Workshop 3

Commences at: 10:50

SAFTE-FAST Console Tools & Tips

Presented by: Ben Brown

PROPRIETARY INFORMATION: The information contained in this document is the property of the Institutes for Behavior Resources. Inc. (IBR). Except as specifically authorized in writing, the holder of this document shall keep information contained herein confidential and shall protect same, in whole or in part, from disclosure and dissemination to all third parties. © 2019 - All rights reserved. Institutes for Behavior Resources. Inc. (IBR). SAFTE-FAST is a product of IBR.

INSTITUTES FOR BEHAVIOR RESOURCES, INC.
shaping a better world

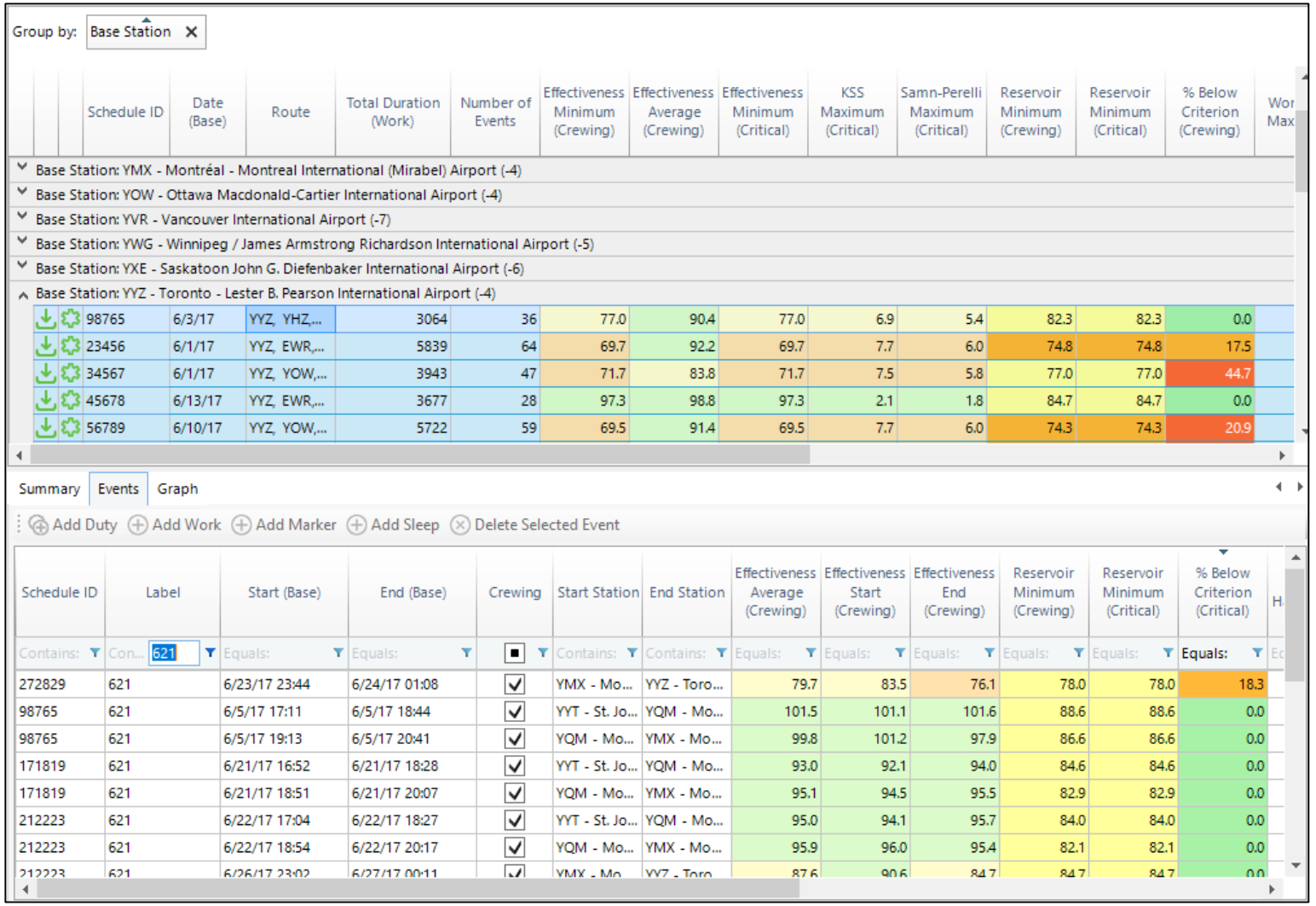
SAFTEFAST

SFC Tools & Tips

- Schedules and Events Tables
- Scenarios, Templates and Parameters
- Parameter overriding with ‘Station Parameters’
- Data Processing
- Workload
- Augmentation Refresher
- Schedule Editor

Making the most of Schedules & Events Tables

- **Search** – Find matching text in some or all columns
- **Filter** – Show only rows that match
- **Group** – Organize the data into
  - Combined groups
  - Nested groups
- **Multi-Select** – View Events from multiple Schedules
- **Save as Scenario** – Create data sub-sets for comparison and experimentation



SAFTEFAST

Making the most of Data Tables – Multi-Select

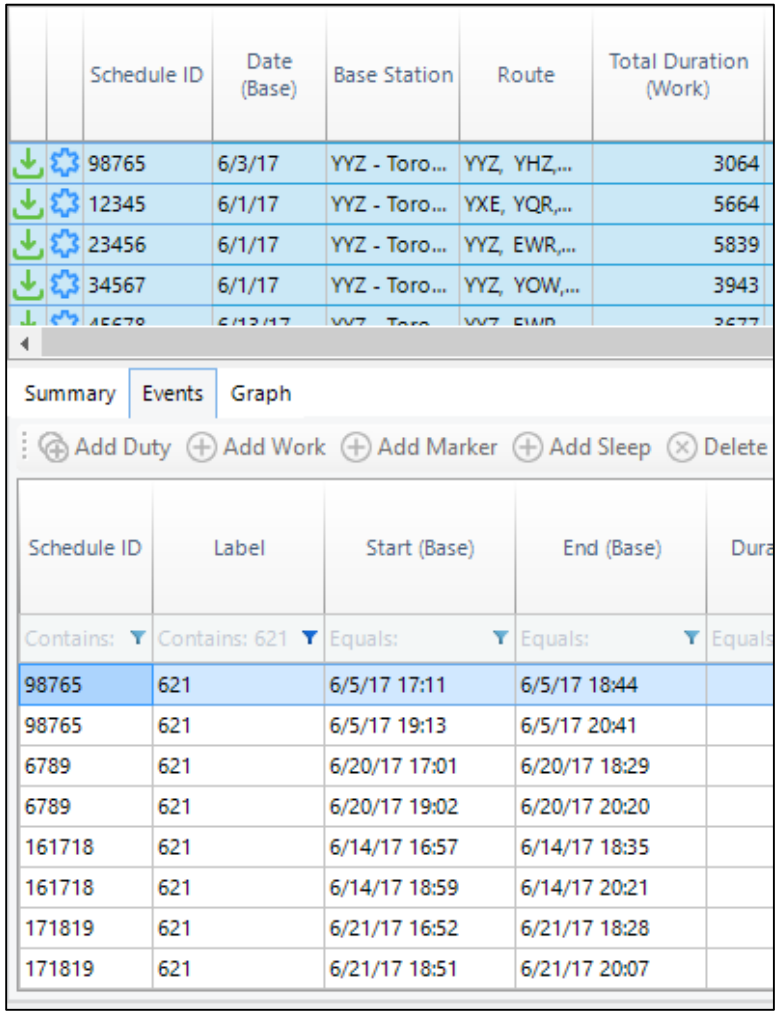
- Multi-select Schedules to view all related Events
  - Ctrl + Click – individual rows
  - Shift + Click – a consecutive series of rows
  - Ctrl + A – all rows

		Schedule ID	Date (Base)	Base Station	Route	Total Duration (Work)	Number of Events	Effectiveness Minimum (Crewing)	Effectiveness Average (Crewing)	Effectiveness Minimum (Critical)	KSS Maximum (Critical)	Samn-Perelli Maximum (Critical)	Reservoir Minimum (Crewing)	Reservoir Minimum (Critical)	% Below Criterio (Crewing
		98765	6/3/17	YYZ - Toro...	YYZ, YHZ,...	3064	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		12345	6/1/17	YYZ - Toro...	YXE, YQR,...	5664	78	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		23456	6/1/17	YYZ - Toro...	YYZ, EWR,...	5839	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		34567	6/1/17	YYZ - Toro...	YYZ, YOW,...	3943	47	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		45678	6/13/17	YYZ - Toro...	YYZ, EWR,...	3677	28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		56789	6/10/17	YYZ - Toro...	YYZ, YOW,...	5722	59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		6789	6/1/17	YYZ - Toro...	YMX, YQM,...	6531	53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		78910	6/3/17	YYZ - Toro...	YYZ, YWG,...	5369	59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		891011	6/1/17	YYZ - Toro...	YYZ, YOW,...	7509	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		91011	6/13/17	YYZ - Toro...	YYZ, EWR,...	3677	27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		101112	6/1/17	YYZ - Toro...	EWR, BDA,...	6418	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		111213	6/1/17	YYZ - Toro...	YYZ, YOW,...	4807	55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		121314	6/16/17	YYZ - Toro...	YYZ, YWG,...	1517	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

SAFTEFAST

Making the most of Data Tables – All Events

- Events table will show all Events from the selected Schedules
- Filter, Group and Sort resulting events table
- Add Schedule ID column to events table to help identify related Schedules



