

Occupational Chemical Exposure Management System

HKARMS 2005.12.02

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Taiwan**

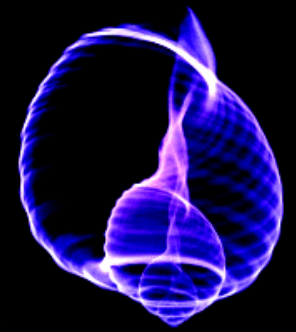


工業技術研究院
環境與安全衛生技術發展中心

Industrial Technology Research Institute
Center for Environmental, Safety and Health Technology Development

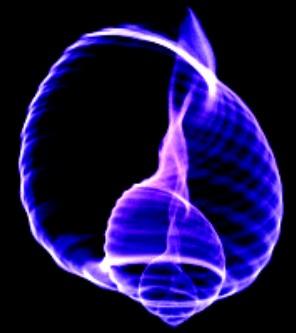


Background



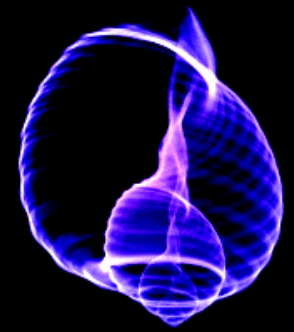
- 🦋 In Taiwan, every industrial factory was required to monitoring chemical exposure concentration at work place in half year by Occupational Safety and health Act.
- 🦋 Exposure concentration data came from worker (personal monitoring) and work place (area monitoring)
- 🦋 Almost 70 thousand data were received, and the total expense is 4.5 million US \$ per year
- 🦋 Government wish those data can help companies to prevent occupational disease happened , and reduce the higher exposure concentration after a regular periodical monitoring

But, Unfortunately ...

