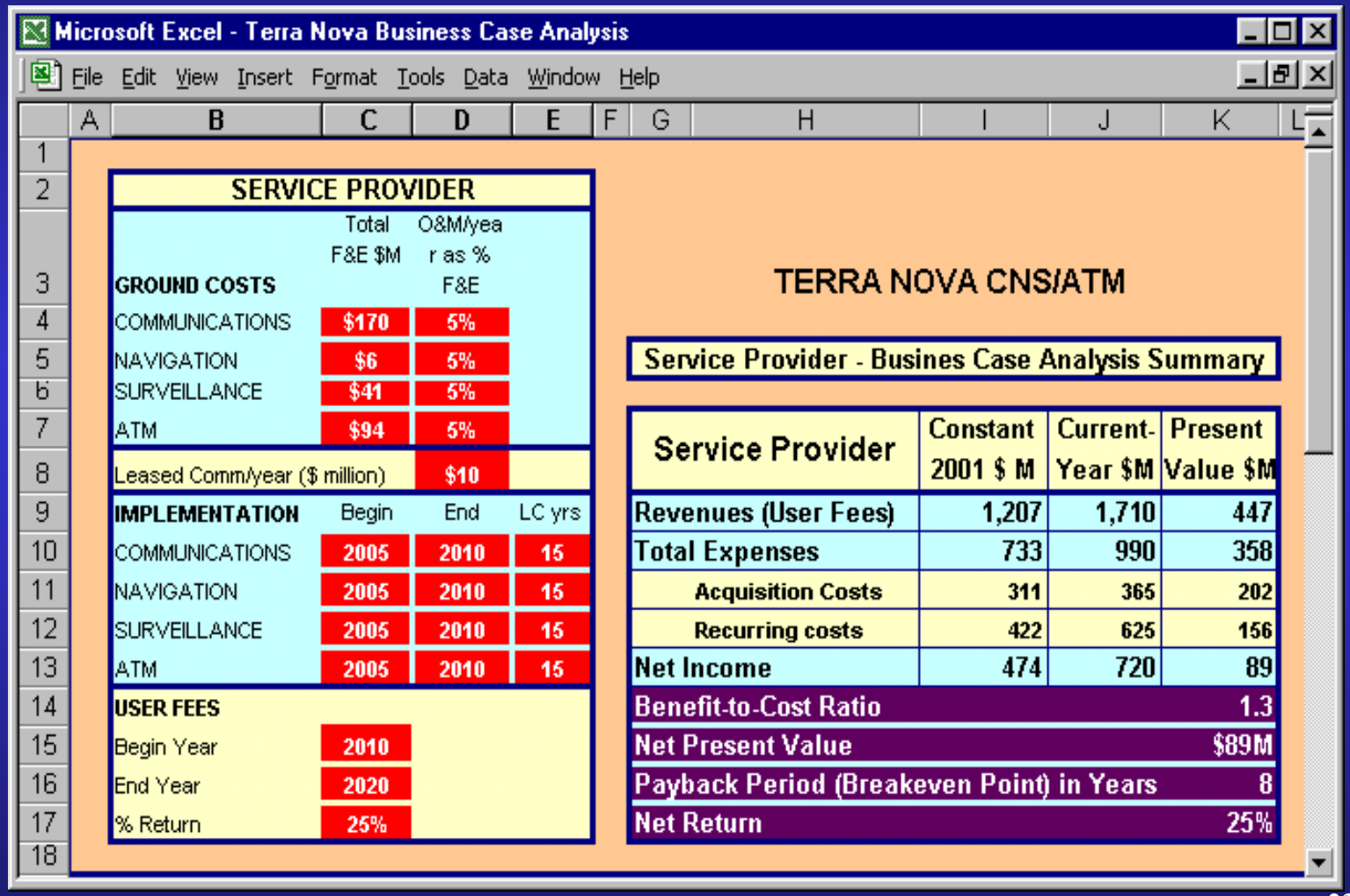

Print
Sensitivity Analysis
NPV
Code: BOL
Version: 1
Name: Bolivia
$4,541
Base Year: 2003
Equipment Life Expectancy: 15 years
Parallel Period: 6 months
Maximum Stretching: 3 years
Interest Rate: 10.00%
Run
Life Expectancy: 13 14 15 16 17
$4,583 $4,568 $4,541 $4,537 $4,535 NPV
Operational: 07/07/05 07/07/06 07/07/07 07/07/08 07/07/09
$4,777 $4,693 $4,541 $4,467 $4,486 NPV
Parallel Period: 4 5 6 7 8