		Schedule ID	Date (Base)	Base Station	Route	Total Duration (Work)
		98765	6/3/17	YYZ - Toro...	YYZ, YHZ,...	3064
		12345	6/1/17	YYZ - Toro...	YXE, YQR,...	5664
		23456	6/1/17	YYZ - Toro...	YYZ, EWR,...	5839
		34567	6/1/17	YYZ - Toro...	YYZ, YOW,...	3943

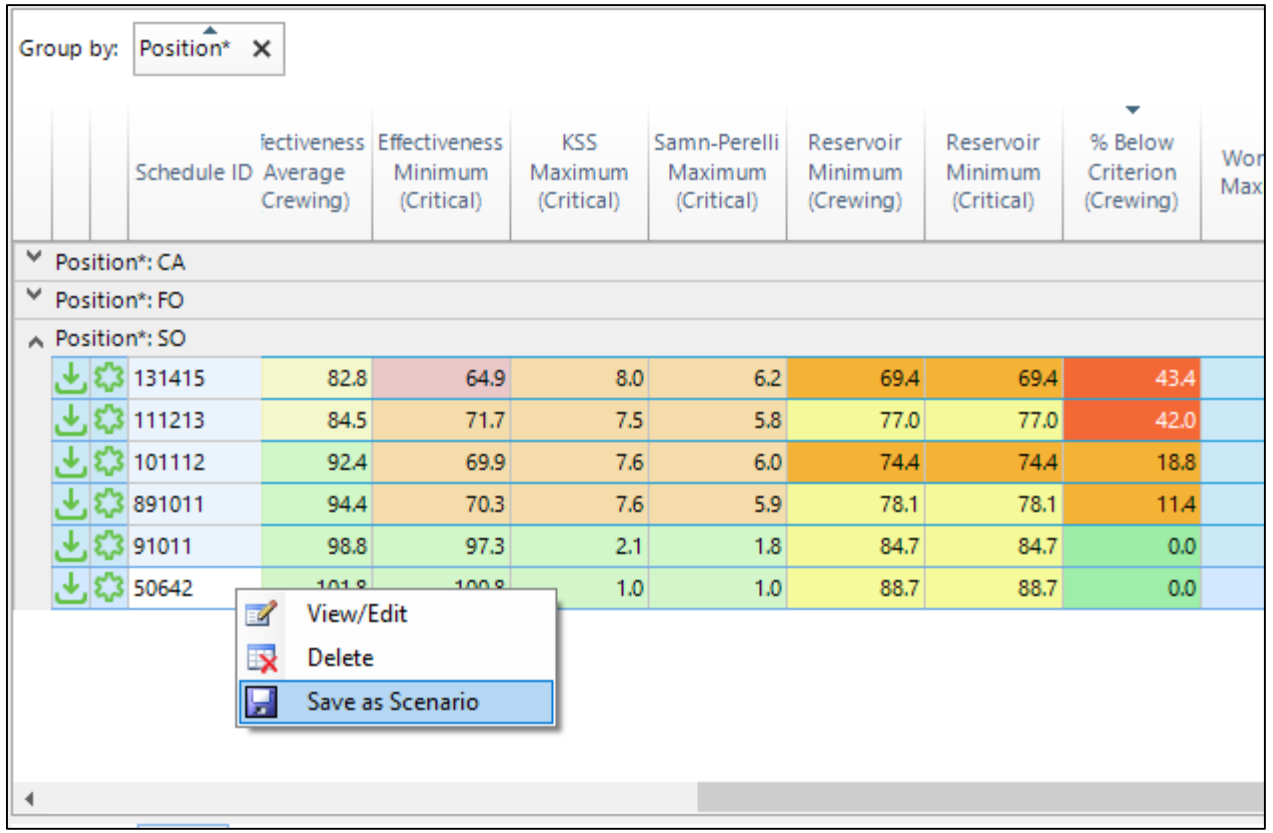
Summary | Events | Graph

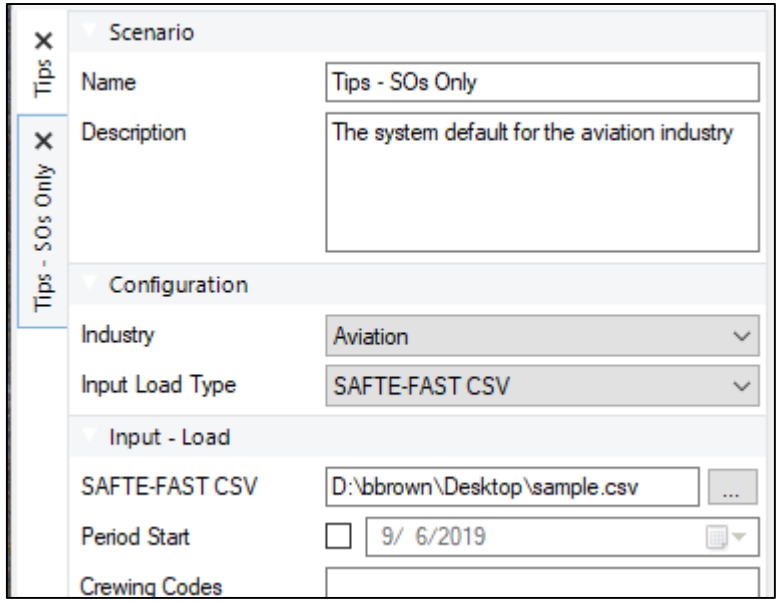
Add Duty | Add Work | Add Marker | Add Sleep | Delete

Schedule ID	Label	Start (Base)	End (Base)	Dura
Contains:	Contains: 621	Equals:	Equals:	Equals
98765	621	6/5/17 17:11	6/5/17 18:44	
98765	621	6/5/17 19:13	6/5/17 20:41	
6789	621	6/20/17 17:01	6/20/17 18:29	
6789	621	6/20/17 19:02	6/20/17 20:20	
161718	621	6/14/17 16:57	6/14/17 18:35	
161718	621	6/14/17 18:59	6/14/17 20:21	
171819	621	6/21/17 16:52	6/21/17 18:28	
171819	621	6/21/17 18:51	6/21/17 20:07	

Making the most of Data Tables – New Scenario

- Multi-selected Schedules can also be copied to a new Scenario for further analysis





SAFTEFAST

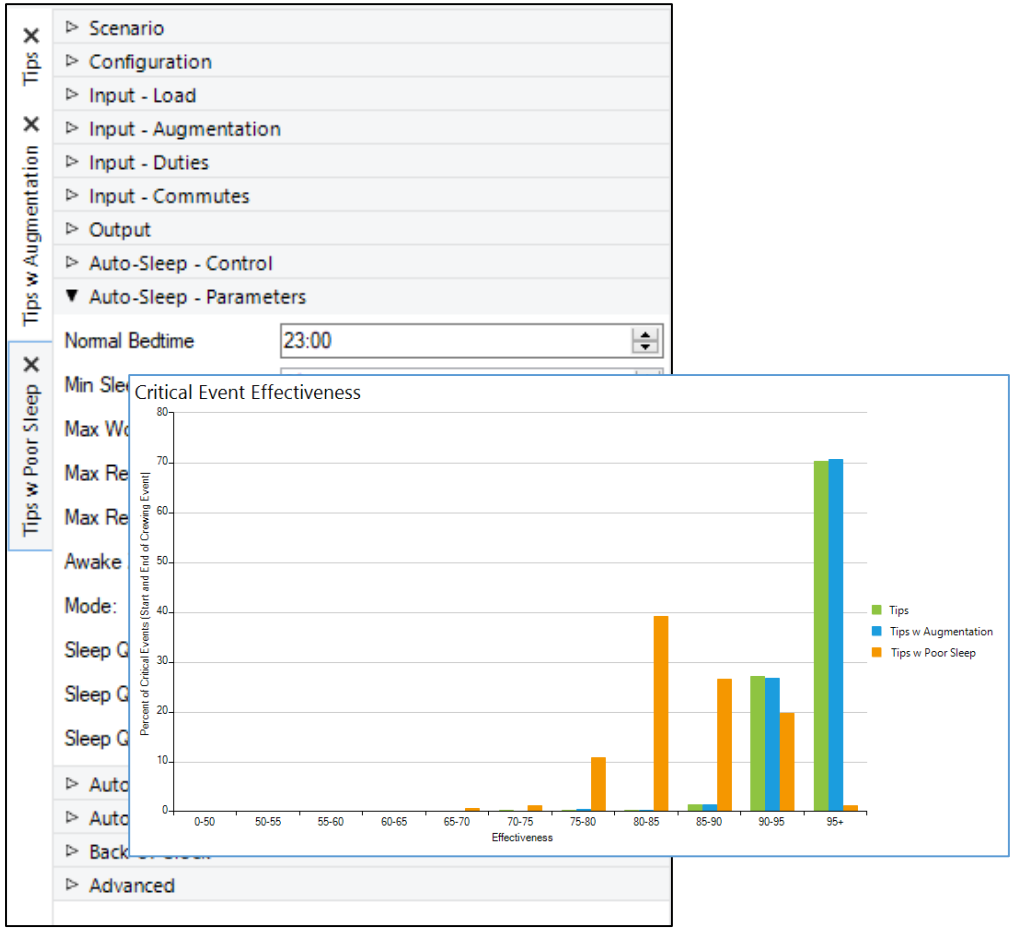
Making the most of Data Tables – Future Dev

- **SFC Enhancements**
  - Additional tools to Select All, Select Group
  - Options to launch Schedule Details Editor for Events table
  - Export Events table results to CSV
  - New reporting tools that exposes “drill-down” data tables
  - ???