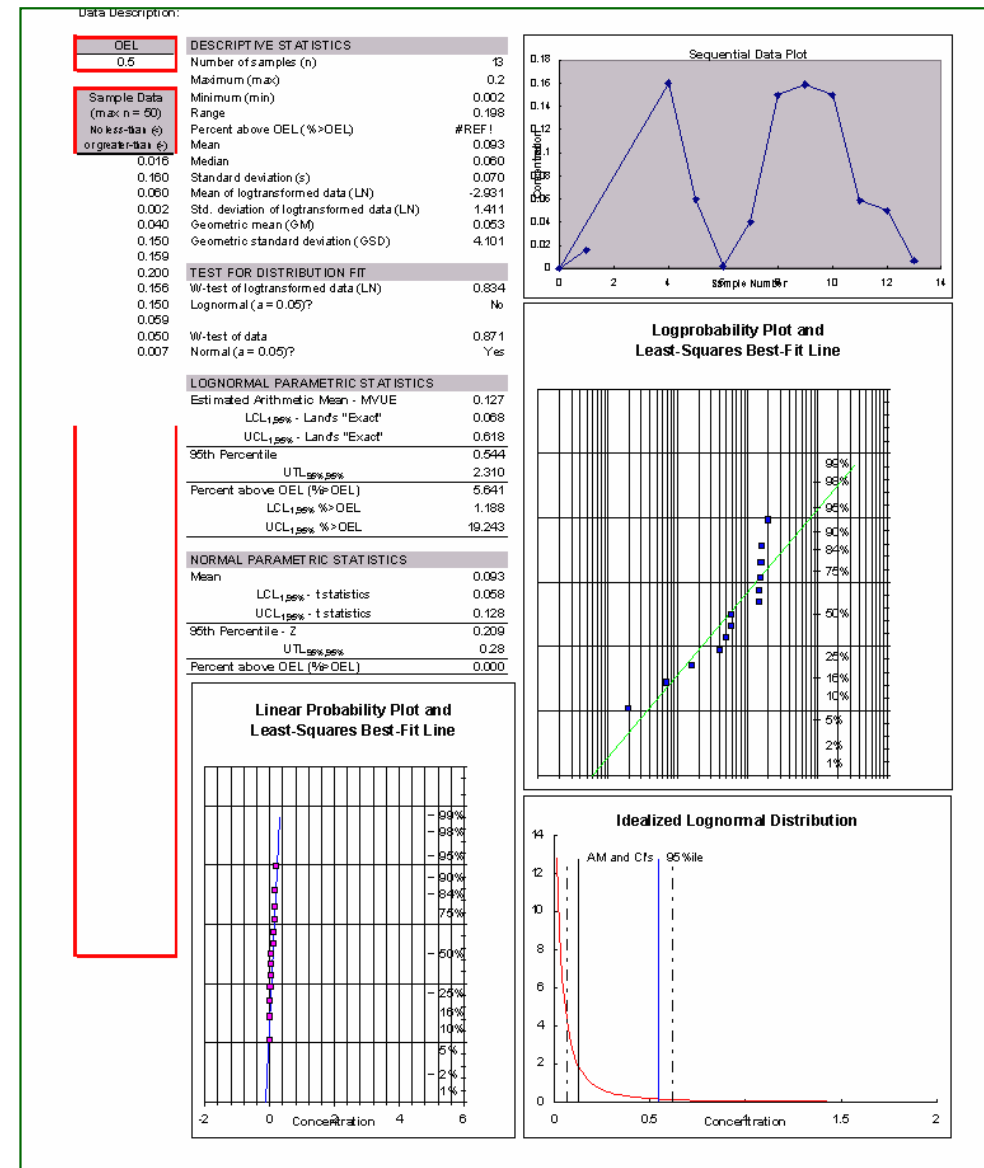


- 🌈 It is difficult to administrate exposure data systematically in the general companies (workers number <300)
- 🌈 Each certificated laboratory has their own report format.
(paper document and digital file)
- 🌈 Except fully satisfied with regular monitoring requirement, almost factories do not know how to work and applied those exposure data. Because of hygienists lack of statistic method, tools and skills

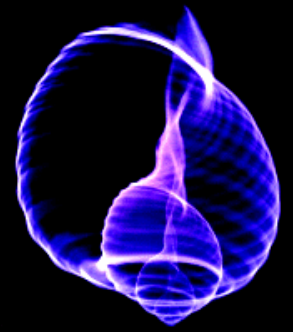
How to Use Exposure Data



- “A Strategy for Assessing and Managing Occupational Exposures”, AIHA, 1998
- Chapter 7: “Quantitative Exposure Data : Interpretation, Decision Making, and Statistical Tools”
- Easy tool, developed by MS-Excel VBA language

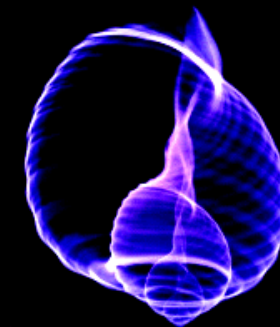


The Aims



- 🦋 Developed a statistic and management tool for easy to use
- 🦋 Provide more valuable information to hygienists by systematically statistic work and automatically plotting make
- 🦋 Increase more efficient to data collection

Material and Method



Developed by Visual Basic (VB6)

Database type: MS-Access

Functions Design:

- Data management
- Data Statistic
- Plotting
- Analysis Report

PROFILE 2

查得 6 筆資料

條件值:

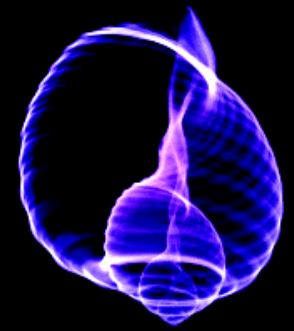
查詢條件: 中英俗名

只顯示勾選項目

項次	物種代碼	中文名稱
<input checked="" type="checkbox"/>	00067-63-0	異丙醇
<input checked="" type="checkbox"/>	00067-64-1	丙酮
<input checked="" type="checkbox"/>	00068-12-2	N,N-二甲基甲酰胺
<input checked="" type="checkbox"/>	00078-93-3	丁酮
<input checked="" type="checkbox"/>	00108-88-3	甲苯
<input checked="" type="checkbox"/>	00141-78-6	乙酸乙酯

