Market Operations – Day Ahead Market Operations

1 Descriptions of Functions – Day Ahead Market Operations

All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work should be so noted.

1.1 Function Name

Name of Function

Day Ahead Market Operations across 3 Western Regional Transmission Organizations (RTOs)

1.2 Function ID

IECSA identification number of the function

M-4

1.3 Brief Description

Describe briefly the scope, objectives, and rationale of the Function.

As the electricity industry is deregulated, and as FERC defines more clearly what the market operation tariffs will encompass, three possible Regional Transmission Organizations (RTOs) in the Western Interconnection are developing seamless interfaces for Market Participants to submit energy schedules and ancillary service bids across these 3 RTOs. The 3 RTOs are California ISO (existing ISO handling the electricity market in California), RTO West (potential RTO of many northwestern utilities), and WestConnect (potential RTO of many southwestern utilities). These 3 RTOs are developing the requirements for the Western RTO functions.

1.4 Narrative

A complete narrative of the Function from a Domain Expert's point of view, describing what occurs when, why, how, and under what conditions. This will be a separate document, but will act as the basis for identifying the Steps in Section 2.

The following is a list of Western RTO functions related to Day Ahead market operations.

Only the listed functions with asterisks are represented in the diagrams and/or step-by-step descriptions in section 2.

1. Day Ahead Market
   a. Auction/sale of FTRs *
   b. Day Ahead Submittal of Energy Schedules *
   c. Day Ahead Submittal of Ancillary Service Bids *
   d. Schedule Adjustment of Energy Schedules *
   e. Schedule Adjustment of Ancillary Services *
   f. NERC Tagging Management *

1.5 Actor (Stakeholder) Roles

Describe all the people (their job), systems, databases, organizations, and devices involved in or affected by the Function (e.g. operators, system administrators, technicians, end users, service personnel, executives, SCADA system, real-time database, RTO, RTU, IED, power system). Typically, these actors are logically grouped by organization or functional boundaries or just for collaboration purpose of this use case. We need to identify these groupings and their relevant roles and understand the constituency. The same actor could play different roles in different Functions, but only one role in one Function. If the same actor (e.g. the same person) does play multiple roles in one Function, list these different actor-roles as separate rows.

Grouping (Community)		*Group Description*
Market Operations		
Actor Name	*Actor Type (person, device, system etc.)*	*Actor Description*
Area & ResourceOperation Centers	Corporation	
AuditingPersonnel	Person	
DatabaseAdministrator	Person	
DisCos	Corporation	
DistributionSystem	System	
Eligible Customer Metered Entity	Person	
Eligible Customers	Person	
GenCos	Corporation	
IntervalMeterDevice	Device	
LGROwner	Person	
LoadProfile	Database	
MarketParticipant	Person	
Metered Entities	Corporation	
WeatherService	Corporation	
NERC	Corporation	

Grouping (Community)		*Group Description*
Market Operations		
Actor Name	*Actor Type (person, device, system etc.)*	*Actor Description*
Other 2 RTOs	Corporation	
RetailCos	Corporation	
RTOOperator	Person	
RTOProgrammerEngineerPersonnel	Person	
RTOScheduler	Person	
SC-FTROwner	Person	
SchedulingCoordinator	Person	
SettlementAdministrator	Person	
SettlementDataMgmtAgent	Corporation	
CustomerMeterDevice	Device	
Tag Authority	Corporation	
TimeLineManager	Timer	
TransmissionOwner	Person	
TransmissionSystem	Power System	
WSCC	Corporation	

Grouping (Community)		*Group Description*
Market Operations		
Actor Name	*Actor Type (person, device, system etc.)*	*Actor Description*
PowerSystemModel	Database	
RTOPowerSystemModelPowerSystemModel	Database	
TransmissionOutageSchedule	Database	
LGRGenerationMaintenanceSchedule	Database	
EnergyScheduleDatabase	Database	
AncillaryServiceSchedule	Database	
TransmissionRightOwnershipDatabase	Database	
FTR Requirements Matrix	Database	
TransmissionSystemCharacteristicsDatabase	Database	
Existing Transmission Contracts	Database	
OperatingPlan	Database	
Balancing Energy Stack	Database	
Ancillary Services Procurement Analysis		

Grouping (Community)		*Group Description*
Market Operations		
Actor Name	*Actor Type (person, device, system etc.)*	*Actor Description*
Area & Resource Operation Centers		
CongestionManagementSystem		
Control (DAC) Subsystem		
Data Acquisition		
FTR Market Clearing Price Auction Function		
OperationalTransmissionCapacity		
Tag Approval Service		
WMI Web Server		

Replicate this table for each logic group.