$4,537 $4,537 $4,541 $4,537 $4,537 NPV
Stretching: 1 2 3 4 5
$4,537 $4,537 $4,541 $4,537 $4,537 NPV
Interest Rate: 8.00% 9.00% 10.00% 11.00% 12.00%
$5,087 $4,798 $4,541 $4,301 $4,086 NPV
Continue

Why Business Case?

- Determine financial viability of scenario;
- Measure Risk through Cash Flow analysis;
- Assist in the determination of the amount of financing required;
- Determine Break-Even point;
- Assist in the determination of user charges required to recover costs;
-

A must for financing.

CNS/ATM PET



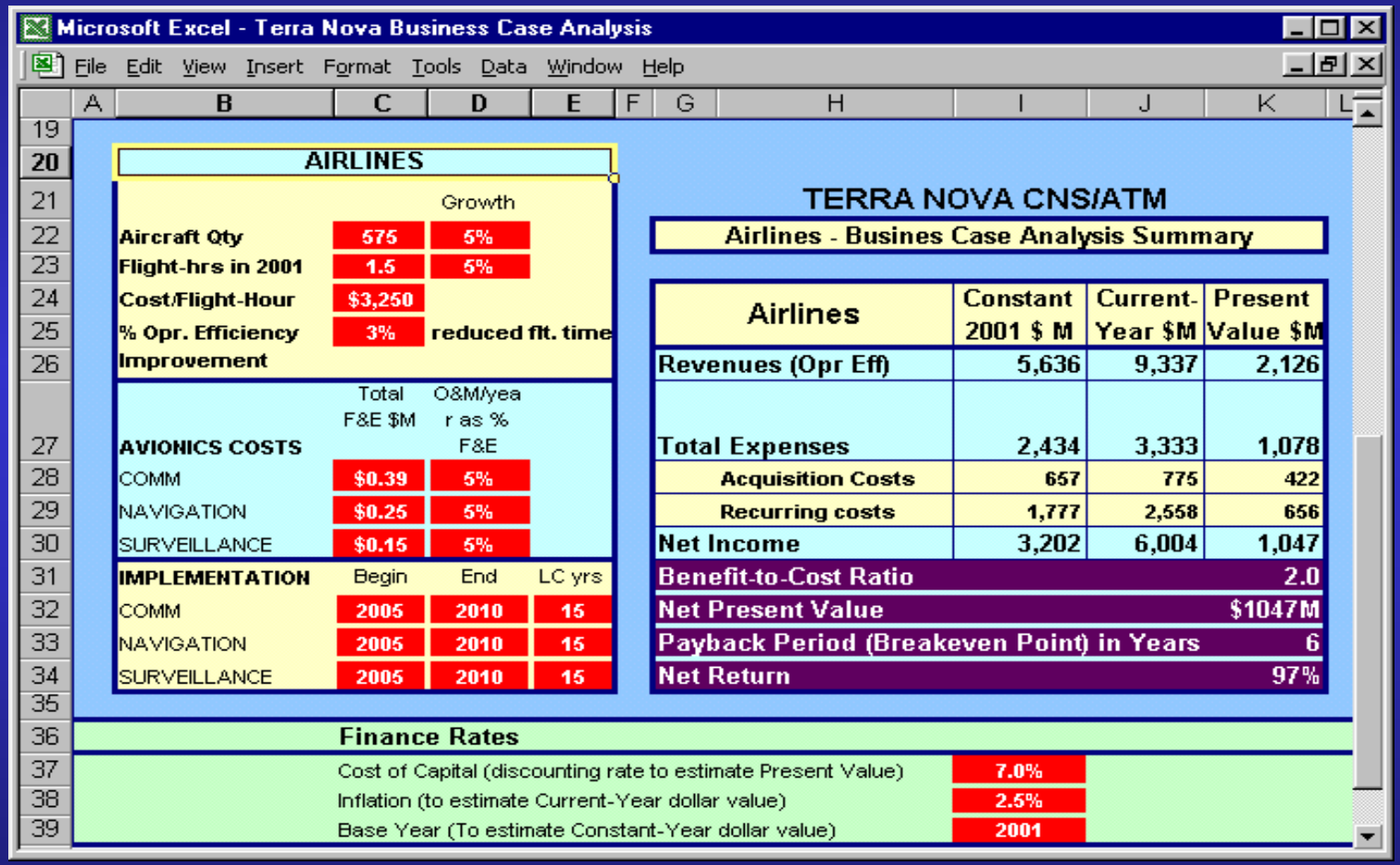
SERVICE PROVIDER			
	Total F&E $M	O&M/year as % F&E	
GROUND COSTS			
COMMUNICATIONS	$170	5%	
NAVIGATION	$6	5%	
SURVEILLANCE	$41	5%	
ATM	$94	5%	
Leased Comm/year ($ million)		$10	
IMPLEMENTATION	Begin	End	LC yrs
COMMUNICATIONS	2005	2010	15
NAVIGATION	2005	2010	15
SURVEILLANCE	2005	2010	15
ATM	2005	2010	15
USER FEES			
Begin Year	2010		
End Year	2020		
% Return	25%		

