Power of Simulation for Better Solutions

Simulation-based automation to support

- Strategic planning
- Portfolio management
- Program management
- Organizational analysis

- Media analysis
- Budget planning
- Survey services
- Facilitation

DART STORYBOARD

Why simulation-based automation? With the challenges of limited time, strained budgets, and heavily burdened staff, the U.S. Government and our nation's industries at all levels are increasingly turning to simulation based automation for cost-effective and efficient solutions. Leaders and managers are realizing that automated systems operated by skilled staff provide more effective solutions than traditional methods.

> DART automation results in 20% to 30% less cost and time than traditional methods; it is a *game changer*.

DART Operational capabilities

Front End Analysis
- Set up scenario and organizational structure.
- Determine data items for analysis.
- Determine sources to provide weighted input.
  - ➢ May be located worldwide
- Conduct test drive with notional data.

Data Analysis
- Select structure and data items to be examined.
- Select options for analysis, level and status thresholds and trends.
- Stakeholder perspectives.
- Conduct real-time data analysis.
- Visually present analysis results in real-time.

Data Operations
- Obtain data/input for analyses.
- Convert data items into a list edited and assigned to sources for input.
- Notify sources via e-mail to provide inputs.
- Download and compile source inputs.

Information Operations
- Automation support to prepare, monitor and report progress of implementation/action plans.
- Prepare plans in an on-line worksheet with real-time download on-demand to a PDF file format.
- Automated population of Status Summary charts.
- View plan changes between any two points in time.
- Prepare next generation/multiple generation plans.

Portfolio Management

- Integrate FEA, Data Opns & Analysis, and Info Opns.
- Interfaces and converters obtain and transition data from different sources to a common format.
- Automation supports data updates and presentations for individual programs and a common operational picture across multiple programs; e.g., enterprise level.
- Feedback provided as required.
-

DART Technical Capabilities

- Accessible with approved access through a web browser running at 1024x768 or greater resolution consisting of standard HTML and JavaScript using a PC (laptop), smart phone, or tablet.
- Server(s) located at a *certified FISMA* data storage site with 99.5% plus operational up-time.
- Supported by two U.S. Patents.

DART Decision Support System automation available via Software as a Service, license, or purchase.

The figures and descriptions are examples of screen shots for a real-world application of ITS simulation-based automation; other examples are available on-demand.