1.6 Information Exchanged

Describe any information exchanged in this template.

Information Object Name	*Information Object Description*

1.7 Activities/Services

Describe or list the activities and services involved in this Function (in the context of this Function). An activity or service can be provided by a computer system, a set of applications, or manual procedures. These activities/services should be described at an appropriate level, with the understanding that sub-activities and services should be described if they are important for operational issues, automation needs, and implementation reasons. Other sub-activities/services could be left for later analysis.

Activity/Service Name	***Activities/Services Provided***
Maintenance Outage Function	Analyzes maintenance outages
7-Day Load Forecast Function	Determines the long term load forecast
CongestionManagementSystem	Determines if congestion could occur
Operations Transmission Capacity	Determines the Operations Transmission Capacity, based on energy schedules
Western Market Interface Web Server	Manages the interface between the RTOs and the MarketParticipants
Data Acquisition and Control Subsystem	Monitors and controls field devices
Available FTR	Manages FTRs
FTR Market Clearing Price Auction Function	Determines market clearing price of FTRs based on energy schedules
EnergyScheduleDatabase Analysis Function	Analyzes the energy schedules
Ancillary Services Procurement Analysis	Analyzes the needs for ancillary services
Tag Approval Service	Approves electronic tags

1.8 Contracts/Regulations

Identify any overall (human-initiated) contracts, regulations, policies, financial considerations, engineering constraints, pollution constraints, and other environmental quality issues that affect the design and requirements of the Function.

Contract/Regulation	*Impact of Contract/Regulation on Function*
Market Tariff	Basis for all actions

Policy	*From Actor*	*May*	*Shall Not*	*Shall*	*Description (verb)*	*To Actor*

Constraint	*Type*	*Description*	*Applies to*

2 Step by Step Analysis of Function

Describe steps that implement the function. If there is more than one set of steps that are relevant, make a copy of the following section grouping (Preconditions and Assumptions, Steps normal sequence, and Steps alternate or exceptional sequence, Post conditions)

2.1 Day Ahead Auction of FTRs and NCRs (DAAFN)

2.1.1 DAAFN – Preconditions and Assumptions

Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities

Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place

Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be 'filled in but unapproved'.

Actor/System/Information/Contract	***Preconditions or Assumptions***
All	Market operations are functioning according to the Market Tariff

2.1.2 DAAFN – Steps – Normal Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
									Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.
1.1	Before Day Ahead market	SchedulingCoordinator	Issue notice of intent	(1) Issue notice of intent to use FTRs and NCRs before Day Ahead market	SchedulingCoordinator	WMI Web Server	FTR Notices of intent		User Interface
1.2	After previous step	WMI Web Server	Update intents	(2) Update intents to use FTRs	WMI Web Server	TransmissionRightOwnershipDatabase	FTR Notices of intent		RTOs / Market Participants
1.3	After previous step	TransmissionRightOwnershipDatabase	(3) Provide updates on un-used FTRs and NCRs	(3) Provide updates on un-used FTRs and NCRs	TransmissionRightOwnershipDatabase	OperationalTransmissionCapacity	Unused FTRs		RTOs / Market Participants
1.4	After previous step	TimeLineManager	(4) Trigger posting of FTRs at Schedule Close	(4) Trigger posting of FTRs at Schedule Close	TimeLineManager	OperationalTransmissionCapacity	Used FTRs		RTOs / Market Participants
1.5	After previous step	OperationalTransmissionCapacity	(5) Post available FTRs as auctionable RTRs	(5) Post available FTRs as auctionable RTRs	OperationalTransmissionCapacity	WMI Web Server	Available FTRs		RTOs / Market Participants
1.6	After previous step	WMI Web Server	(6) Review auctionable RTRs	(6) Review auctionable RTRs	WMI Web Server	SchedulingCoordinator	Auctionable RTRs		RTOs / Market Participants

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.7	After previous step	SchedulingCoordinator	(7) Make one-time bid on RTRs and ancillary services	(7) Make one-time bid on RTRs and ancillary services	SchedulingCoordinator	WMI Web Server	Bids for RTRs		User Interface
1.8	After previous step	WMI Web Server	(8) Enter RTR bids	(8) Enter RTR bids	WMI Web Server	FTR Market Clearing Price Auction Function	Bids for RTRs		RTOs / Market Participants
1.9	After previous step	FTR Market Clearing Price Auction Function	(9) Select highest bidder for RTR and store as RTR owner	(9) Select highest bidder for RTR and store as RTR owner	FTR Market Clearing Price Auction Function	TransmissionRightOwnershipDatabase	RTR ownership		RTOs / Market Participants
1.10	After previous step	WMI Web Server	(10) Notify of auction results	(10) Notify of auction results	WMI Web Server	SchedulingCoordinator	Auction results		User Interface