樣品編號	分析編號	分析類別	分析項目	項目代碼
BB	BB	有機	環己烷	00110-82-7
G901109-...	-	有機	二甲苯 (含鄰_間_對異構物)	01330-20-7
G901109-...	-	有機	二甲苯 (含鄰_間_對異構物)	01330-20-7
G901109-...	-	有機	氮	07664-41-7
G901109-...	-	粉塵	第四種粉塵(呼吸性粉塵)	Particle4_Inh
G901109-...	-	有機	二甲苯 (含鄰_間_對異構物)	01330-20-7
G901109-...	-	有機	二甲苯 (含鄰_間_對異構物)	01330-20-7
G901109-...	-	有機	二甲苯 (含鄰_間_對異構物)	01330-20-7
G901109-...	-	有機	氮	07664-41-7
G901109-...	-	粉塵	第四種粉塵(呼吸性粉塵)	Particle4_Inh
G901109-...	-	有機	醋酸	00064-19-7
G901109-...	-	有機	醋酸	00064-19-7
G901109-...	-	有機	二甲苯 (含鄰_間_對異構物)	01330-20-7
G901109-...	-	有機	二甲苯 (含鄰_間_對異構物)	01330-20-7
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G901109-...	-	有機	二甲苯 (含鄰_間_對異構物)	01330-20-7
G901109-...	-	有機	氮	07664-41-7
G901109-...	-	有機	氮	07664-41-7
G901109-...	-	有機	氮	07664-41-7

The Advantage in e-Management



Power Search and Group Setting

🌈 Search method is based on:
**Chemical type, Department,
Task and Area...**

🌈 Group Setting: Industrial
type, sampling company and
city ...

篩選記錄 (單一個廠事業單位, 環測資料管理者... 適用)

分析/量測物種

- 乙醇
- 醋酸
- 甲醇
- 異丙醇
- 丙酮
- 丙二醇甲醚
- 丙二醇甲醚酯
- 甲苯
- 2-甲氧乙基乙酯
- NMP
- 氫氧化鈉
- 二甲苯
- 鉛
- 氯化氫
- 氟化氫
- 氨

部門

- B221
- BU1
- BU2
- BU3
- BU4
- BU5
- BU6
- C260
- D110
- D120
- D320
- D330
- D340
- D350
- D391
- D411

資料庫 選項

化學/分析 物理/直讀

關鍵字搜尋

作業名稱: 機台設備:

區域位置: 作業內容:

分析日期 時間範圍

1990年 1月 1日 2004年 9月 14日

確定 取消

開啓群組 (分析實驗室, 採樣機構, 集團總公司... 適用)

行業別

- 光電材料及元件製造業
- 網路資訊供應業
- 電子管製造業
- 電腦組件製造業

採樣機構

- 中華民國工業安全衛生協會台中作...
- 中華民國工業安全衛生協會台北作...
- 佑民工礦安全衛生技師事務所
- 全安工安暨工礦衛生技師事務所
- 東旭工礦衛生技師事務所

縣市別

- 台中縣 大雅
- 台北市 南港區
- 台南縣 新市
- 新竹縣 寶山
- 新竹縣 竹東

事業單位

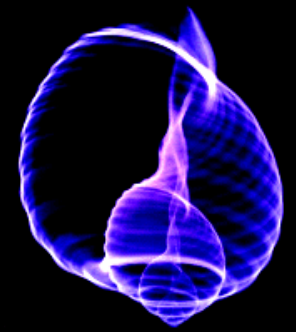
- 888
- 工研_中科廠
- 工研_中科研發中心
- 工研_南科廠
- 工研_南科模組廠