SAFTEFAST

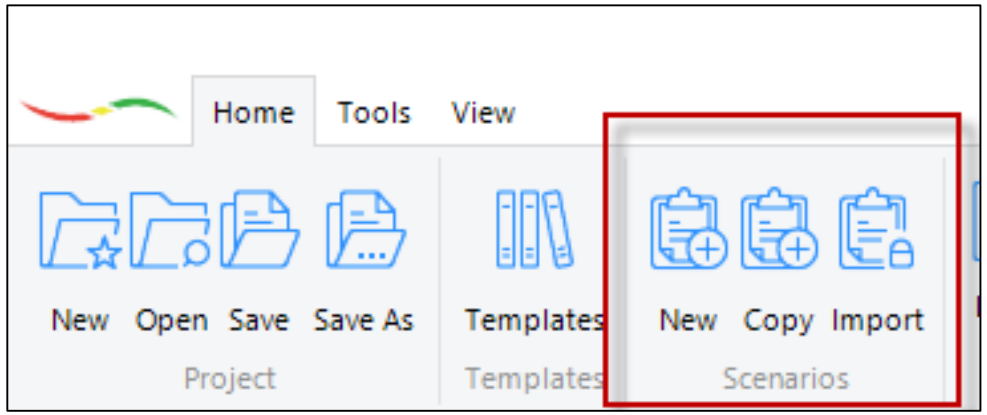
Experimenting with Scenarios and Templates

- Scenario is a combination of Parameters and Schedules
- Use Scenarios to compare:
  - The same schedule data with different parameters – How does changing parameter X effect analysis results of a particular set of schedules
  - Different schedule data with the same parameters – How does analysis change from month-to-month schedules



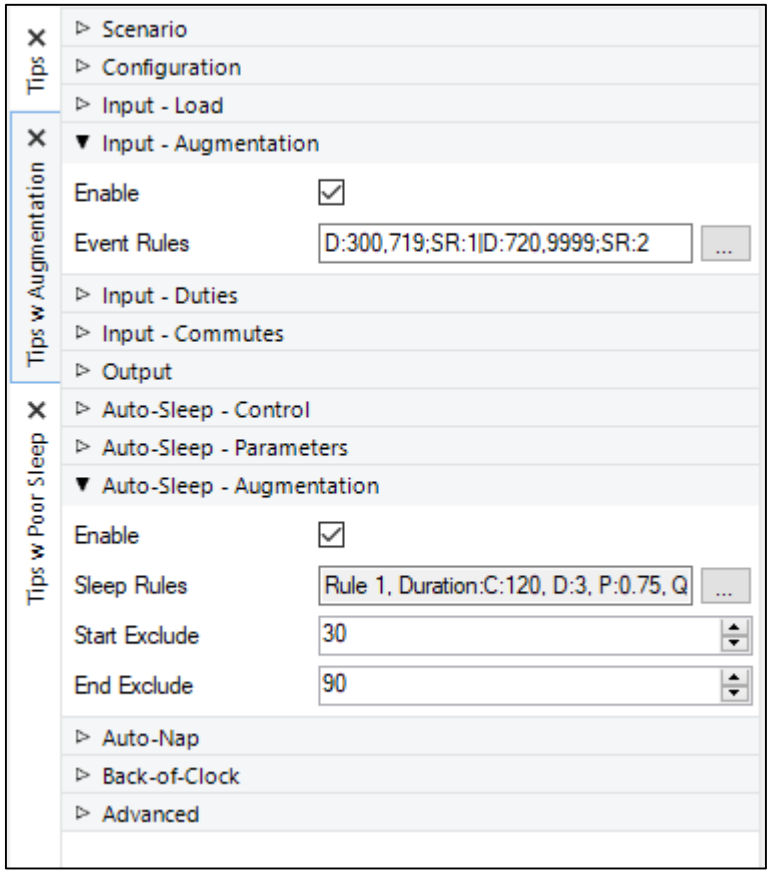
Experimenting with Scenarios and Templates

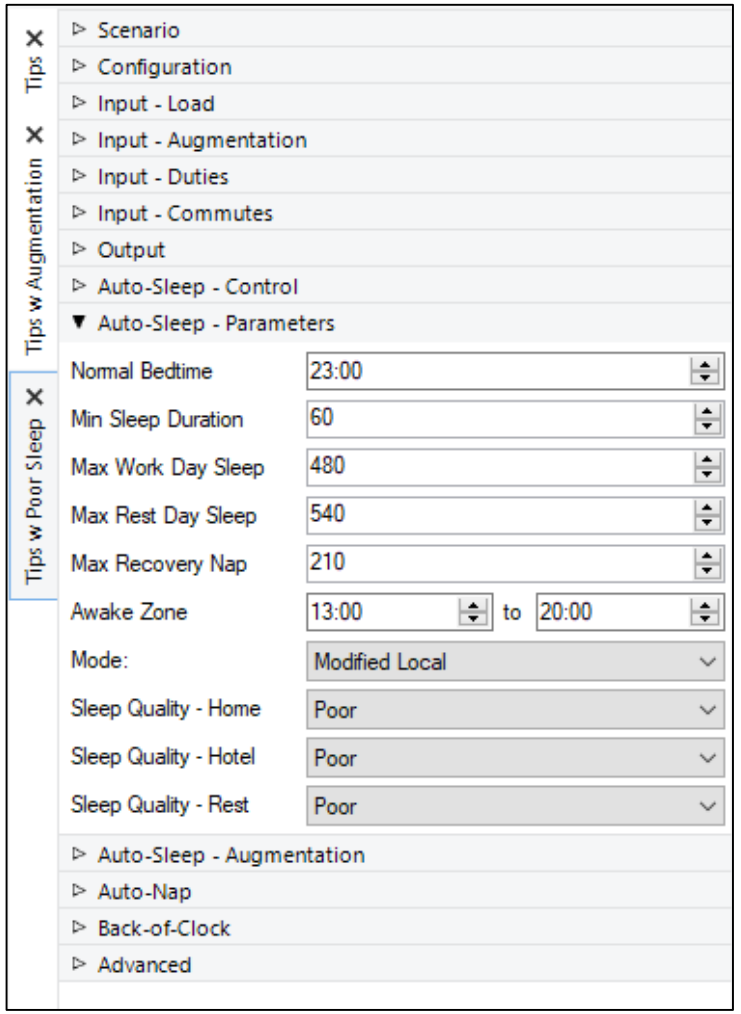
- Alternate Scenarios can be added to a Project in number of ways:
  - Add a new Scenario from a Template
  - Copy an existing Scenario from the current Project
  - Importing an existing Scenario from another Project file
  - Create a new Scenario from a Schedule table selection



Experimenting with Scenarios and Templates

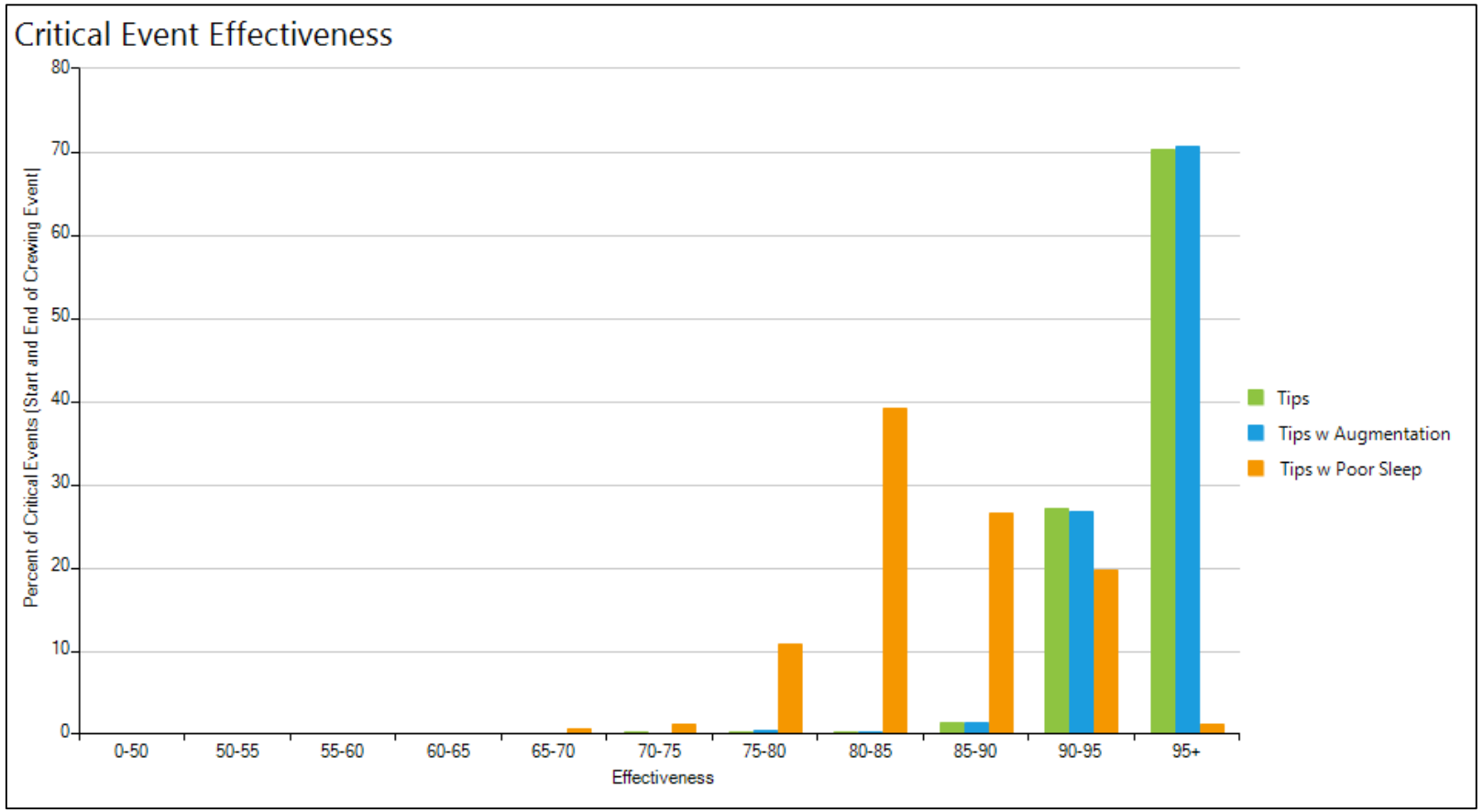
- Example Scenarios
  - Default
  - Default with Aug.
  - Default with Poor Sleep