2.1.3 DAAFN – Steps – Alternative / Exception Sequences

Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

2.1.4 DAAFN – Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

Actor/Activity	***Post-conditions Description and Results***

2.1.5 DAAFN – Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number..

2.1.6 DAAFN – Current Implementation Status

Describe briefly the current implementation status of the function and/or parts of it, referring to Steps above
Identify the key existing products, standards and technologies

Product/Standard/Technology Eg. DNP 3	***Ref - Usage*** 2.1.2.1[1] - Exchange of SCADA information

Current Implementations:

Relative maturity of function across industry:	*Ref - Status Discussion*
Very mature and widely implemented	
Moderately mature	
Fairly new	Fairly new
Future, no systems, no interactions	

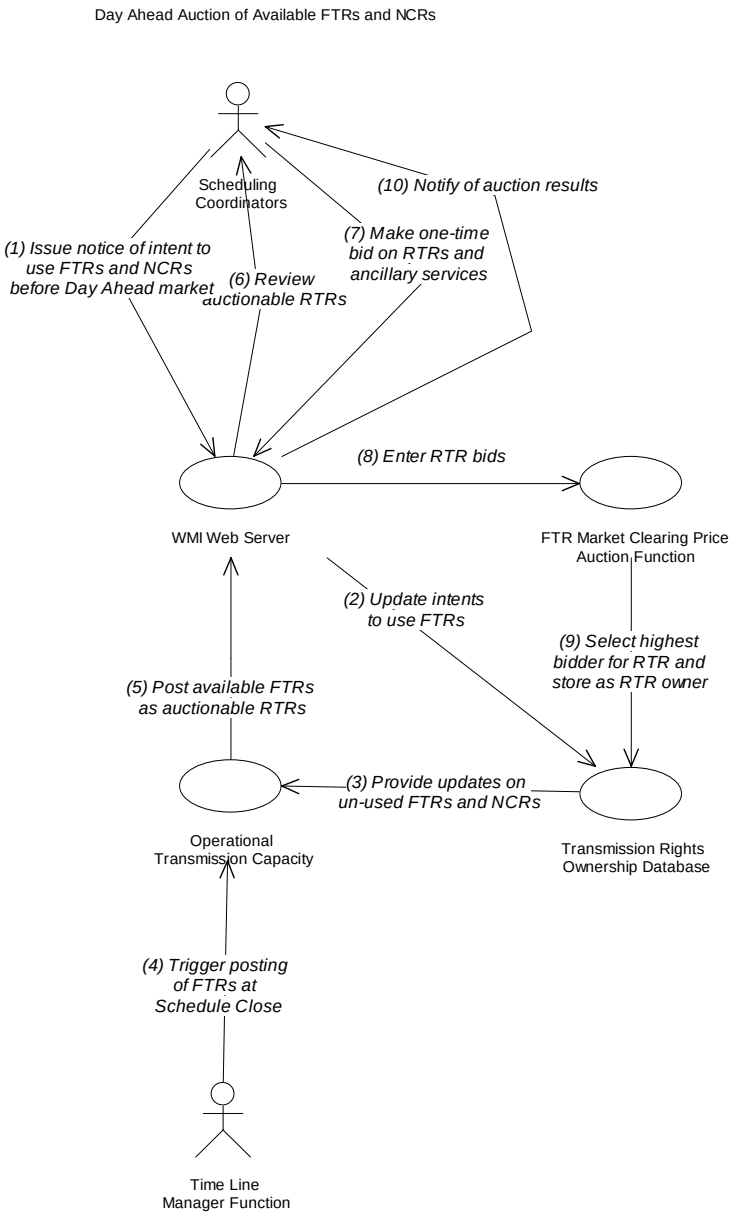
Existence of legacy systems involved in function:	*Ref - Status Discussion*
Many legacy systems	
Some legacy systems	
Few legacy systems	Very few legacy systems
No legacy systems	
Extensive changes will be needed for full functionality	
Moderate changes will be needed	
Few changes will be needed	
No changes will be needed	

Implementation Concerns	*Ref - Status Discussion*
Data availability and accuracy	
Known and unknown market pressures	Could have market pressures changing functionality
Known and unknown technology opportunities	

Validation of capabilities of function
Cost vs. benefit

2.1.7 DAAFN – Diagram

For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.