TERRA NOVA CNS/ATM

Service Provider - Busines Case Analysis Summary

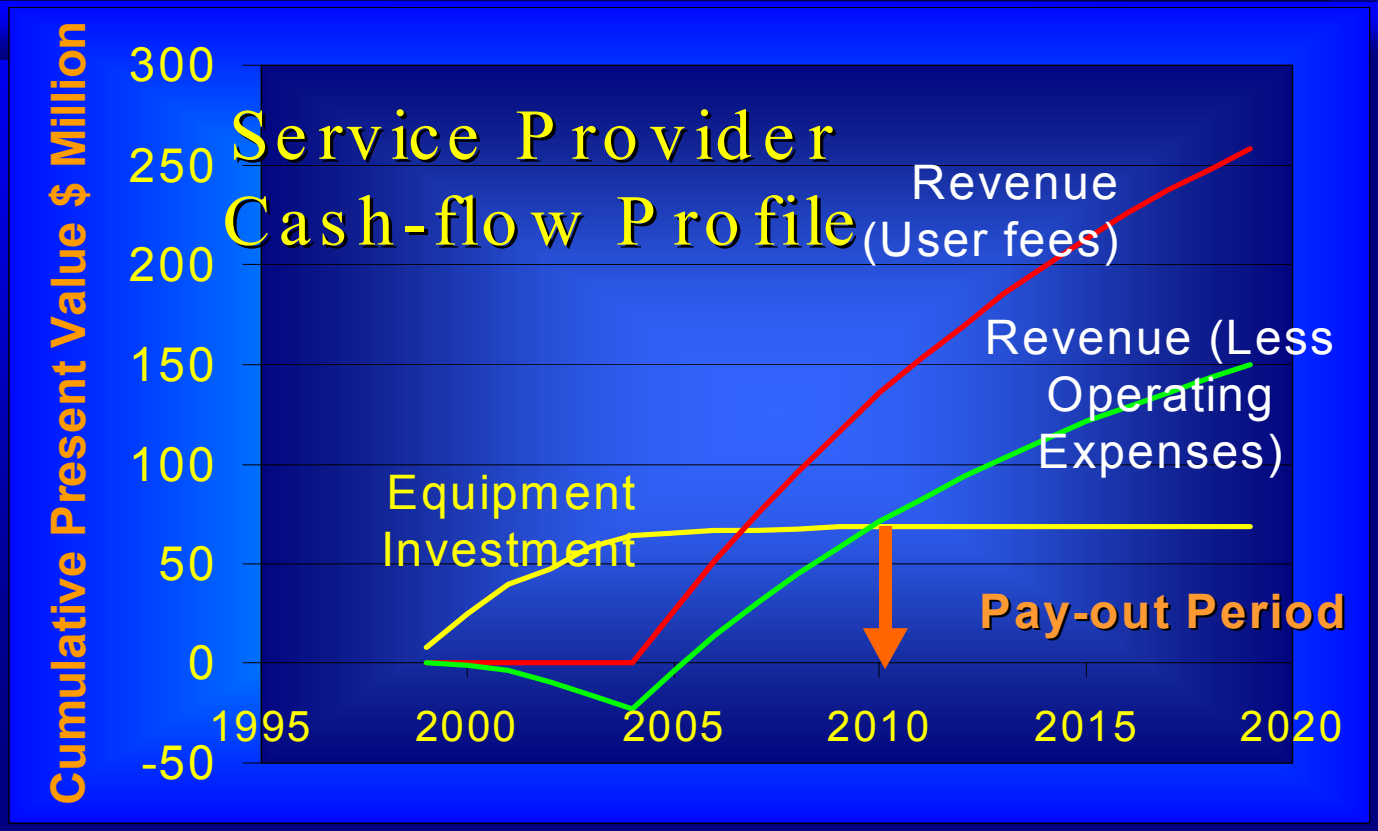
Service Provider	Constant 2001 $ M	Current-Year $M	Present Value $M
Revenues (User Fees)	1,207	1,710	447
Total Expenses	733	990	358
Acquisition Costs	311	365	202
Recurring costs	422	625	156
Net Income	474	720	89
Benefit-to-Cost Ratio			1.3
Net Present Value			$89M
Payback Period (Breakeven Point) in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