Experimenting with Scenarios and Templates

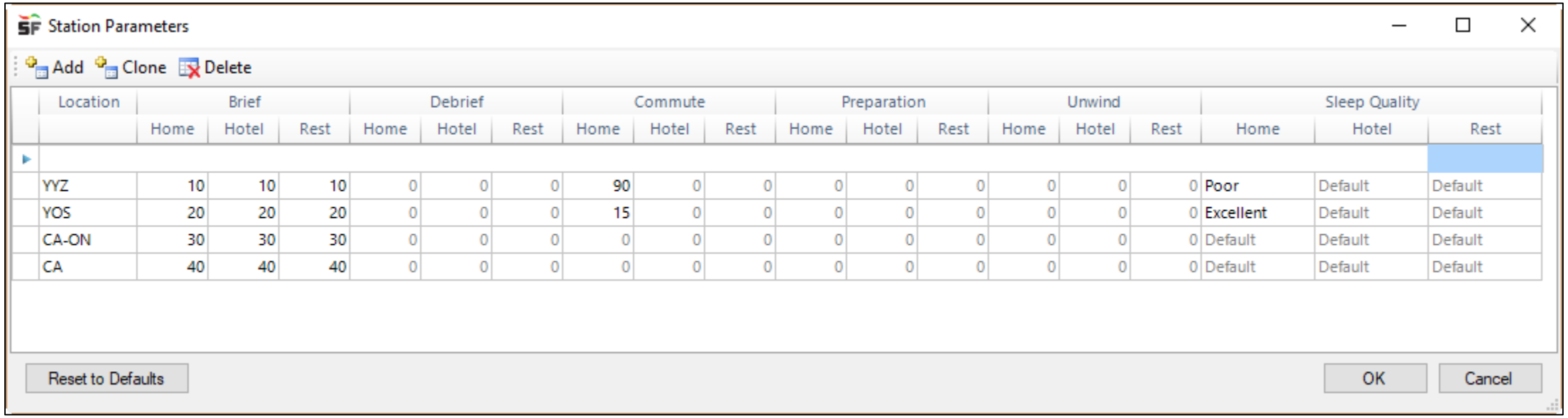
- Example Scenarios
  - Default
  - Default with Aug.
  - Default with Poor Sleep
- Reporting can be used to expose key differences between scenarios and parameter configurations



SAFTEFAST

Station Parameters to override Global Parameters

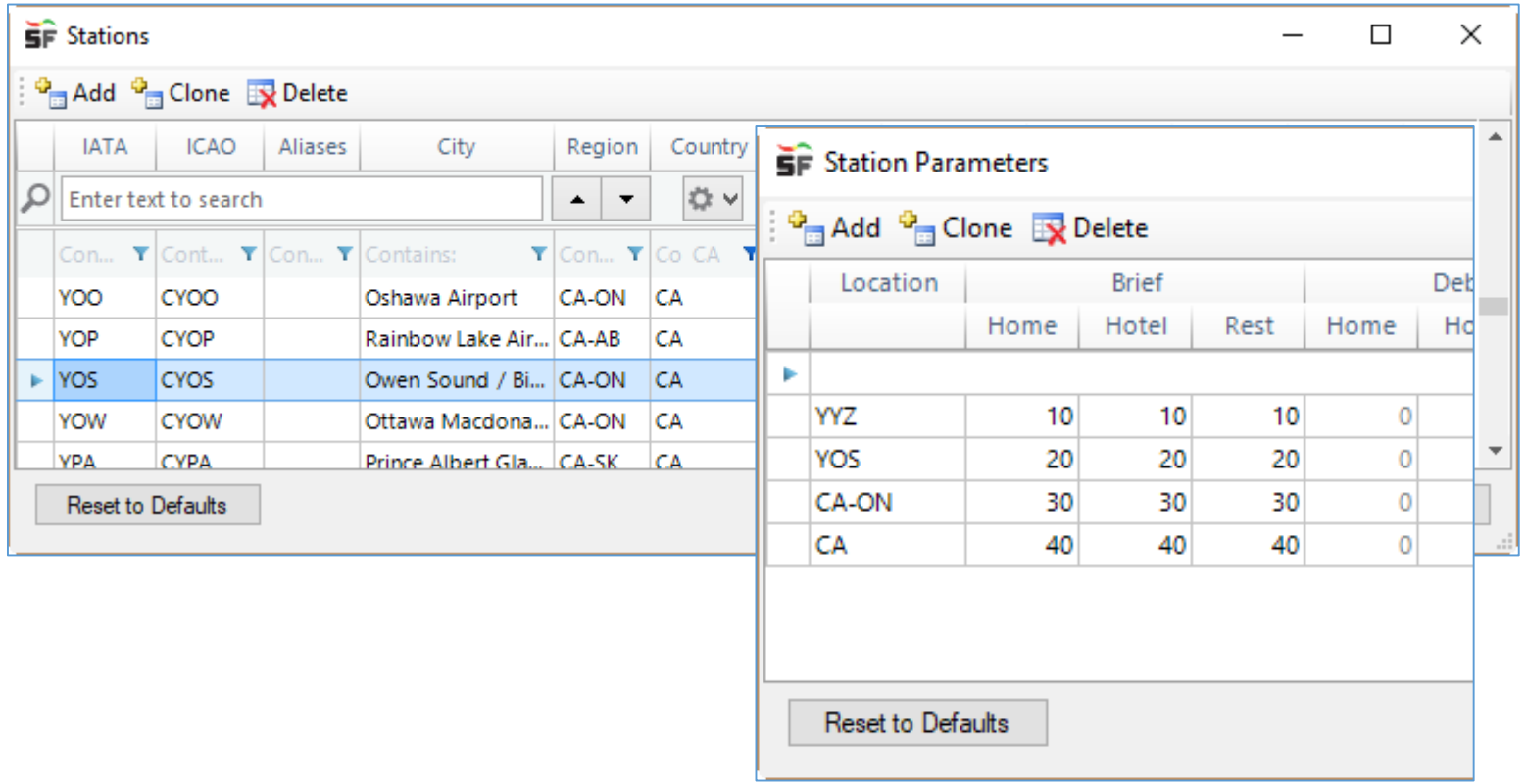
- Some parameters can be overridden to use location-specific values
  - For each place work/sleep can occur: Home, Hotel, Rest Facility
  - Duty-construction durations: Brief, Debrief, Commute, Prep Unwind
  - Sleep Quality



Location	Brief			Debrief			Commute			Preparation			Unwind			Sleep Quality		
	Home	Hotel	Rest	Home	Hotel	Rest	Home	Hotel	Rest	Home	Hotel	Rest	Home	Hotel	Rest	Home	Hotel	Rest
YYZ	10	10	10	0	0	0	90	0	0	0	0	0	0	0	0	Poor	Default	Default
YOS	20	20	20	0	0	0	15	0	0	0	0	0	0	0	0	Excellent	Default	Default
CA-ON	30	30	30	0	0	0	0	0	0	0	0	0	0	0	0	Default	Default	Default
CA	40	40	40	0	0	0	0	0	0	0	0	0	0	0	0	Default	Default	Default

Station Parameters – Location Matching

- Location matches (in order)
  1. Station Code
  2. Region Code
  3. Country Code
- Codes identified in Stations table



SAFTEFAST

Station Parameters to override Global Parameters

- The exact same schedule data, but in a different station

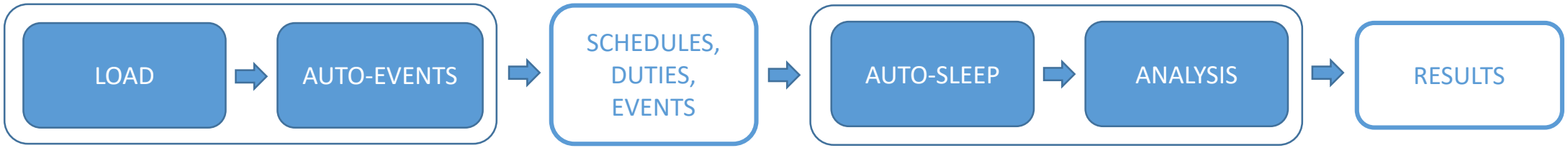
Station Parameters – Future Dev

- **SFC Enhancements**
  - Matching on more than just Station/Location
    - Dynamic filter build to select any schedule or event property
  - Additional parameters to override
  - ???