報告日期 時間範圍

1990年 1月 1日 2004年 9月 14日

確定 取消

Advanced Statistic work

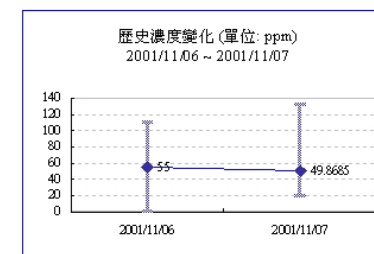
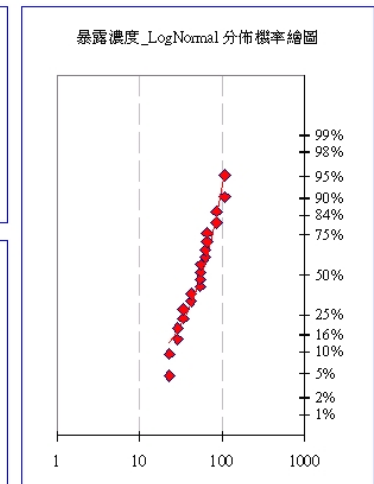
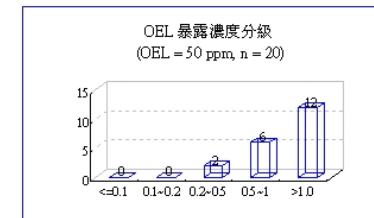
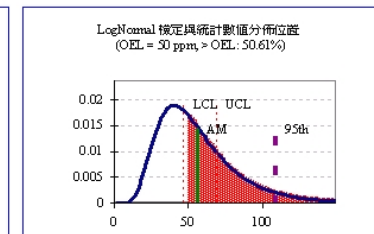
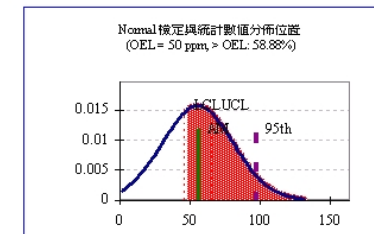


- 🌈 Refer to AIHA statistic tool
- 🌈 Increase more valuable functions
- 🌈 The complete history trend plotting
- 🌈 Normal and Log-Normal distribution drawing
- 🌈 Red area is the probability of above OEL(Occupational Exposure Limited)
- 🌈 OEL classification bar chart
- 🌈 Analysis report

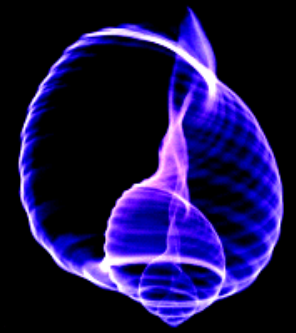
(07664-41-7_氨)

