



**GoExplore Consulting**

**Free Friday Webinars**  
**Merging Prospect Volumes**  
**with the Resource Clustering Tool**  
**May 8<sup>th</sup> 9am Houston Time**

- Introduction to Merging Risk-Volume Assessments
- Dependencies
- GoExplore: Prospector-Light / Resource Clustering Tool
- Demo
- Wrap-up

### GoExplore: Resource Clustering Tool

Resource Clustering With Risk Association and Volume Correlation

1. Up to Five Input-Resources
2. Simple User Interface
3. Scenario Tree
4. Risk Association Assessment

Input Pos, Input Mean, Input Uncertainty, Input Cutoff, Output Resource Distribution

Input Volume Correlation, Input Risk Association, Output Cluster Volumes, Output Graphs

### Risk Association Assessment

Input Risk Association, Output Cluster Pos, Output Diagnostic, Output Graphs, Output Tree

Scenario Tree

© 2020 GoExplore Consulting Ltd Co.

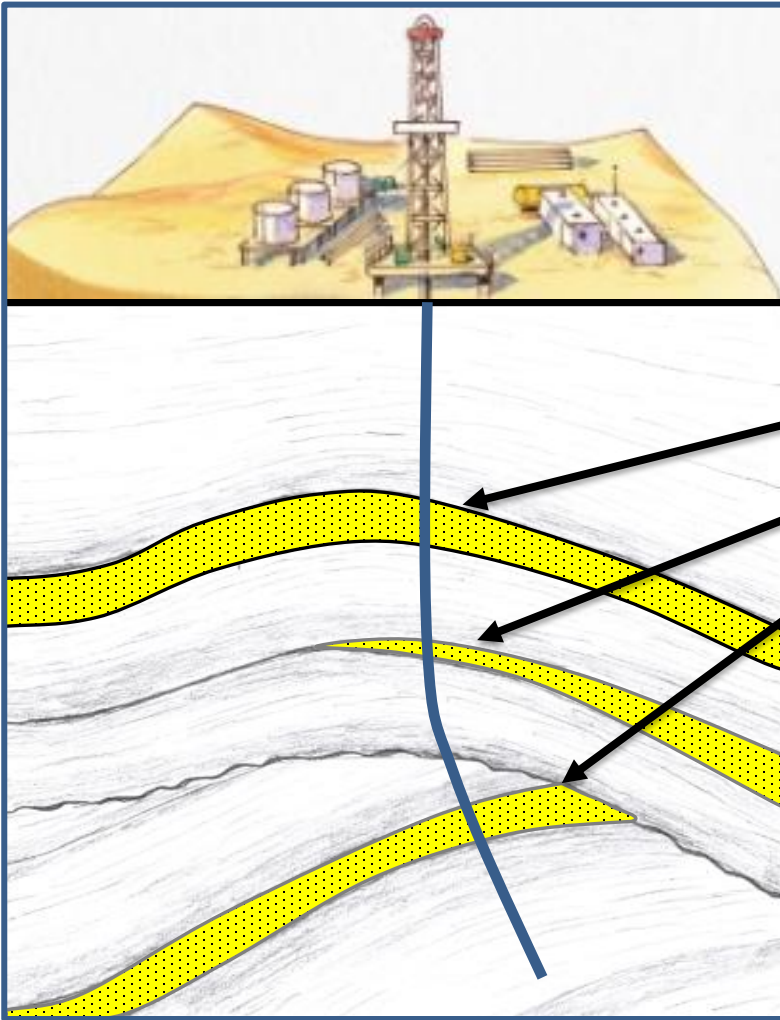
### GoExplore: Prospector Light

Prospector light  
Exploration Volume Calculator  
GoExplore Consulting Ltd Co

1. Deterministic Volume Calculator
2. Pseudo-Probabilistic Volume Calculator
3. Digitize Map areas for GRV
4. Risk-Merge of Multiple Objectives

© 2020 GoExplore Consulting Ltd Co.