Data Processing – Stages of Processing

4 Stages of SFC Data Processing

1. Load - Creates Schedules and Events from an external data file
2. Auto-Events - Enhances a schedule's events with additional events
3. Auto-Sleep - Introduces sleep events into a schedule
4. Analysis - Calculates circadian rhythm, sleep reservoir, effectiveness



Data Processing – Parameter Status

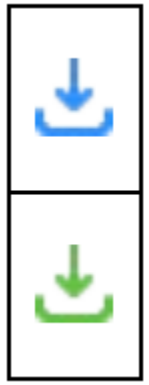
SFC will identify schedules that require data processing after parameters have been modified.

- Load Parameters: File, Codes Include/Ignore, …
- Auto-Events Parameters: Duty event durations, Augmentation, …
- Auto-Sleep Parameters: Sleep duration, quality, awake zone, …
- Analysis Parameters: Phase, rate adjustment, sleep rhythm, …

		Schedule ID	Date (Base)	Rou
		147488	03/02/19	LIS, GRU
		171694	03/02/19	OPO, EV
		174870	07/02/19	LIS, JFK,
		175851	02/02/19	LIS, FOR
		175869	03/02/19	LIS, MIA
		175877	02/02/19	LIS, GRU
		175919	10/02/19	LIS, MP
		176396	05/02/19	LIS, MIA
		176404	05/02/19	LIS, GRU
		176412	07/02/19	OPO, EV
		176420	09/02/19	LIS, GRU
		176438	03/02/19	LIS, GRU
		176446	08/02/19	LIS, CNF
		176453	05/02/19	LIS, FOR
		177089	06/02/19	LIS, GRU
		177246	02/02/19	LIS, LAD

Data Processing – Parameter Status

SFC will identify schedules that require data processing after Load or Auto-Events parameters have been modified.

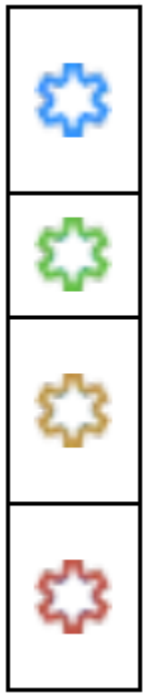


A blue icon will indicate that Load or Auto-Events parameters have changed. Performing a data Load or Refresh Auto-Events will capture the change(s).

A green icon will indicate that the data has been loaded successfully based on Load and Auto-Events parameters at the time.

Data Processing – Parameter Status

SFC will identify schedules that require data processing after Auto-Sleep or Analysis parameters have been modified.



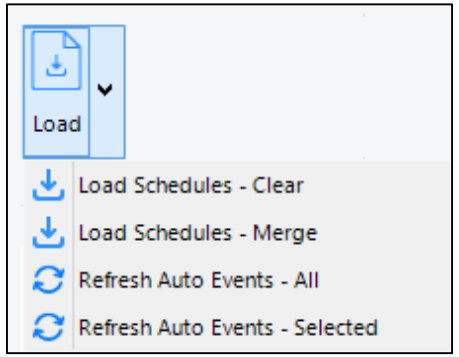
A blue icon will indicate that an analysis is required after changes to Auto-Events, Auto-Sleep or Analysis parameters. Analyzing the schedule(s) will capture the change(s).

A green icon will indicate that the schedule has been successfully analyzed.

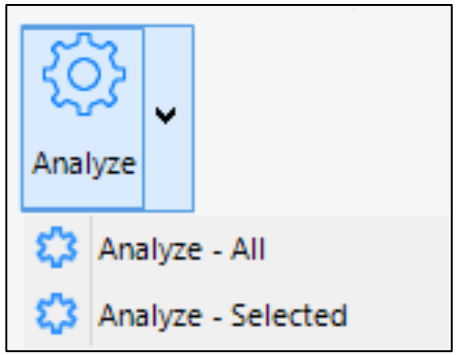
A yellow icon will indicate a warning to the user as a result of performing an analysis. Hovering over the icon will provide the user with further details on the warning.

A red icon will indicate an error to the user as a result of performing an analysis. Hovering over the icon will provide the user with further details on the error.

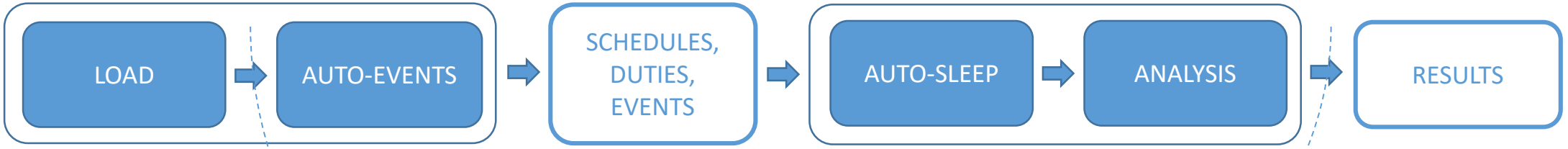
Data Processing – Stages of Processing

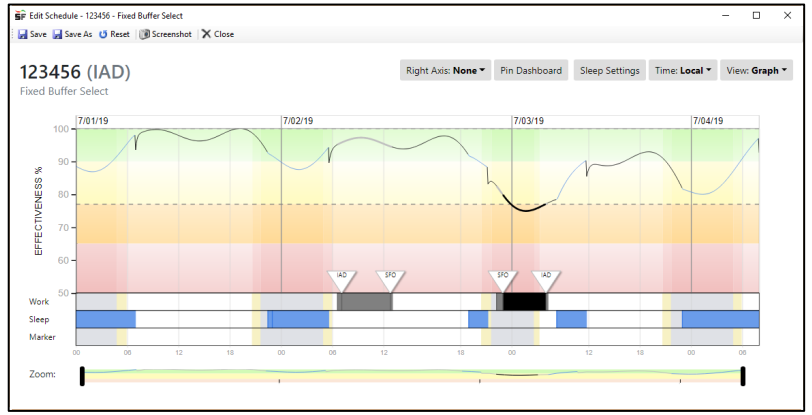


- **Load** – Imports data file AND performs Auto-Events
- **Refresh Auto Events** – Performs Auto-Events on existing schedules



- **Analyze** – Performs Auto-events, Analysis and generates Results on existing schedules





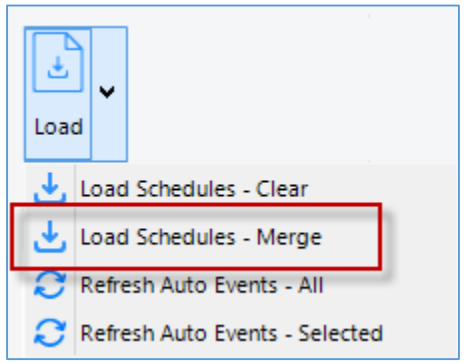
- **Schedule Details Editor** – Performs Auto-events, Analysis and generates Results

Data Processing – When it Happens

- **Load**
  - Only when Load button used
- **Auto-Events**
  - After **Load**
  - When Refresh Auto-Events button used
  - Before **Analysis**
- **Auto-Sleep**
  - Before **Analysis**
- **Analysis**
  - When Analyze button is used
  - When Schedule Details Editor is used

Load Data Merging

- Multiple data files can be loaded into a scenario with the Load Schedules – Merge button



- This tool will combine the datasets of the schedules currently loaded into the scenario, and the schedules contained in the selected data file