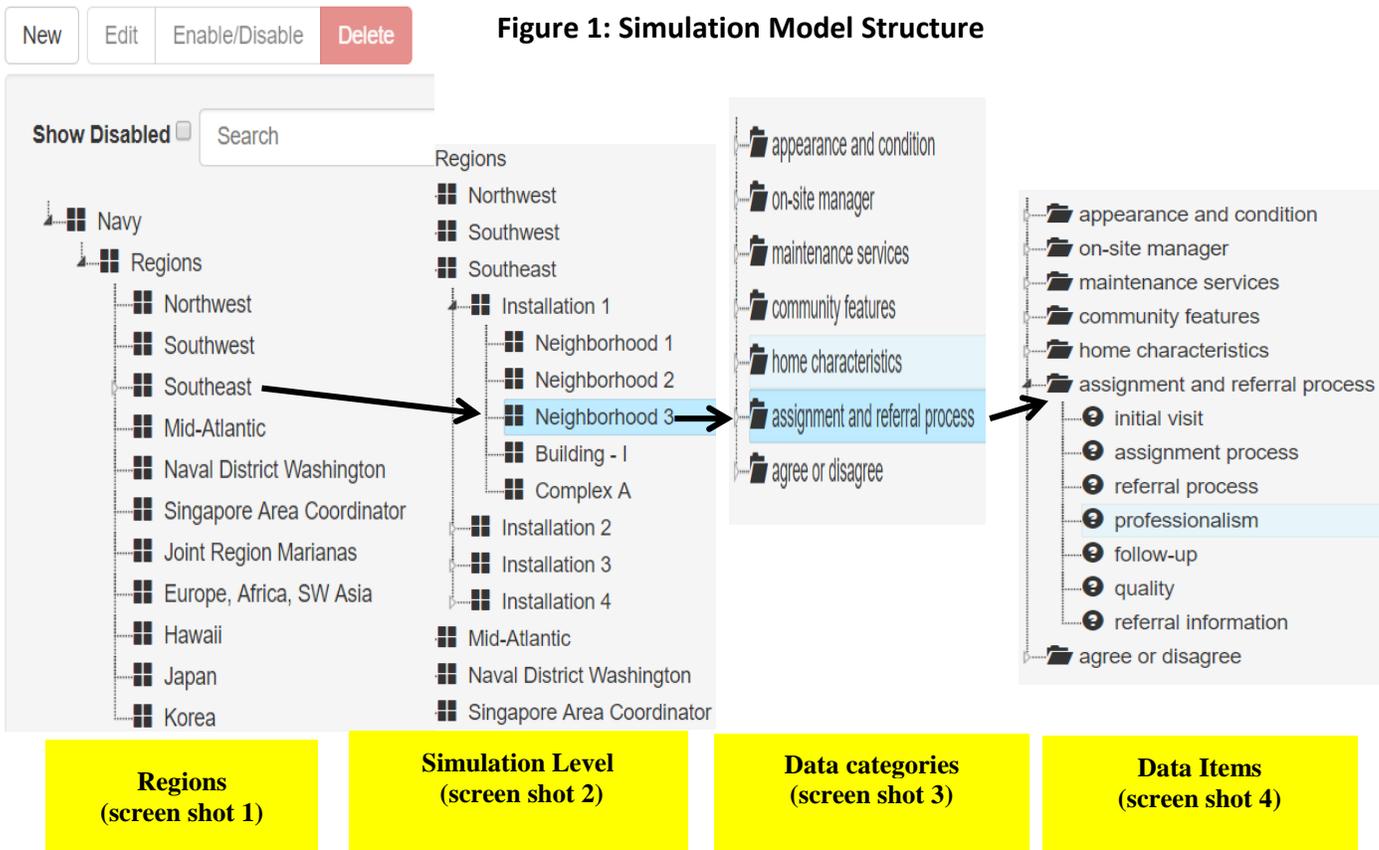**Figure 1** illustrates an example for the structure of the Simulation-based automation model.
Screen shot 1 is the top level of the model.
Screen shot 2 is the view once a selected folder in the screen shot 1 is opened.
Screen shot 3 is the view once a selected folder in screen shot 2 is opened, in this example these are the data categories.
Screen shot 4 is the view once a selected category in screen shot 3 is opened, in this example these are the data items.

There essentially is no realistic limit to the number of inputs that can be entered and saved in the model's database.

Figure 1: Simulation Model Structure

| Regions (screen shot 1) | Simulation Level (screen shot 2) | Data categories (screen shot 3) | Data Items (screen shot 4) |

Figure 2 shows an example for the structure of the Simulation-based automation model continued from Figure 1.

Screen shot 5 are the available options when rating a data item in two respects, level/value and status. These can be modified as needed.

Screen shot 6 is an example of categories used to examine the data, in this case specific demographics. Categories for data analysis are user defined.

Screen shot 7 is the view of the data source structure. Data sources can be grouped in logical and meaningful ways, so that collected data can be examined source by source. Different sources can be given different weights to allow the data to be more representative of the environment and knowledge of those providing the data.

Edits made in model set-up are carried throughout, one place to edit all structure information.

**Figure 2: Simulation Model Structure Continued**

Figure 3 is a screen shot of notional data for a web-based visual presentation of the analysis for each data item. The length of the bar represents the stakeholder level of satisfaction and the color represents the assessment/status for the data item; illustrated in screen shot 5 above.

The "pop-up" box visually presents the data for these analyses.

The presentation can be made for any number of data items saved in the database. It also can be tailored to filter and only present selected components or satisfaction levels.