(普羅番) PROFILE 2 by MUSA system

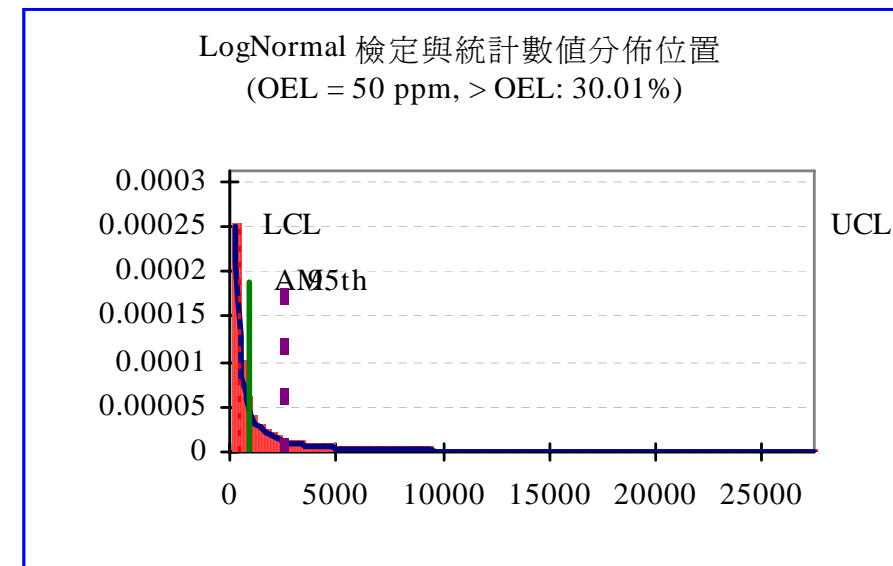
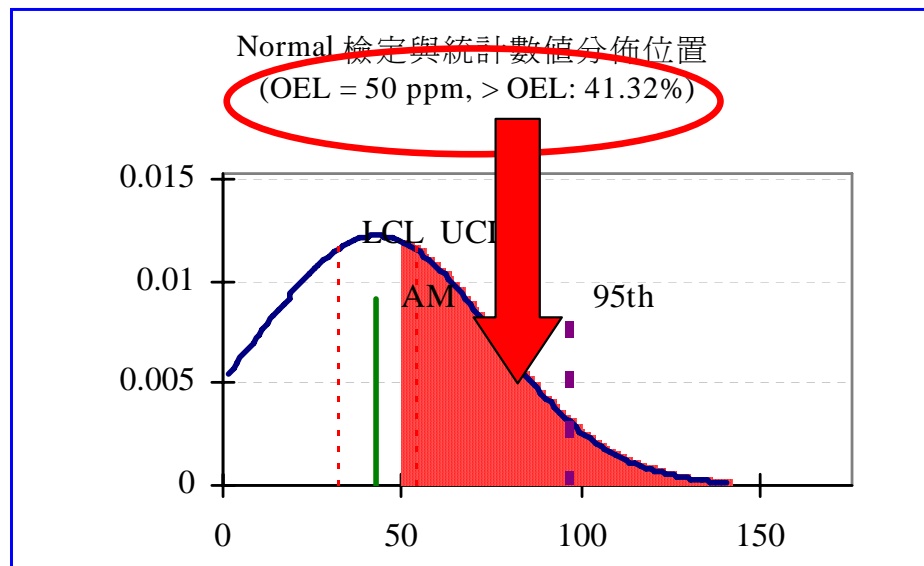
基本資料		運算統計結果	
分析物種	07664-41-7_氨	LOGNORMAL 分佈檢定(W-test, alpha = 0.05)	0.952 (Yes)
CAS NO	07664-41-7	NORMAL 分佈檢定(W-test, alpha = 0.05)	0.92 (Yes)
OEL (ppm)	50	Log-Normal 分佈統計	
樣本數 (n)	20	Estimated Arithmetic Mean - MVUE	55.854
採樣時間範圍	2001/11/06 ~ 2001/11/07	LCL1, 95% - Land's (Exact)	47.155
描述性統計		UCL1, 95% - Land's (Exact)	69.221
ND 個數	0	LOGNORMAL 分佈_第95百分位	108.763
非 ND 個數	20	LOGNORMAL 分佈_第95,95百分位	154.577
長時間樣本個數 (> 2hr)	0	大於職業暴露標準百分比 (%>OEL)	50.61
短時間樣本個數 (<= 2hr)	20	Normal 分佈統計	
數值範圍	23.0 ~ 107.0	算術平均數	55.7
大於職業暴露標準百分比 (%>OEL)	80	LCL1, 95% - t statistics	45.886
算術平均數	55.7	UCL1, 95% - t statistics	65.514
中位數	54.5	常態分佈_第95百分位	97.453
算術標準差 (SD)	25.382	常態分佈_第95,95百分位	116.514
幾何平均數 (GM)	50.359	大於職業暴露標準百分比 (%>OEL)	58.63
幾何標準差 (GSD)	1.597		



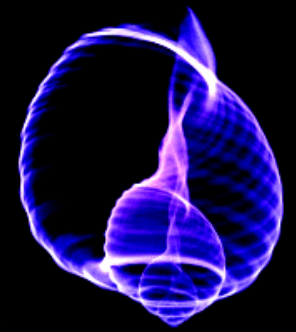
Normal and Log-Normal distribution drawing