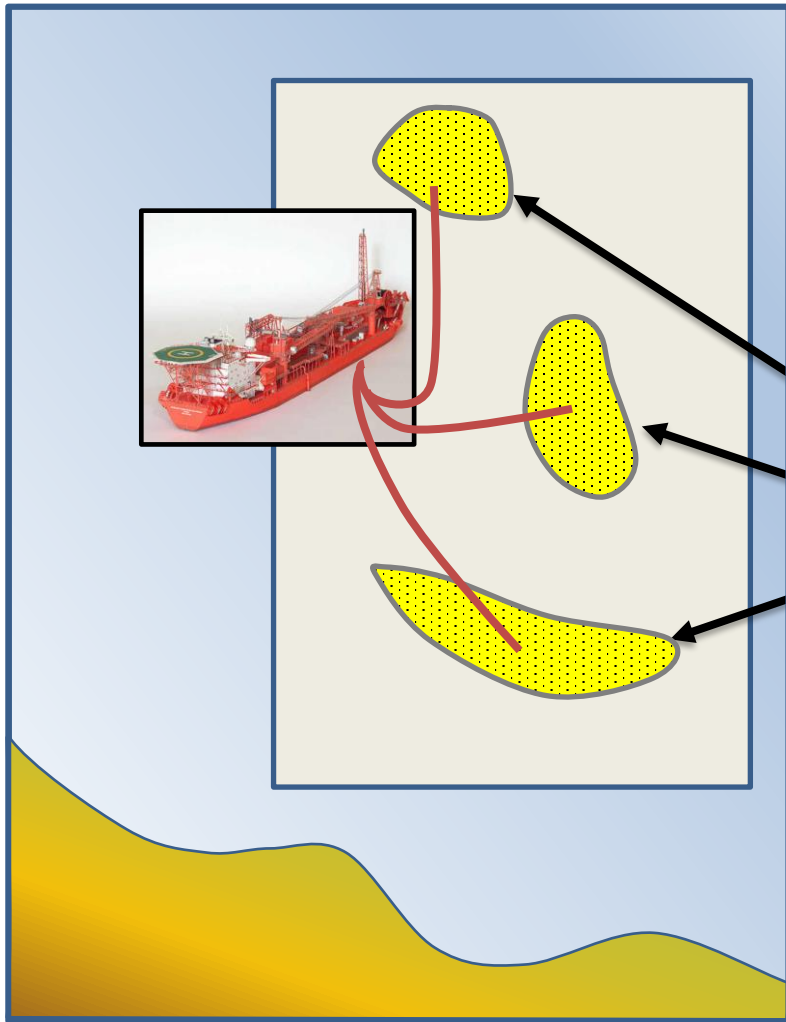
# Why Merging Risk-Volume Assessments?



	Pos	MSV	P90	P50	P10
Target 1	0.3	100	22	70	220
Target 2	0.2	150	33	105	330
Target 3	0.1	200	44	140	440

What is the POS and Volume Description of this Prospect?

# Why Merging Risk-Volume Assessments?



	Pos	MSV	P90	P50	P10
Prospect 1	0.3	100	22	70	220
Prospect 2	0.2	150	33	105	330
Prospect 3	0.1	200	44	140	440

What is the POS and Volume Description of this Cluster?

You **cannot** add P10, P50, P90 or MSVs volumes from the individual segment

Merging is a Statistical operation that considers:

- The Input Volume Distributions
- Dependencies between Volume distributions (correlation)
- The Input Risk Profiles
- Dependencies between the Risk Profiles (association)

**Dependencies:**

**If we know the outcome in Objective A, how does it affect our estimate of Objective B?**

**Association (related to Risk)**

Change Chance Factor estimates

**Correlation (related to Volume)**

Change Volume/Property estimates

A Prospect has two Objectives:

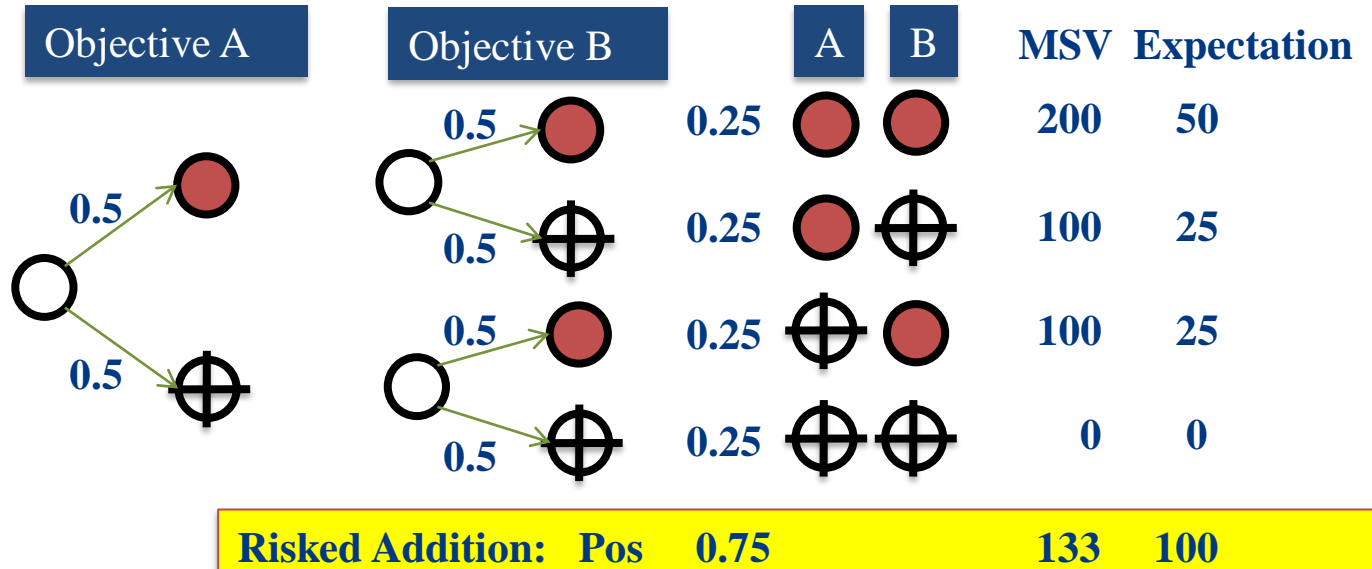
- **Objective A: PoS = 50% MSV 100 MMbbl**
- **Objective B: PoS = 50% MSV 100 MMbbl**

What is the combined POS and MSV of the Prospect (combined objectives) in case of:

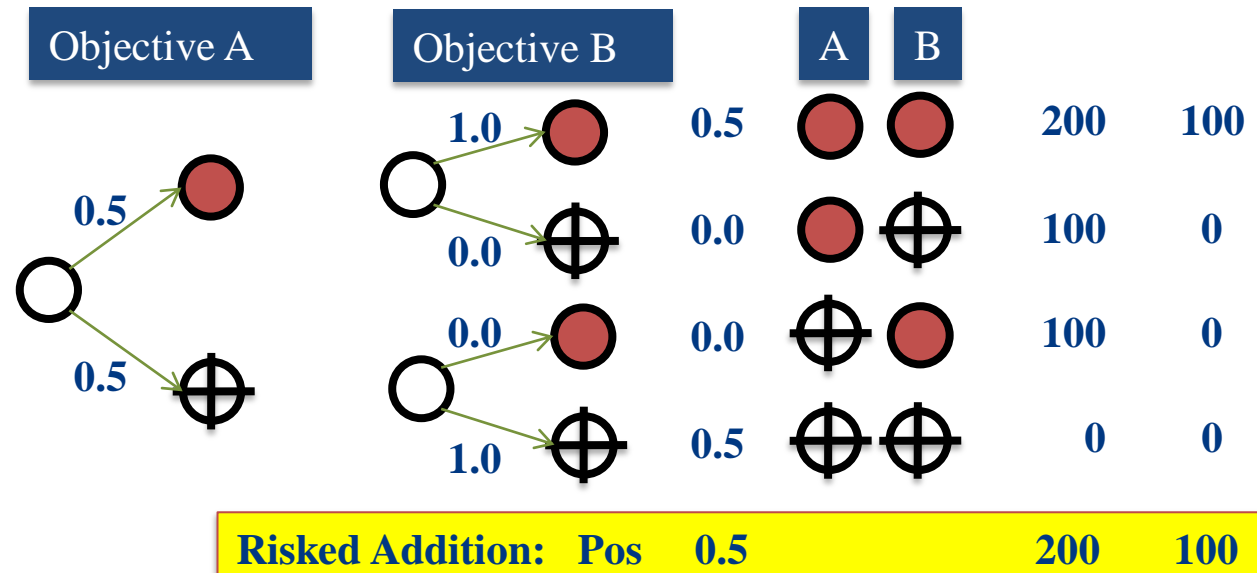
- **No Risk Dependency (No Association)**
- **Full Risk Dependency (Full Association)**