Clicking on the small square box located to the right of the data item downloads these data items from the universe of data items to a smaller subset for closer examination and, for example, possibly additional actions such as preparing an Action Plan to "fix" it.
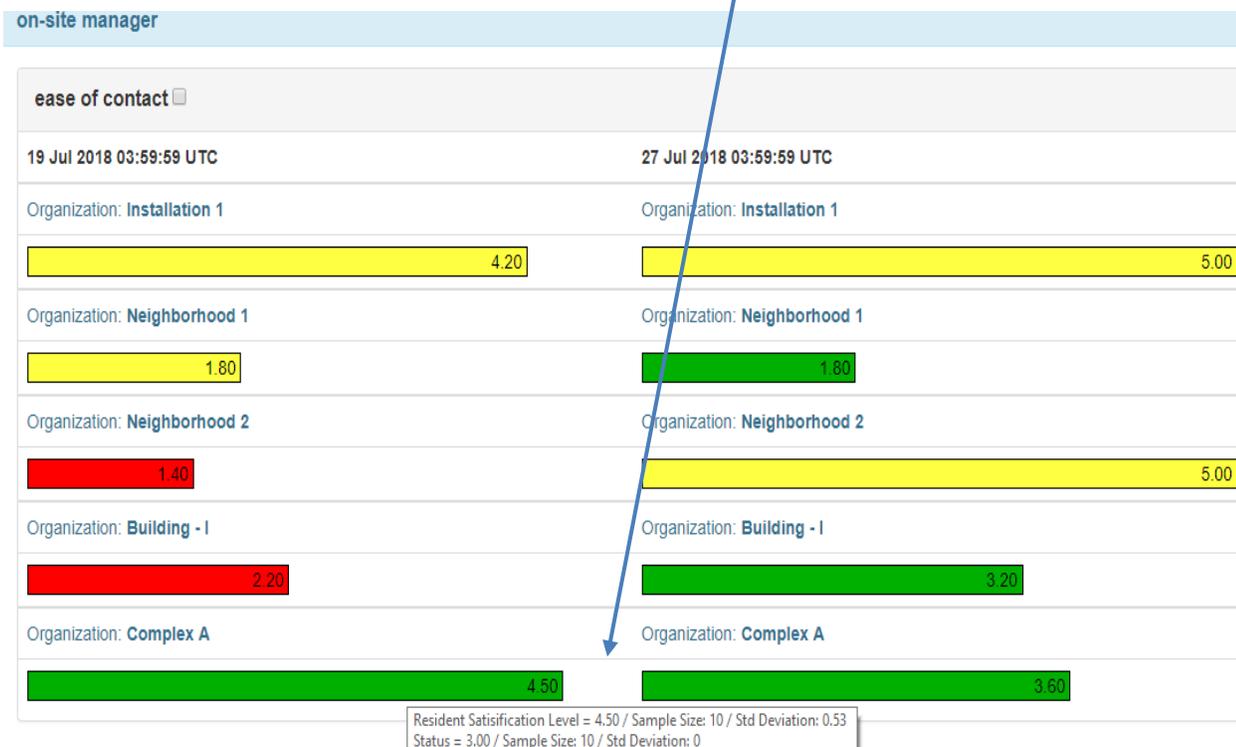
Figure 3: Data Analysis (On-site Manager Local Level)