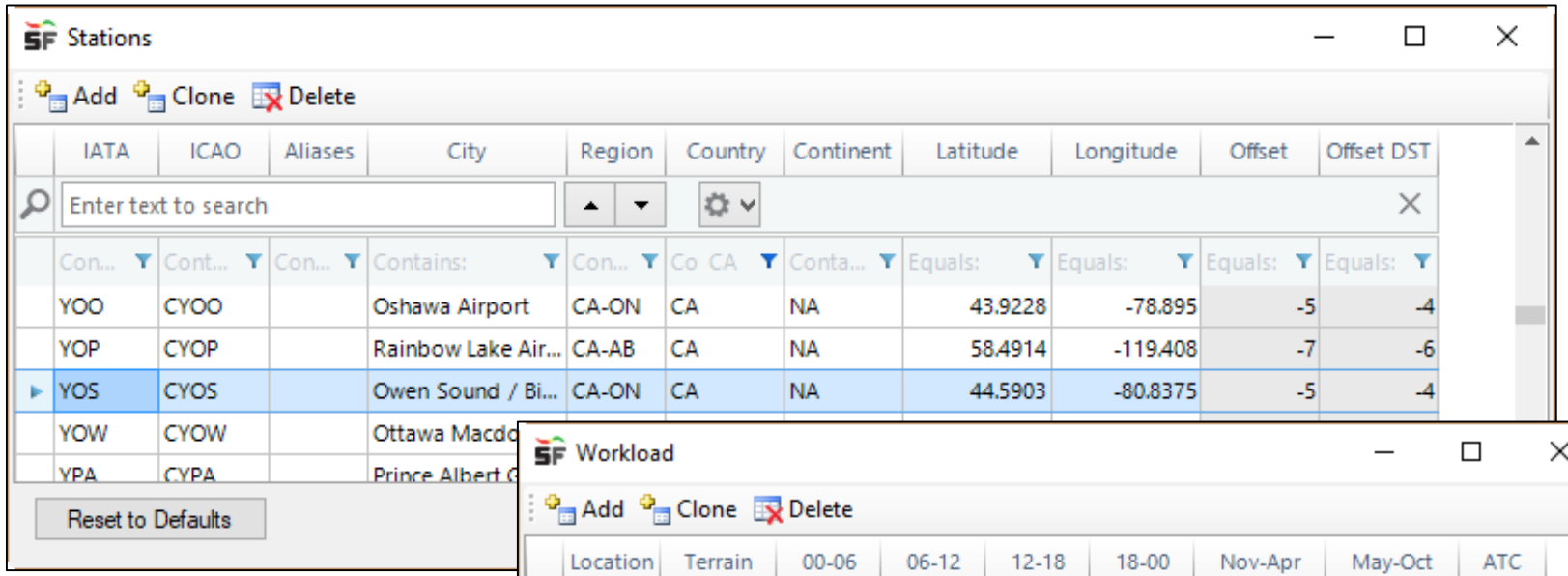
SAFTEFAST

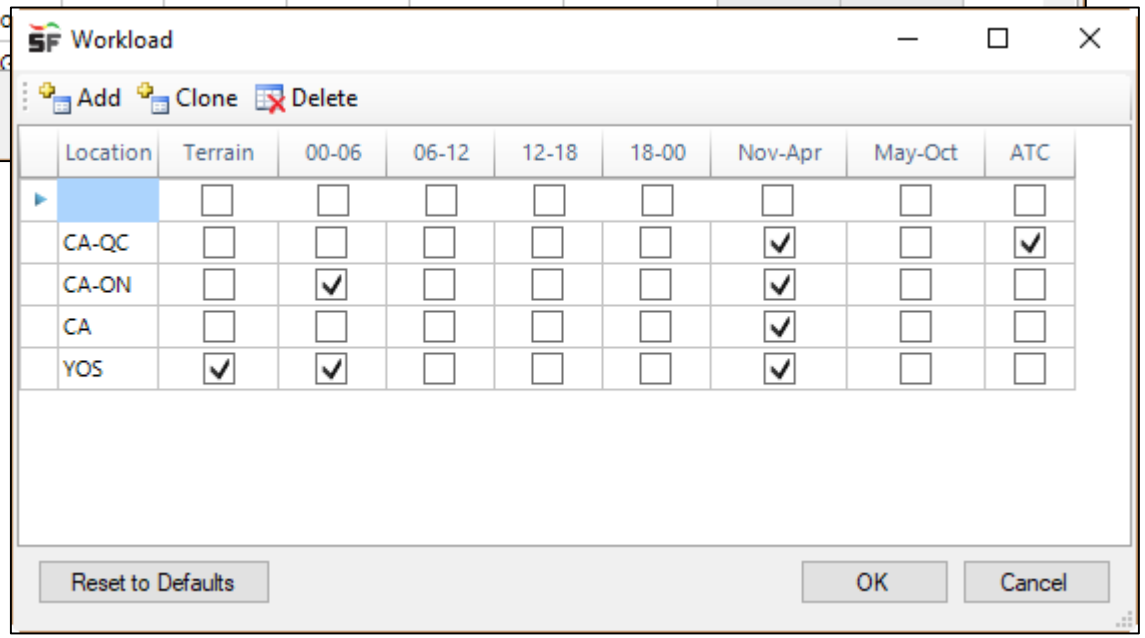
Load Data Merging

- If the incoming data file includes new unique Schedule IDs, they will be added as new schedules in the scenario
- If the incoming data file includes Schedule IDs that already exist in the scenario, the separate lists of Events and Sleep events in the existing schedule will be overridden
- This allows different combinations of
  - Multiple schedule files – Combine Flight and Cabin crew schedules in a scenario
  - Separate events and sleep files – Combine Event and Sleep data in a scenario

Workload – Location Matching

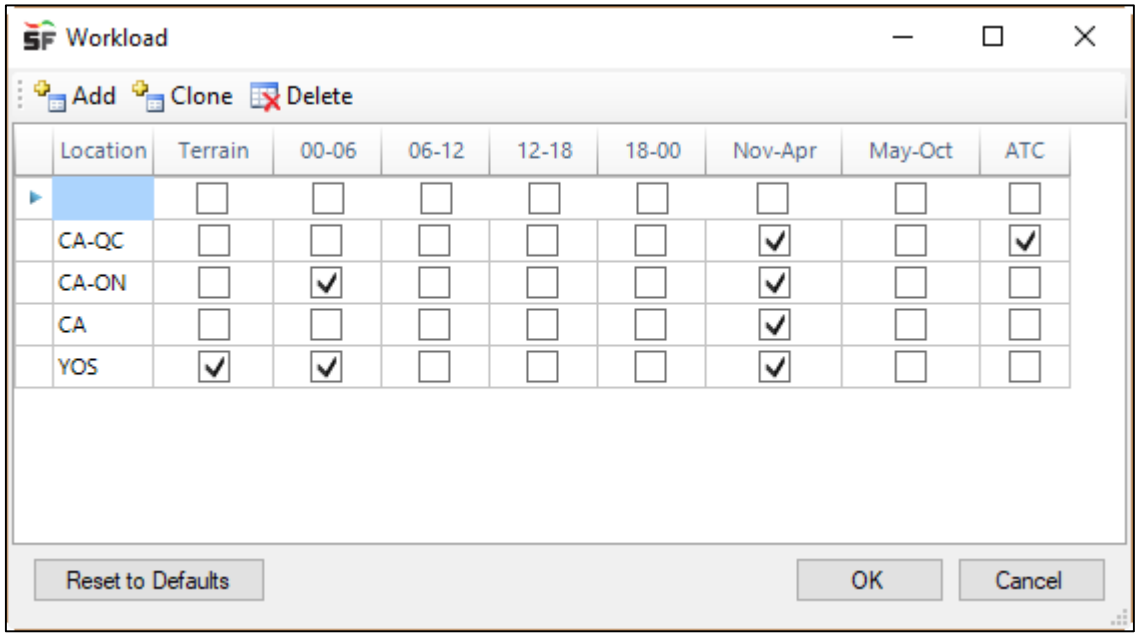
- Location matches (in order)
  1. Station Code
  2. Region Code
  3. Country Code
- Codes identified in Stations table