# Example Risk Dependency (Association)

**Independent Risk-addition**



**Fully Dependent Risk-addition**



# How to estimate Risk Dependencies?

The Dependency effects Several Aspects on which you might have an opinion:

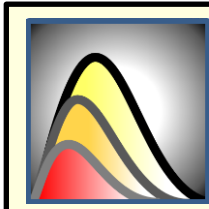
1. How does the POS of Objective “B” change **after a success** at Objective “A” ?
2. How does the POS of Objective “B” change **after a failure** at Objective “A” ?
3. What should the combined POS be of Objective A and B ?
4. How many successful objectives do you expect ?

**Dependency (Association Coefficient)**

	0.0	0.2	0.4	0.6	0.8	1.0
<b>POS “B” change after success at “A”</b>	0.5	0.56	0.61	0.67	0.76	1.0
<b>POS “B” change after failure at “A”</b>	0.5	0.44	0.39	0.33	0.24	0
<b>Combined POS be of Objective A &amp; B</b>	0.75	0.73	0.7	0.66	0.62	0.5
<b>One Successful Target</b>	0.66	0.62	0.57	0.5	0.4	0.0
<b>Two Successful Targets</b>	0.33	0.38	0.43	0.5	0.6	1.0

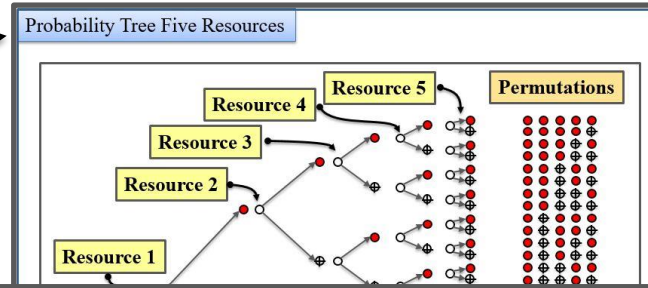


## GoExplore: Resource Clustering Tool



Resource Clustering With Risk Association and Volume Correlation

1. Up to Five Input-Resources
2. Simple User Interface
3. Scenario Tree
4. Risk Association Assessment



## GoExplore: Resource Clustering Tool

Input Pos Input Mean Input Uncertainty Input Cutoff Output Resource Distribution

GoExplore Resource Clustering Tool Licensed to: GoExplore Consulting Ltd Co

Name	Pos	MSV	Expect	Cutoff	Pos	MSV	P90	P10	Expect	Risk Association	Shared Risk	Matrix		
Resource-1	1	10	<>	3.3	1	0.99	10.1	2.29	7.02	22	0.999	0.60	0.60	0.50
Resource-2	0.2	10	<>	20	2	0.8	12.2	2.71	7.32	27.9	1.95	0.6	0.15	0.70
Resource-3	0.4	20	<>	5	0	1	20	7.46	16.7	37.3	8	0.6	0.15	0.40
Resource-4	0.5	2	<>	10	0	1	2	0.438	1.38	4.38	1	0.5	0.7	0.4

Input Volume Correlation

Input Risk Association

Output Cluster Volumes

Output Graphs

## Risk Association Assessment

Input Risk Association Output Cluster Pos Output Diagnostics Output Graphs Output Tree

GoExplore Risk Association Assessment

Risk Association Input

Shared Probability: 0.67

Association Coefficient: 0.54

Four Questions to Assess Risk Association

1) Combined POS of all Objectives

Merged Pos: 0.63

2) How does the POS change after previous successes?