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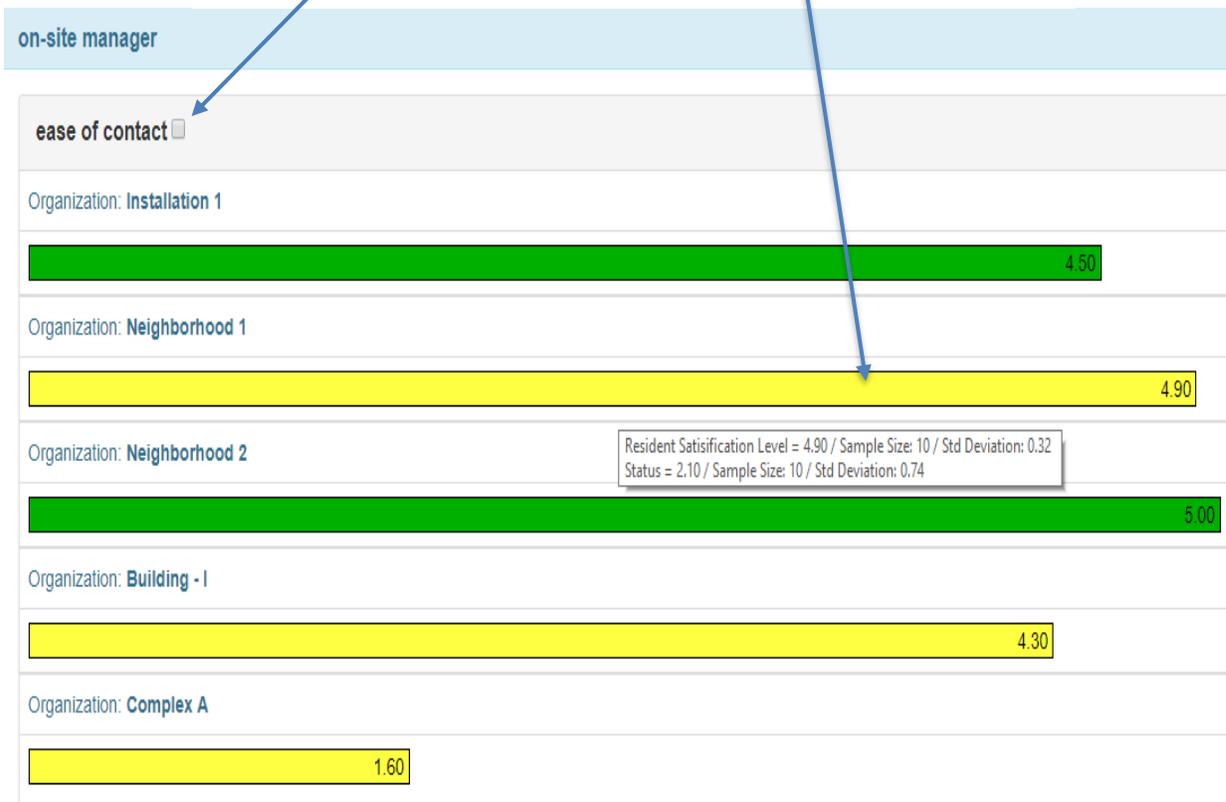
**Research-based
Solutions**

Figure 4 is the same as Figure 3 with side by side comparison between two points in-time for the same data items; supports trend analysis. This presentation is a rapid visual method to view progress over time. By hovering over any output, the details for the data value are displayed.

Figure 4: Data Comparison over Time (On-site Manager Level)

on-site manager

ease of contact

19 Jul 2018 03:59:59 UTC	27 Jul 2018 03:59:59 UTC
Organization: **Installation 1**	Organization: **Installation 1**
4.20	5.00
Organization: **Neighborhood 1**	Organization: **Neighborhood 1**
1.80	1.80
Organization: **Neighborhood 2**	Organization: **Neighborhood 2**
1.40	5.00
Organization: **Building - I**	Organization: **Building - I**
2.20	3.20
Organization: **Complex A**	Organization: **Complex A**
4.50	3.60

Resident Satisification Level = 4.50 / Sample Size: 10 / Std Deviation: 0.53
Status = 3.00 / Sample Size: 10 / Std Deviation: 0

Figure 5 uses notional data for a visual presentation of the data analysis in a condensed data file format; in this example, the data analysis and presentation is for the demographics of stakeholders. The data items are located on the left, the analyses for the values/satisfaction levels and the status are presented on the right, and stakeholder demographics are located across the right side of the top row. The model can be set to visually present only selected data items and/or levels or status. There is essentially no realistic limit on the number of data items that can be presented in this format. The visual presentation is made in near-real time. This presentation format is well suited for summary presentations of large data sets and conducting gap analysis.