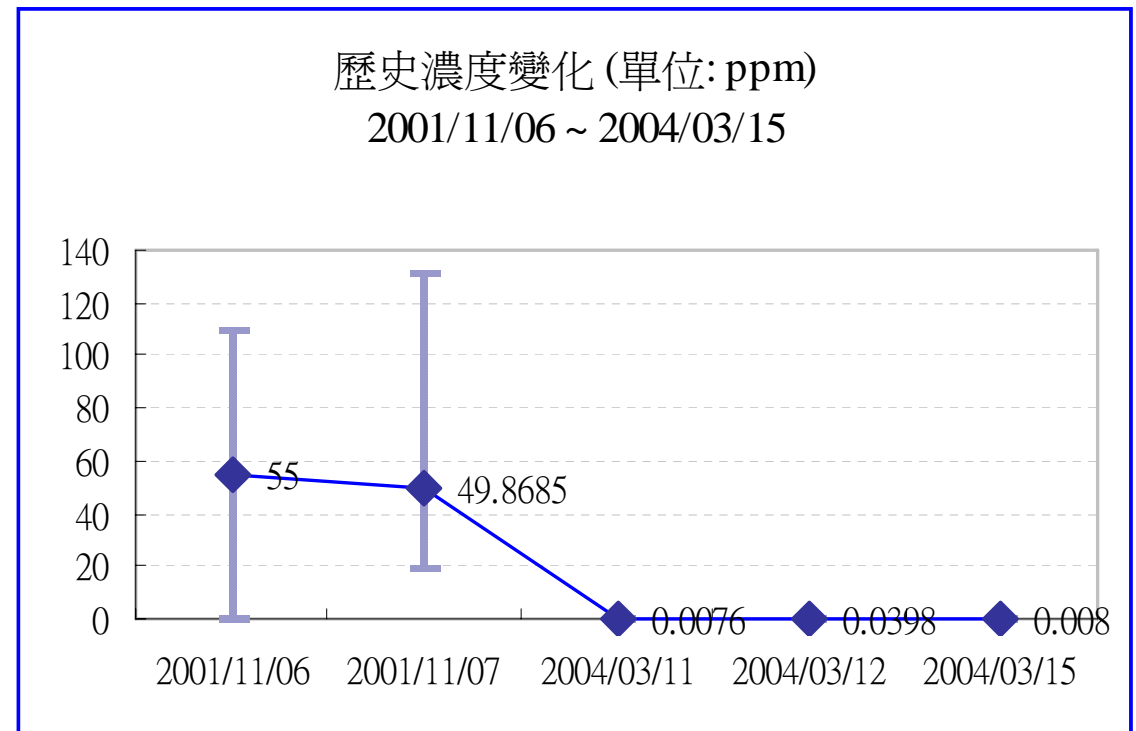
- 🌈 Drawing work Based on data variation and sample size
- 🌈 X-axis: Concentration
- 🌈 Y-axis: Probability value
- 🌈 Red Area: the probability of above OEL



The History Trend Plotting



- 🦋 Integrated exposure data automatically
- 🦋 Mean value by geometric mean (GM)
- 🦋 Standard deviation by geometric standard deviation (GSD)
- 🦋 X-axis: Date
- 🦋 Y-axis: Exposure Concentration