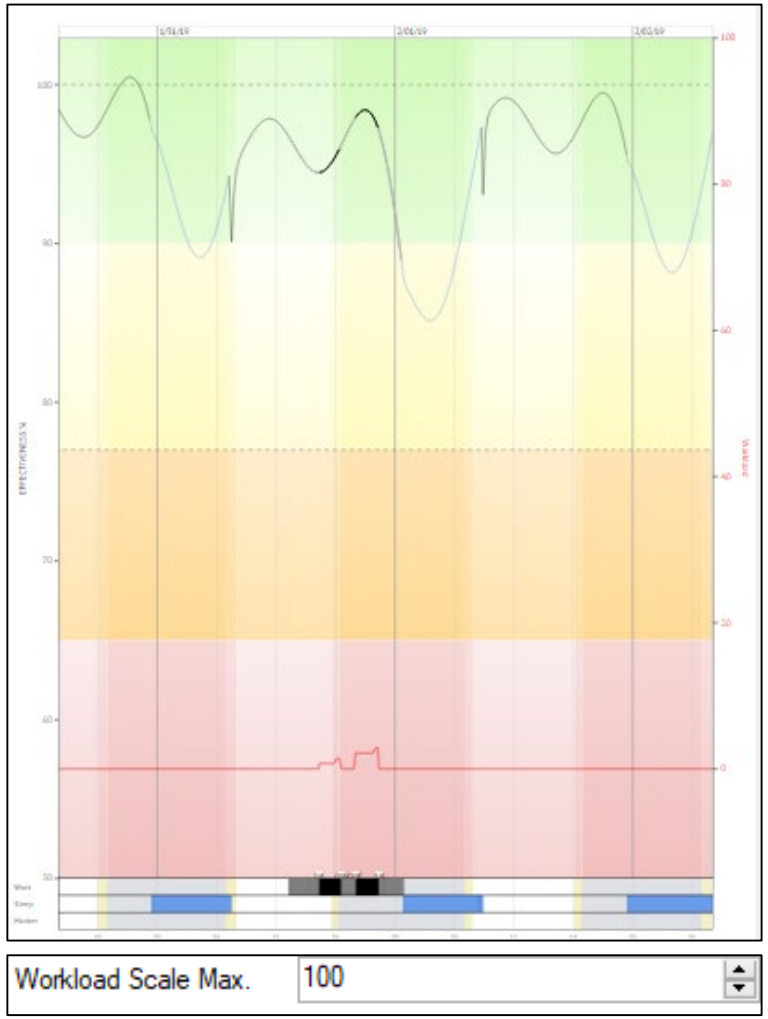
Workload - Calculation

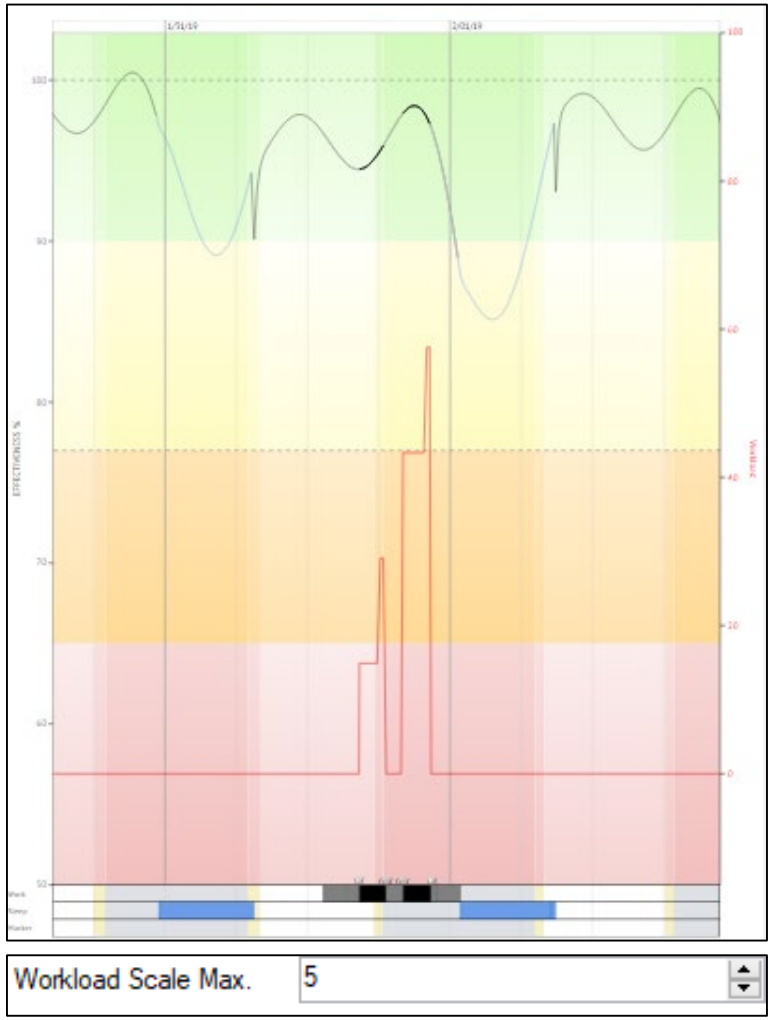
- Baseline workload score of 1 applied at first minute and last minute of each Crewing event
- 4 Additional attributes
  - Terrain
  - Time of Day
  - Season
  - ATC (language)
- 0.25 workload score per attribute applied in addition to baseline
- If all 4 attributes enabled and applicable, max score of 2 applied at first minute and last minute of each Crewing event
- Total score accumulates of 72 hours, then decays – Workload score applied more than 72 hours no longer effects current score



Workload – Relative Value

- Maximum workload score is **relative** to crewing event density
- Theoretical maximum workload score
  - A 1 minute crewing event, every 1 minute, for 72 hours
  - All attributes applied
  - **17280**
- Normalization or Re-scaling required
- By default, a practical max score is assumed to be 100
- If in practice your scores are higher or lower than 100, the Workload Scale Max. parameter can be adjusted to fit a percent scale



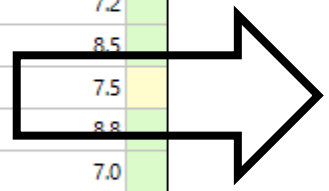


Workload – Normalization

1. Set Workload Scale Max. parameter to 100 (default value)
2. Perform analysis on typical data set
3. Determine maximum workload score in the scenario
4. Modify Workload Scale Max. parameter to be around 10% higher than the maximum score
5. Perform analysis again
6. Note the increase (or decrease) in relative workload scores, which should now be more evenly distributed on the 100 point scale

Workload – Normalization

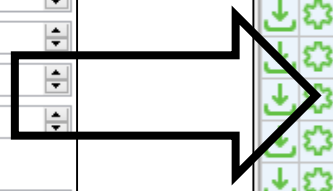
		Schedule ID	Workload Maximum	Workload Median	Effe M (C
		0350	12.8	8.0	
		2417	12.0	8.6	
		0239	12.0	7.9	
		2274	11.9	7.5	
		2436	11.7	7.2	
		2388	11.4	8.5	
		0060	11.4	7.5	
		2470	11.3	8.8	
		2412	11.3	7.0	
		0432	11.0	6.7	
		0332	10.8	6.3	
		2180	10.8	6.3	
		0365	10.5	6.2	
		0384	10.5	6.1	
		0446	10.5	6.1	
		2276	10.5	6.1	



Advanced

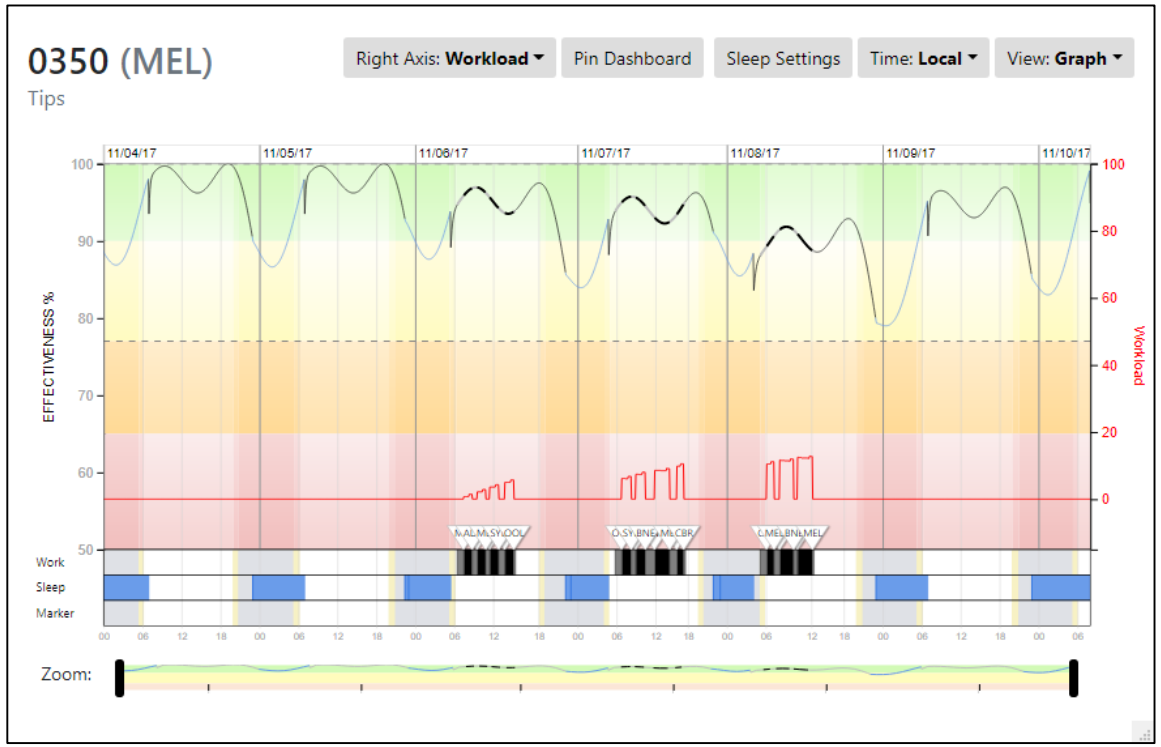
Advanced parameters are unlocked.

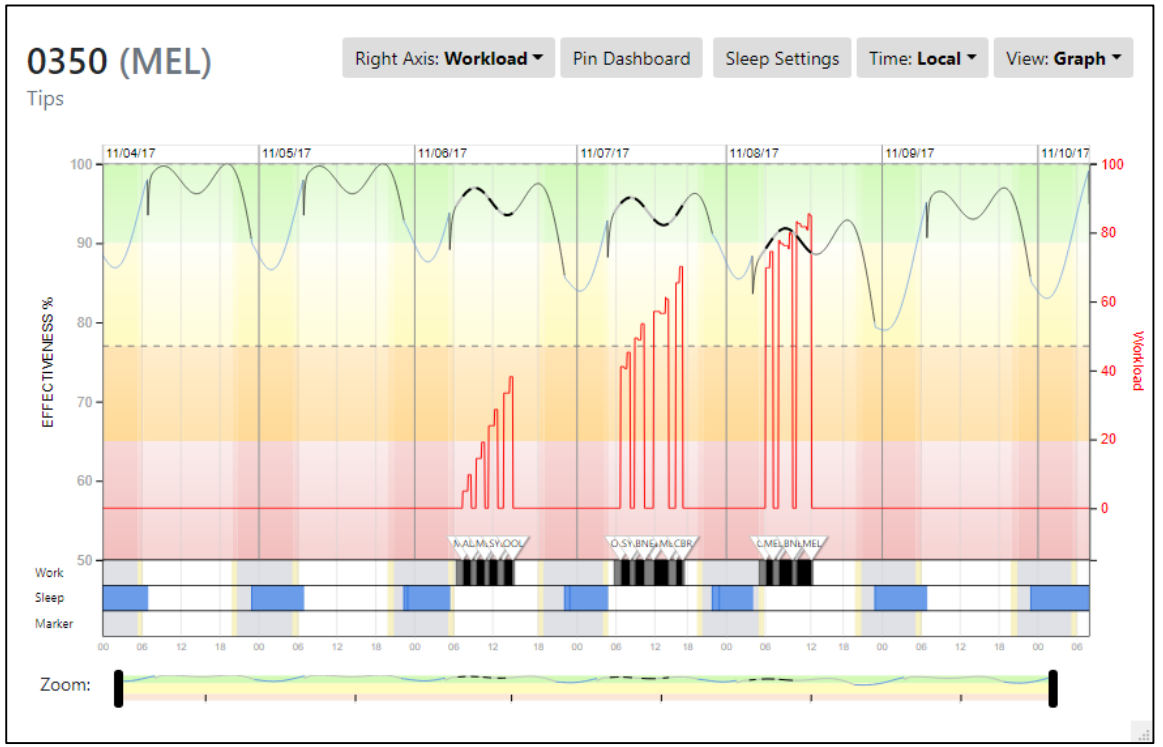
Multi-Processor	☑
Stop on Error	☐
Default Sleep Discount	100
AS1 Look-back Duration	0
AS1 Look-back Weight	100
Explicit Sleep Buffer	Pre 1.5 Post 1.5
Buffer Hours Max	16
Min Sleep Goal Phase	75
Circ. Delay Rate Adj.	0.6667
Circ. Advance Rate Adj.	0.6667
Sleep Rhythm	0.5500
Workload Scale Max.	15