Figure 5: Data Analysis presented as Condensed Data File (On-site Manager Level)

Title	Organization	Less than 1 year	1+ to 2 years	2+ to 5 years	5+ to 10 years	More than 10 years	O5 - O6	Overall
on-site manager								
ease of contact	Installation 1	3.10	4.70	4.60	4.50	5.00	4.50	4.40
	Neighborhood 1	5.00	4.20	2.10	4.20	4.60	3.00	3.85
	Neighborhood 2	1.50	2.40	1.50	1.80	1.10	4.50	2.13
	Building - I	3.00	3.10	3.00	4.80	1.50	3.50	3.15
	Complex A	4.60	1.20	5.00	1.50	5.00	4.40	3.62
follow-up	Installation 1	4.20	1.30	1.40	1.40	5.00	4.30	2.93
	Neighborhood 1	4.30	4.60	4.80	2.60	4.50	4.00	4.13
	Neighborhood 2	5.00	2.60	3.00	4.60	5.00	5.00	4.20
	Building - I	1.10	2.80	5.00	4.60	1.40	3.90	3.13
	Complex A	3.30	4.10	1.20	3.00	4.10	3.30	3.17
courtesy and respect	Installation 1	2.10	5.00	2.90	1.30	1.40	2.00	2.45
	Neighborhood 1	5.00	2.20	4.70	4.60	1.90	3.40	3.63
	Neighborhood 2	1.50	5.00	3.80	4.70	5.00	4.60	4.10
	Building - I	3.60	1.20	4.60	3.80	4.60	4.20	3.67
	Complex A	1.90	2.10	2.30	1.60	2.10	1.60	1.93
ability	Installation 1	1.50	4.90	5.00	5.00	5.00	4.60	4.33
	Neighborhood 1	5.00	4.10	5.00	1.60	4.80	4.70	4.20
	Neighborhood 2	1.40	1.30	1.60	2.70	5.00	5.00	2.83
	Building - I	4.90	2.00	5.00	4.20	5.00	2.80	3.98
	Complex A	1.80	4.60	5.00	1.10	2.80	3.80	3.18