Exposure data key in from MS-Excel

Data Input Module

Exposure Data

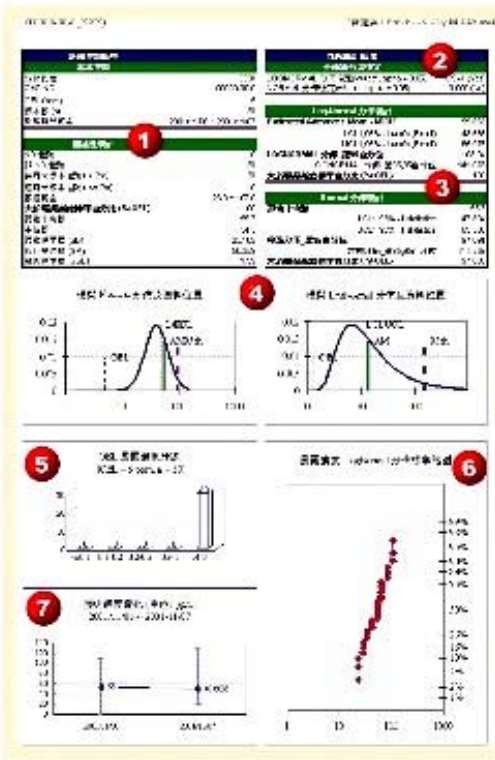
Operation Interface

Chemical Database

Statistics Module

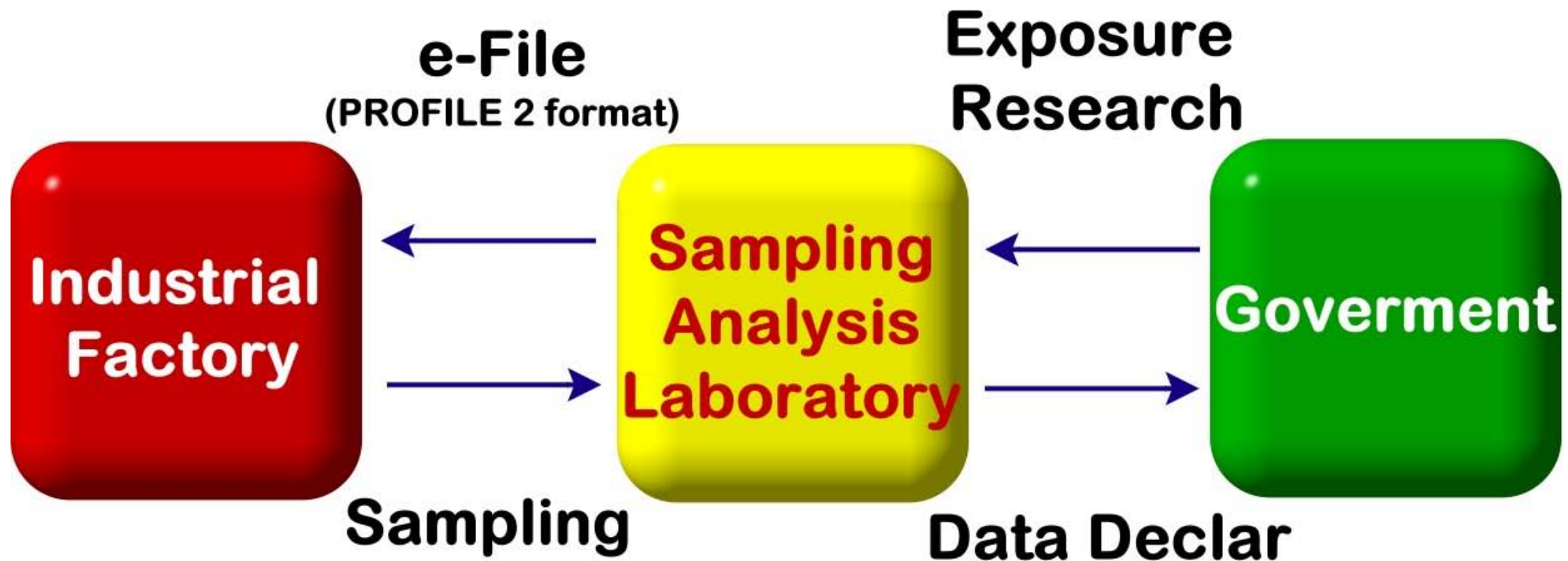
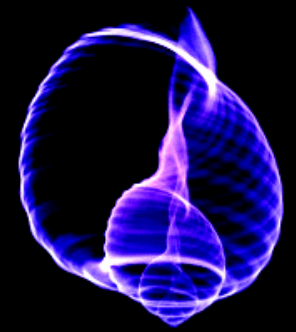
Charting Module

Data Filter Module

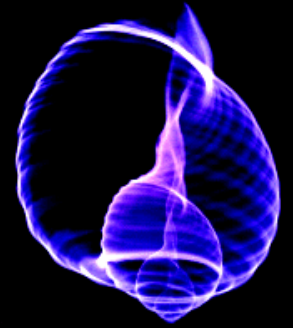


Analysis Report

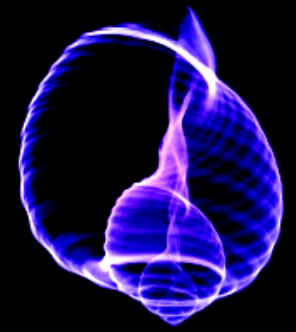
Next Step and Feature Work



The Comprehensive Solutions



Thank you for your attention



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