CNS/ATM PET


Microsoft Excel - Terra Nova Business Case Analysis
File Edit View Insert Format Tools Data Window Help
AIRLINES
Growth
Aircraft Qty 575 5%
Flight-hrs in 2001 1.5 5%
Cost/Flight-Hour $3,250
% Opr. Efficiency Improvement 3% reduced flt. time
Total F&E $M
O&M/year as % F&E
AVIONICS COSTS
COMM $0.39 5%
NAVIGATION $0.25 5%
SURVEILLANCE $0.15 5%
IMPLEMENTATION Begin End LC yrs
COMM 2005 2010 15
NAVIGATION 2005 2010 15
SURVEILLANCE 2005 2010 15
TERRA NOVA CNS/ATM
Airlines - Busines 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%
Finance Rates
Cost of Capital (discounting rate to estimate Present Value) 7.0%
Inflation (to estimate Current-Year dollar value) 2.5%
Base Year (To estimate Constant-Year dollar value) 2001

CNS/ATM PET

Business Case – Break even chart (parametric)



CNS/ATM PET

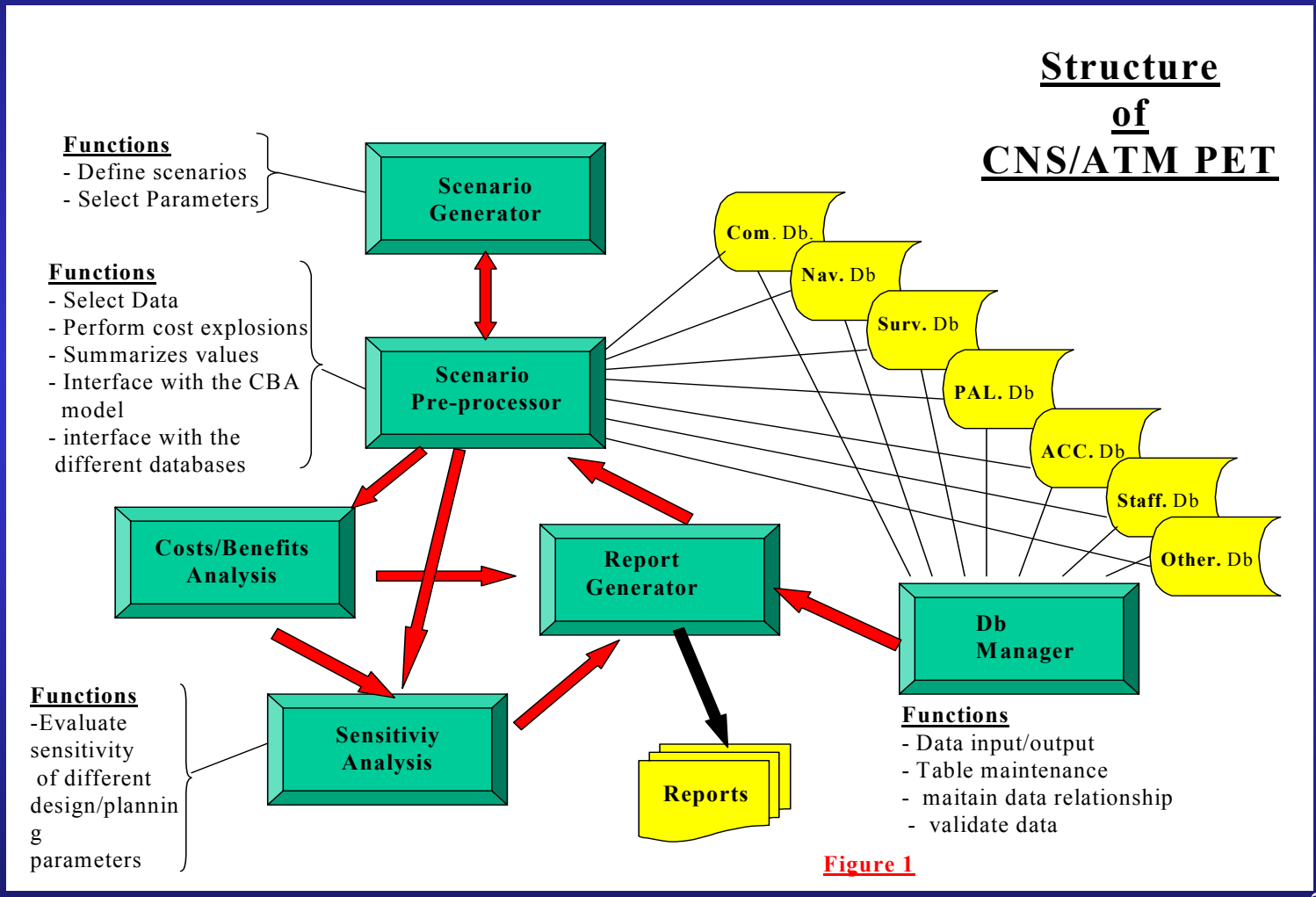


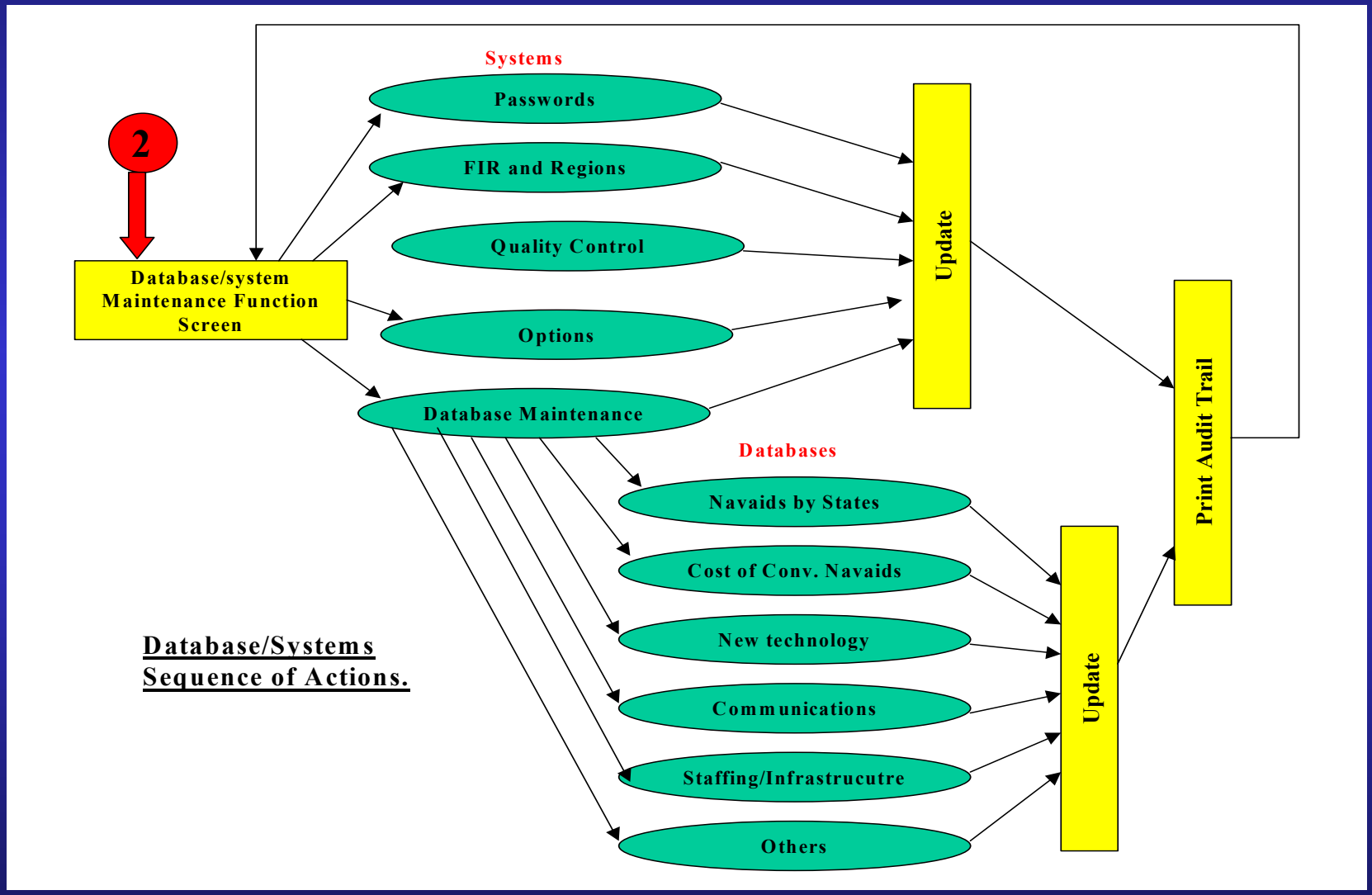
Figure 1

Why databases?

Considering that the same basic data will be re-used in the evaluation of different implementation scenarios, the data has been organized in different databases. (Navaids database, personnel database, infrastructure database, etc.)

In addition, through the use of associated tools, the maintenance of the databases will be simplified, the integrity of the databases insured and data relationships maintained.