Figure 6 demonstrates the use of data analysis rolled up one or more levels; encapsulating the details and instead examining the data from a perspective that includes more than one logically grouped sub-perspectives. Figure 6 is a roll-up perspective view of Figure 3 (from installations to regions).
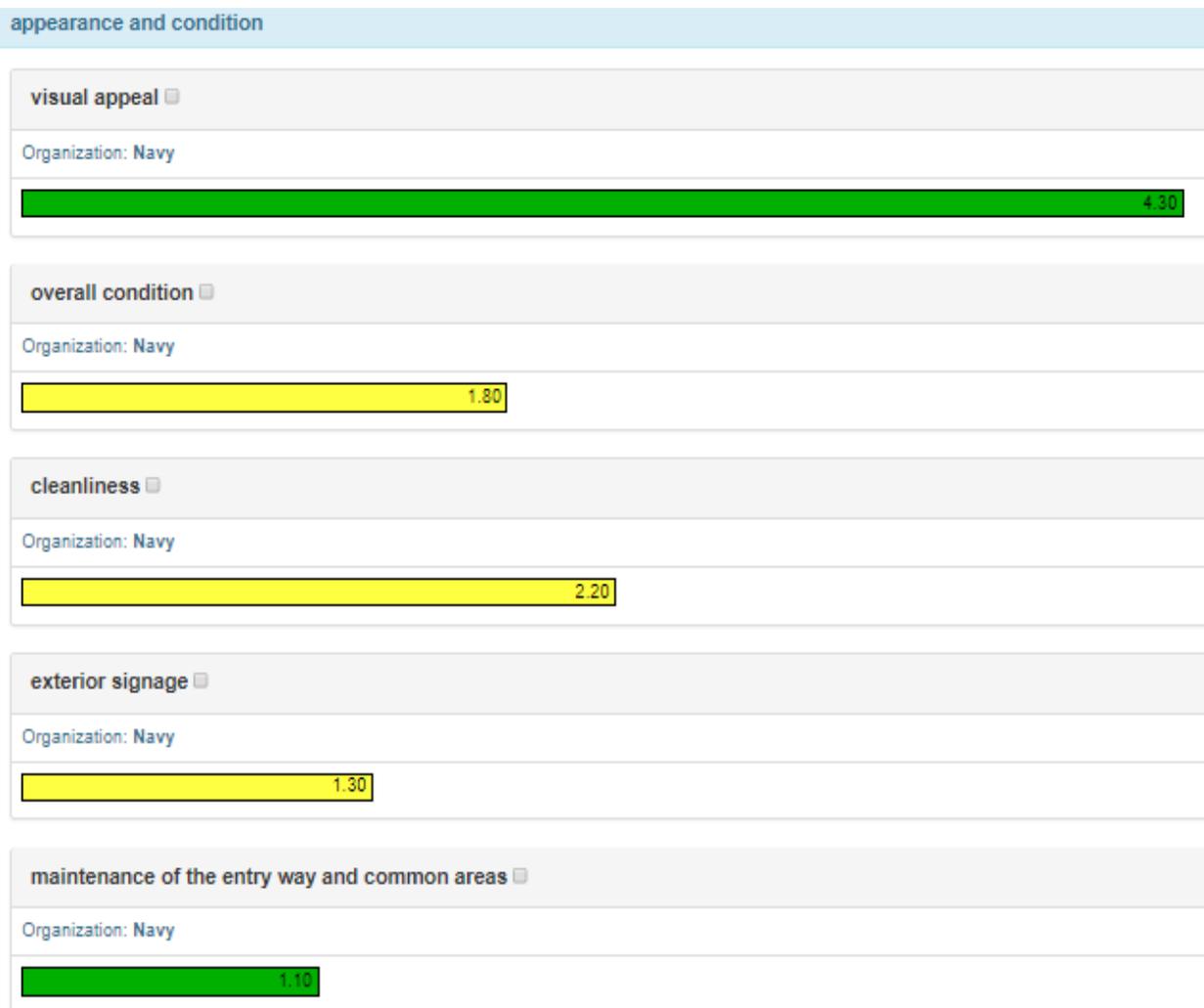
Figure 6: Data Analysis Roll-up (CNIC Region Level)

Figure 7 demonstrates the use of data roll-up one level from Figure 6 (region to enterprise); encapsulating the details and instead examining the data from a perspective that includes more than one logically grouped sub-perspectives.

Figure 7: Data Analysis Roll-up (CNIC Enterprise Level)

Figure 8 is a presentation of data in a detailed data file format. This format supports project reports and monthly Status Reports.

Figure 8: Data Analysis (Overall On-site Manager roll-up at Local Level)

Courtesy And Respect
courtesy and respect with which you are treated

on-site manager

Installation 1

Overall	3.20

Neighborhood 1

Overall	2.80

Neighborhood 2

Overall	4.30

Details

Stat Summary		Status			Resident Satisification Level		
	N	**Mean**	**σ**	**N**	**Mean**	**σ**	
Installation 1							
Overall	10	1.9	0.88	10	3.2	0.79	
Neighborhood 1							
Overall	10	2.6	0.52	10	2.8	0.79	
Neighborhood 2							
Overall	10	3	0	10	4.3	0.48	

Frequency Data		Status			0	Resident Satisification Level				
						1	**2**	**3**	**4**	**5**
Installation 1										
Overall	0	4	3	3	0	0	2	4	4	0
Neighborhood 1										
Overall	0	0	4	6	0	0	4	4	2	0
Neighborhood 2										
Overall	0	0	0	10	0	0	0	0	7	3

Stat Summary		Status			Resident Satisification Level		
	N	**Mean**	**σ**	**N**	**Mean**	**σ**	
Overall	10	1.9	0.74	10	4.1	0.88	
Japan							
Overall	10	3	0	10	1.4	0.52	