Objective	A	B	C	D	E
POS prior input	0.1	0.2	0.4	0.5	0
POS after success	0.15	0.3	0.6	0.75	0

3) How does the POS change after successive failures?

Objective	A	B	C	D	E
POS after failure @ A	0.19	0.38	0.47	0	0
POS after failure @ A, B	0.33	0.41	0	0	0
POS after failure @ A, B, C	0.24	0	0	0	0
POS after failure @ A, B, C, D	0	0	0	0	0

4) Number of Successful Objectives

1	2	3	4	5
0.308	0.462	0.194	0.022	0

Optional: Tweak Input Pos

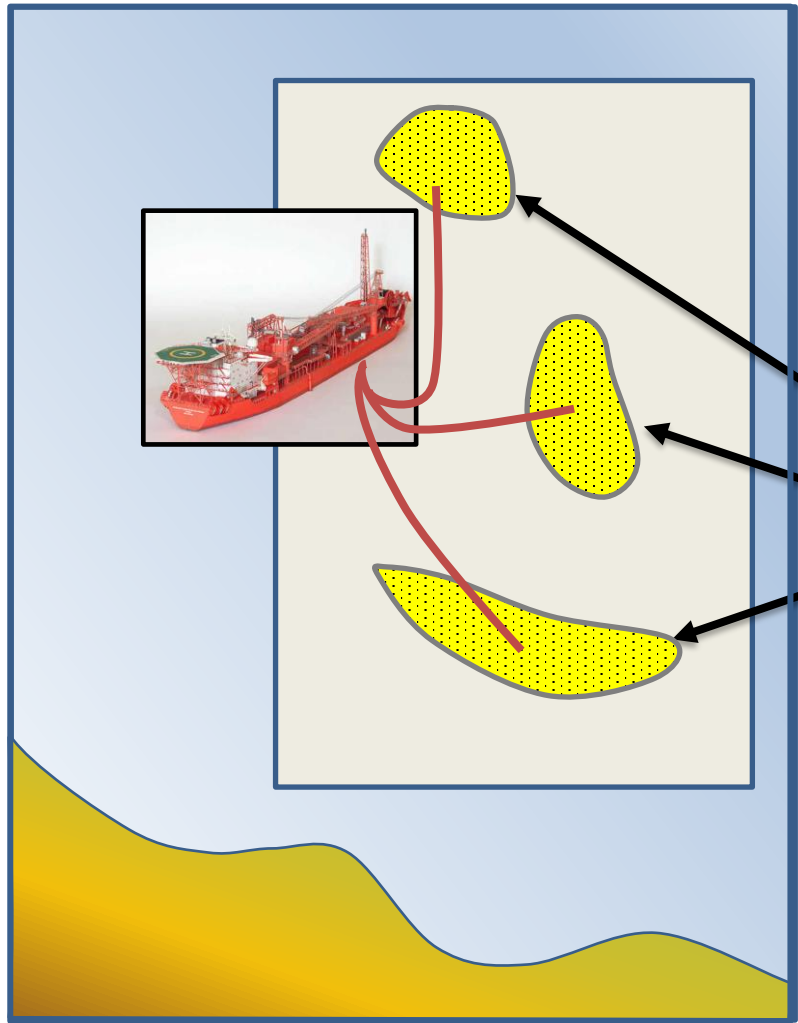
Merged Pos: 0.63

© 2018 GoExplore Consulting Ltd Co.