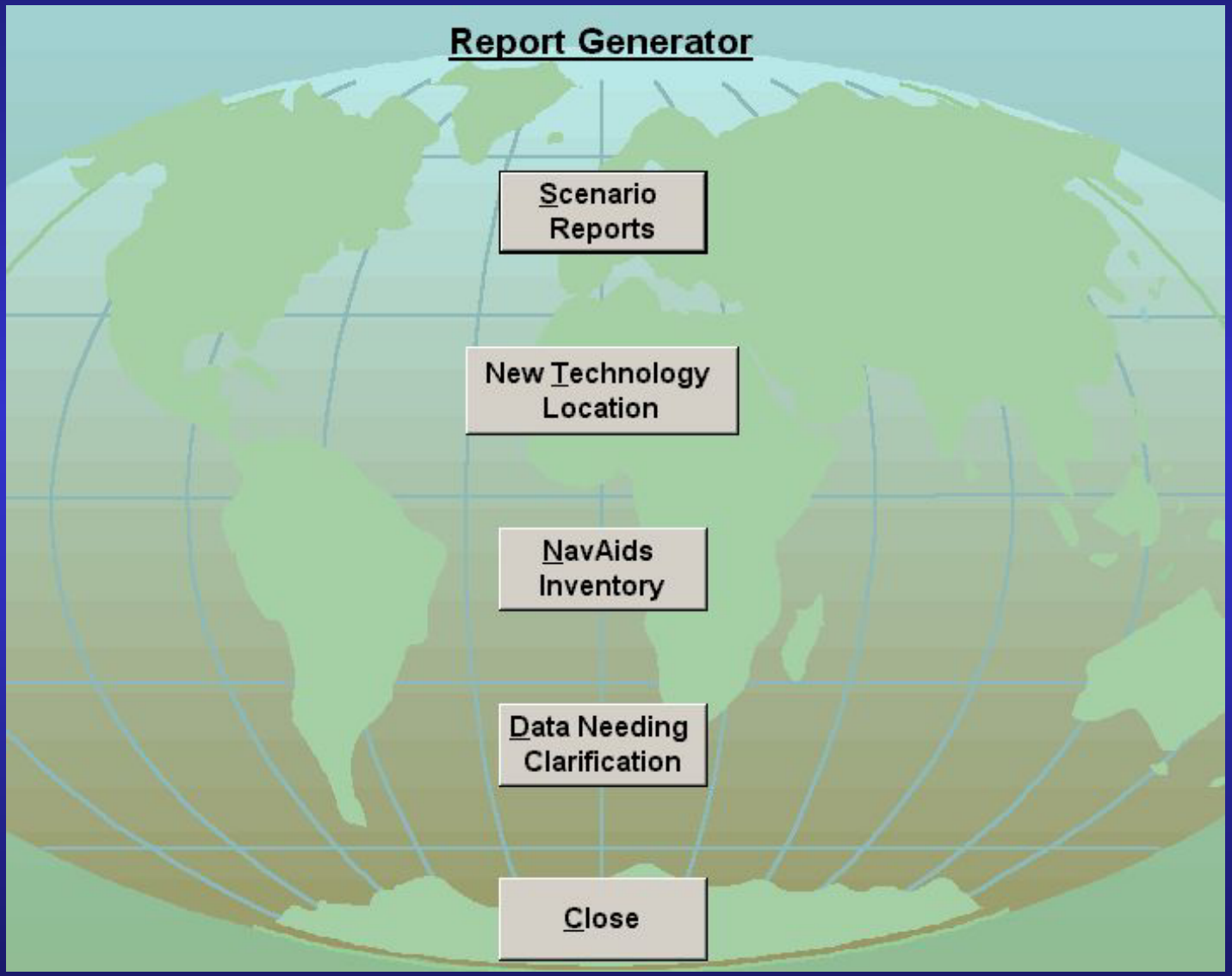
CNS/ATM PET


Systems
Passwords
FIR and Regions
Quality Control
Options
Database Maintenance
2
Database/system Maintenance Function Screen
Update
Print Audit Trail
Databases
Navaids by States
Cost of Conv. Navaids
New technology
Communications
Staffing/Infrastrucutre
Others
Update
Database/Systems Sequence of Actions.

Why Report Generator?

- To provide an audit trail;
- Quality control for databases
- Scenario summaries;
- Inventory reports;
- Others.

CNS/ATM PET


Report Generator
Scenario Reports
New Technology Location
NavAids Inventory
Data Needing Clarification
Close

CNS/ATM PET

What will CNS/ATM PET do?

- assist in the selection of the best technical solution
- assist in the determination of the best implementation timing
- assist in the determination of the best implementation option
- determine viability of the project
- determine most critical elements of the project (sensitivity)

Thank You.