Frequency Data		Status			0	Resident Satisification Level				
						1	**2**	**3**	**4**	**5**
Northwest										
Overall	0	5	5	0	0	0	0	0	5	5
Southwest										
Overall	0	8	2	0	0	0	0	6	1	3
Southeast										
Overall	0	0	0	10	0	0	4	2	4	0
Mid-Atlantic										
Overall	0	0	0	10	0	3	2	5	0	0
Europe, Africa, SW Asia										
Overall	0	3	5	2	0	0	0	3	3	4
Japan										
Overall	0	0	0	10	0	6	4	0	0	0

Figure 9 is a presentation of data in a detailed data file format. It is the same as Figure 8 but demonstrates the ability to roll-up data from different perspectives for use by different stakeholders and/or reports.

Figure 9: Data Analysis (Overall On-Site Managers roll-up at CNIC Region Level)

Service
overall service and quality of service you are receiving

on-site manager

Northwest

Overall — 4.50

Southwest

Overall — 3.70

Southeast

Overall — 3.00

Mid-Atlantic

Overall — 2.20

Europe, Africa, SW Asia

Overall — 4.10

Japan

Overall — 1.40

Details

Stat Summary		Status			Resident Satisification Level		
		N	Mean	σ	N	Mean	σ
	Northwest						
	Overall	10	1.5	0.53	10	4.5	0.53
	Southwest						
	Overall	10	1.2	0.42	10	3.7	0.95
	Southeast						
	Overall	10	3	0	10	3	0.94
	Mid-Atlantic						
	Overall	10	3	0	10	2.2	0.92
	Europe, Africa, SW Asia						

Figure 10 is a presentation of data in a detailed data file forma at the enterprise level. It is the same as Figure 8 and Figure 9, but demonstrates the ability to roll-up data from different perspectives for use by different stakeholders and/or reports.

Figure 10: Data Analysis (Overall On-Site Managers roll-up at CNIC Enterprise Level)

Ability
ability to do what is required to keep you satisified

on-site manager

Navy

Overall		5.00

Details

Stat Summary	Status			Resident Satisification Level		
	N	**Mean**	**σ**	**N**	**Mean**	**σ**
Overall	10	3	0	10	5	0

Frequency Data	Status				Resident Satisification Level					
				0	**1**	**2**	**3**	**4**	**5**
Overall	0	0	0	10	0	0	0	0	0	10

Figure 11 is an illustration of capabilities that include an on-line worksheet with automation that can be used for creating, maintaining, and tracking Action Plans. In this example, the format includes an overall assessment (upper left corner), title, lead, assistants, author, and major description. The format can be organized by individual tasks and/or grouping of tasks.

Figure 11: Action Plan Template

Figure 11 illustrates changes between any two points in time; the changes can be compared and visually presented; note the assessment change from Red (Not present or not operational) to Yellow (Functioning, but needs to be improved). These capabilities support evaluating alternatives as well as tracking and comparing changes over time (trend analysis).

Authorized Users create implementation/action plans by entering text and/or data from drop down tabs in specified fields; these entries are date/time stamped, saved, and downloaded to a digital file. The fields for entering text can be individualized or customized to meet requirements. The plans are created in the database and downloaded in essentially real-time; like the visual presentations of data analysis, these plans download in a format that can be used easily and quickly for visual presentations such a PowerPoint and Word file documents.

A supporting file link includes an on-line Reader Review formatted for readers to enter comments; these comments are available on-line. These electronic links provide Users with access credentials quick and readily available access to supporting documentation. The supporting files are maintained and remain at their saved location from where they are accessed and used by viewers.

Figure 12 illustrates automation support for working in multiple cycles/phases while continuing to operate in the current cycle/phase. For example, the capabilities enable working in the current cycle while planning the next cycle with linkages

Figure 12: Multiple Planning/Phases (example)

with historical cycles. The automation includes access and linkage between planning cycles/phases saved in the database. Users find these capabilities very useful for monitoring and tracking activities and changes in programing decisions.