Scenario Tree

- 0.308 A (Success)
  - 0.600 C (Success) Case: ABCD (0.468) Volume: 42 (15.3 - 34.5 - 78.1)
  - 0.750 D (Success) Case: ABC (0.158) Volume: 40 (14.5 - 32.8 - 74.6)
  - 0.400 C (Failure) Case: AB,D (0.958) Volume: 22 (4.98 - 15.4 - 47.6)
  - 0.250 D (Failure) Case: AB,.. (0.328) Volume: 20 (4.23 - 13.7 - 44)
  - 0.700 B (Failure)
- 0.500 A (Failure)
  - 0.600 C (Success) Case: A,CD (1.988) Volume: 32 (11.9 - 26.8 - 60.1)
  - 0.750 D (Success) Case: A,C (0.668) Volume: 30 (10.9 - 24.9 - 56.8)
  - 0.400 C (Failure) Case: ..,D (4.18) Volume: 12 (3.06 - 8.8 - 25)
  - 0.250 D (Failure) Case: A,.. (1.378) Volume: 10 (2.21 - 6.95 - 21.9)
  - 0.900 A (Failure)
- 0.189 B (Success)
  - 0.600 C (Success) Case: ..CD (17.858) Volume: 22 (8.5 - 18.6 - 40.2)
  - 0.750 D (Success) Case: ..,C (5.958) Volume: 20 (7.46 - 16.7 - 37.3)
  - 0.400 C (Failure) Case: ..,D (8.598) Volume: 12 (1.86 - 7.09 - 28.2)
  - 0.250 D (Failure) Case: .., (2.868) Volume: 10 (1.22 - 5.44 - 24.3)
  - 0.326 C (Success) Case: ..,CD (17.858) Volume: 22 (8.5 - 18.6 - 40.2)
  - 0.750 D (Success) Case: ..,C (5.958) Volume: 20 (7.46 - 16.7 - 37.3)
  - 0.400 C (Failure) Case: ..,D (8.598) Volume: 12 (1.86 - 7.09 - 28.2)
  - 0.242 D (Success) Case: ..,D (11.98) Volume: 2 (0.438 - 1.39 - 4.38)
  - 0.758 D (Failure) Case: .., (17.36) (Failure Case)

© 2018 GoExplore Consulting Ltd Co.



	Pos	MSV	P90	P50	P10
Prospect 1	0.3	100	22	70	220
Prospect 2	0.2	150	33	105	330
Prospect 3	0.1	200	44	140	440

What is the POS and Volume Description of this Cluster?

- **Things we can't do:**

- Add MSVs:

$$MSV_{sum} = MSV_1 + MSV_2 + MSV_3 + \dots$$

- Add  $P_{50}$ s,  $P_{90}$ s,  $P_{10}$ s etc.

$$P50_{sum} = P50_1 + P50_2 + P50_3 + \dots$$

- **Things we can do:**

- Apply “Expectation of Sum = Sum of Expectations”

$$MSV_{sum} \times PoS_{sum} = MSV_1 \times PoS_1 + MSV_2 \times PoS_2 + MSV_3 \times PoS_3 + \dots$$

- **Preservation of Expectation**

Expectation of Sum = Sum of Expectations

- $PoS_{sum}$  is controlled by degree of risk dependence (association)
- $MSV_{sum}$  is controlled by  $PoS_{sum}$  and the sum of Expectations

We offer a:

- **3-day course on Quantitative Prospect Evaluation**



**GoExplore**

## Techniques for Quantitative Prospect Evaluation

1. Analyzing a Prospect
2. Prospect Volumetric Methods
3. Prospect Risking Methods
4. Prospect Volume Reporting and Cutoffs
5. MonteCarlo Models and Volume Calculators
6. Distributions and Estimating Techniques
7. Conditional Probabilities ; Bayesian Analysis ; QI uplift
8. Scenarios and Multiple Hypothesis Analysis
9. Multiple Objectives Workflows
10. Learning from Look backs
11. Evaluation Pitfalls

The background of the slide features a desert landscape with a paved road leading towards a large rock formation under a sunset sky.

You can download the Software at:

[www.goexplore.consulting](http://www.goexplore.consulting)

**Contact: Bloemendaal@GoExplore.Consulting**



**GoExplore Consulting**

**Free Friday Webinars**  
**Any Questions ?**



**GoExplore Consulting**

**Free Friday Webinars**  
**Thank You**