		Schedule ID	Workload Maximum	Workload Median	Effe M (C
		0350	85.5	53.5	
		2417	80.2	57.1	
		0239	80.0	52.4	
		2274	79.1	49.7	
		2436	78.2	47.9	
		2388	76.3	56.5	
		0060	76.1	50.0	
		2470	75.6	58.6	
		2412	75.5	46.7	
		0432	73.3	44.7	
		0332	71.9	41.7	
		2180	71.9	41.7	
		0365	70.1	41.1	
		0384	70.1	40.5	
		0446	70.1	40.5	
		2276	70.1	40.5	

Workload – Normalization

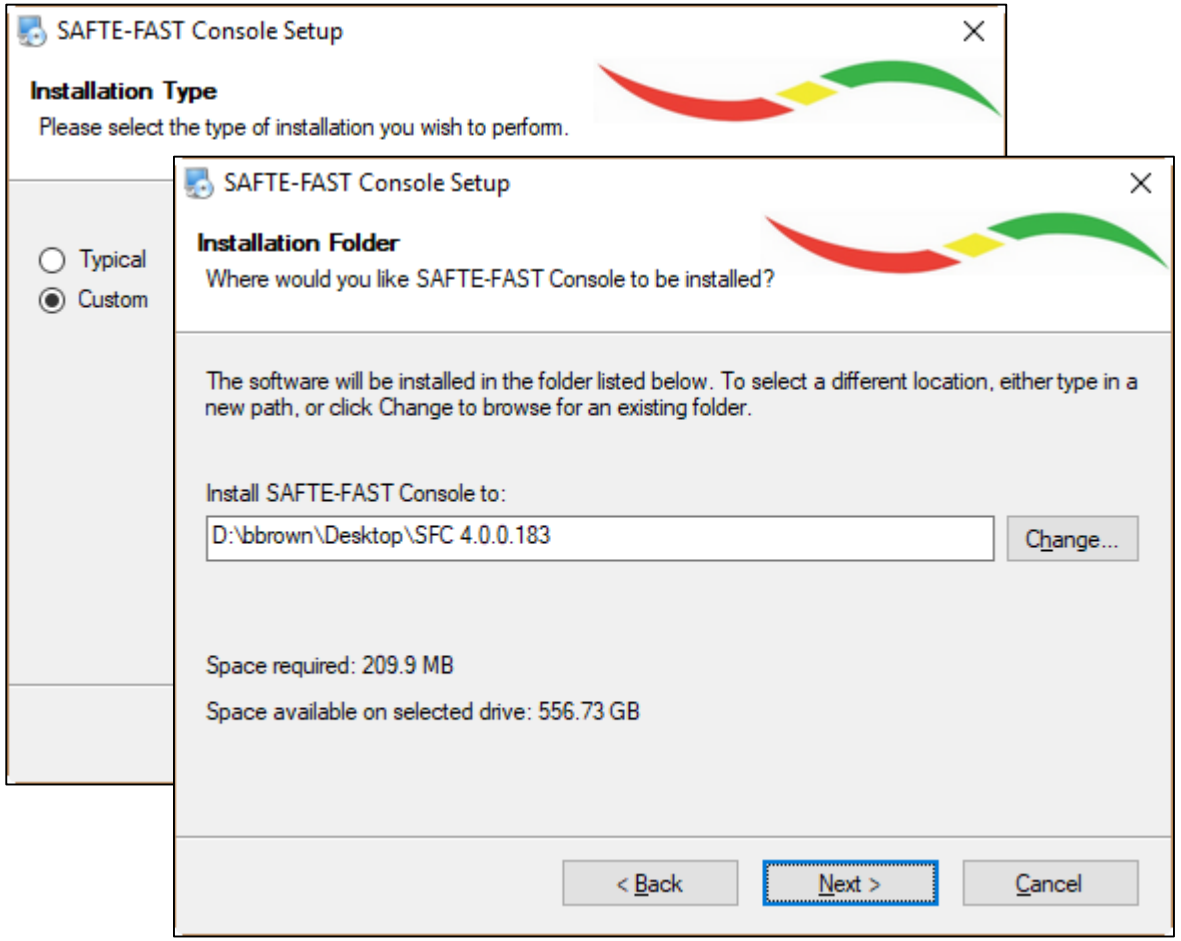




Workload – Normalization

- Perform normalization on each type of data set
  - Short vs. Long haul
  - Flight vs. Cabin
- Once each template/scenario is using a normalized workload scale, more relevant comparisons can be made across desperate data sets
- Month-to-month comparisons should show more significant differences
  - Greater than 100 implies higher-than-expected workload

Multiple Version Installations

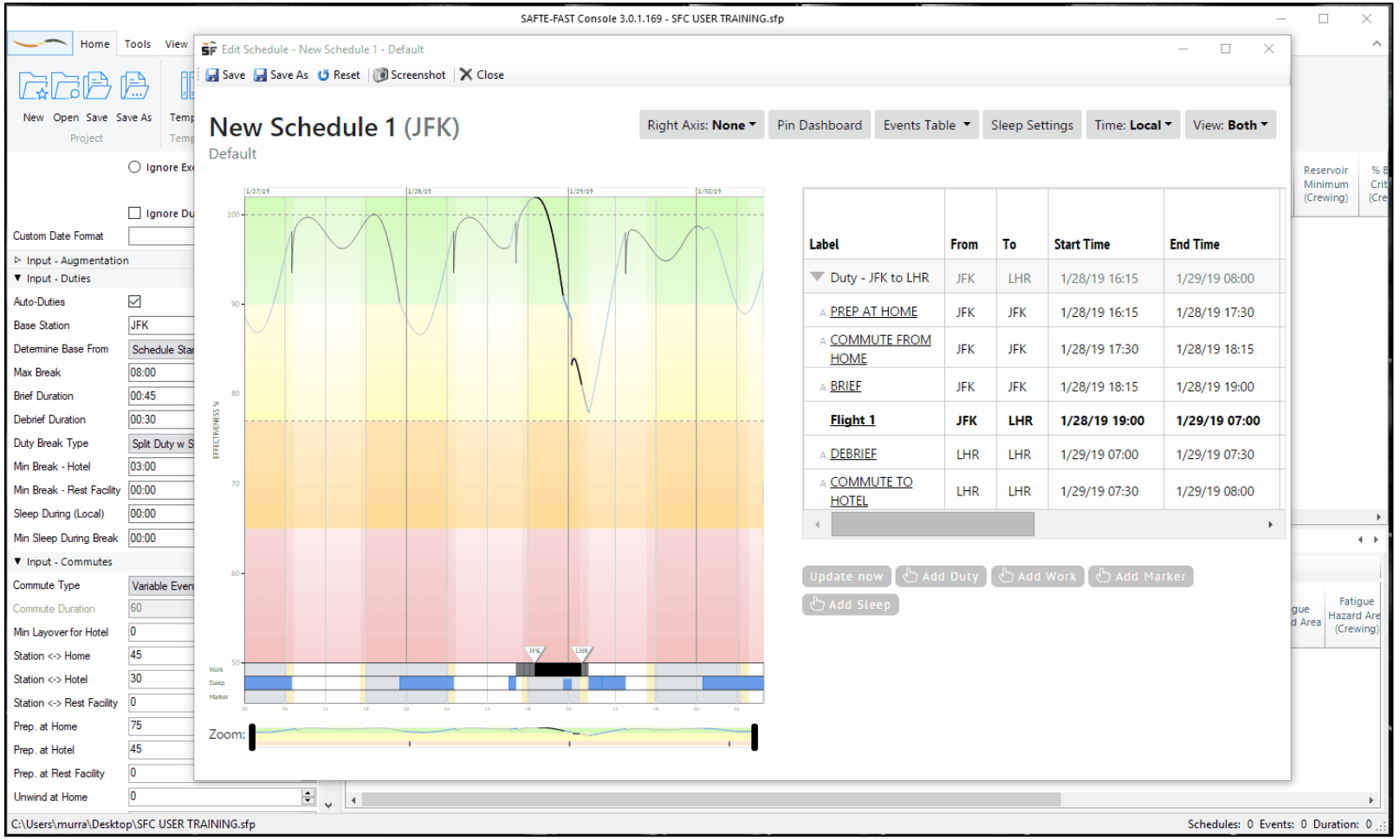


- Desktop shortcut will be created with each installation
- Rename the shortcut to be version specific
- Keep shortcuts organized to easily launch any version
- Only the most recently installed version will appear in Windows Apps & Features list
- Other versions can be removed by deleting the installation folder

Augmentation Refresher

Multiple sleep periods can be defined and used to model:

- Rest by order
  - 1st rest, 2nd rest, 3rd rest
  - Can be used with Crew Position
- Multiple Rests
  - 2 pilots rest during 1st and 3rd period
  - 2 pilots rest during 2nd and 4th period
  - 70% of total rest occurs in 1st period and 30% in 2nd period for both groups



SAFTEFAST

The Science of Performance at Work

Questions?

Conclusion of Presentation