Day Ahead Auction of Available FTRs and NCRs
Scheduling Coordinators
(10) Notify of auction results
(7) Make one-time bid on RTRs and ancillary services
(1) Issue notice of intent to use FTRs and NCRs before Day Ahead market
(6) Review auctionable RTRs
(8) Enter RTR bids
WMI Web Server
FTR Market Clearing Price Auction Function
(2) Update intents to use FTRs
(9) Select highest bidder for RTR and store as RTR owner
(5) Post available FTRs as auctionable RTRs
(3) Provide updates on un-used FTRs and NCRs
Operational Transmission Capacity
Transmission Rights Ownership Database
(4) Trigger posting of FTRs at Schedule Close
Time Line Manager Function

2.2 Day Ahead Submittal of Energy Schedules (DAES)

2.2.1 DAES – Preconditions and Assumptions

Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities

Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place

Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be 'filled in but unapproved'.

Actor/System/Information/Contract	***Preconditions or Assumptions***

2.2.2 DAES – Steps – Normal Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
									Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.
2.1	On-going	SchedulingCoordinator	Submit energy schedules	(1) Submit Balanced EnergyScheduleDatabase, including self-provided AncillaryServiceSchedule, any inter-SC trades, and any generation limit changes, until Schedule Close	SchedulingCoordinator	WMI Web Server	Energy schedules		User Interface
2.2	Submittal of an energy schedule	WMI Web Server	Validation	(2) Indicates valid input or indicates clerical & format errors	WMI Web Server	SchedulingCoordinator	Energy schedules		User Interface
2.3	Correction	SchedulingCoordinator	Correction	(3) Corrects errors	SchedulingCoordinator	WMI Web Server	Energy schedules		User Interface
2.4a	Valid energy schedule submitted	WMI Web Server	Energy Schedule Analysis	(4a) Provides Day-Ahead EnergyScheduleDatabase	WMI Web Server	Energy Schedule Analysis	Energy schedules		RTOs / Market Participants
2.4b	Simultaneous with previous step	WMI Web Server	EnergyScheduleDatabase to RTOs	(4b) Provides Day-Ahead EnergyScheduleDatabase relevant to each RTO	WMI Web Server	Other 2 RTOs Energy Schedule Processing	Energy schedules		RTOs / Market Participants

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.5a	Analysis of energy schedules	Energy Schedule Analysis	Adjustment to energy schedules	(5a) Adjusts any unbalanced schedules and stores validated input as proposed schedules	Energy Schedule Analysis	RTO Energy & A/S Schedules	Energy schedules		RTOs / Market Participants
2.5b	Simultaneous with previous step	Energy Schedule Analysis	Adjusted energy Schedules to RTOs	(5b) Provides adjusted and validated cross-RTO schedules	Energy Schedule Analysis	Other 2 RTOs Energy Schedule Processing	Energy schedules		RTOs / Market Participants
2.5c	Simultaneous with previous step	Existing Transmission Contracts	Apply existing energy schedule contracts	(5c) Enter existing contracts	Existing Transmission Contracts	RTO Energy & A/S Schedules	Existing energy schedule contracts		RTOs / Market Participants
2.6a	Day Ahead Market Close	TimeLineManager	Time-based trigger	(6a) Initiates Day Ahead security analysis verification after Schedule Close	TimeLineManager	CongestionManagementSystem	Day Ahead Energy schedules		RTOs / Market Participants
2.6b	Simultaneous with previous step	RTO Energy & A/S Schedules	Retrieve Day-Ahead schedules	(6b) Retrieves all Day Ahead schedules	RTO Energy & A/S Schedules	CongestionManagementSystem	Day Ahead Energy schedules		RTOs / Market Participants
2.6c	Simultaneous with previous step	Other 2 RTOs Energy Schedule Processing	Cross-RTO security analysis	(6c) For cross-RTO schedules, validates schedules, adjusts any unbalanced schedules, and provides as proposed schedules	Other 2 RTOs Energy Schedule Processing	RTO Energy & A/S Schedules	Day Ahead Energy schedules		RTOs / Market Participants

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.7a	After previous step	CongestionManagementSystem	Security Analysis	(7a) Verifies schedules meet intra-zonal & connection point security requirements	CongestionManagementSystem	RTO Energy & A/S Schedules	Day Ahead Energy schedules		RTOs / Market Participants
2.7b	Simultaneous with previous step	CongestionManagementSystem	Cross-RTO security analysis	(7b) For cross-RTO schedules, provide results of Congestion Management analysis	CongestionManagementSystem	Other 2 RTOs Energy Schedule Processing	Day Ahead Energy schedules		RTOs / Market Participants
2.8a	After previous step	RTO Energy & A/S Schedules	Post results of security analysis	(8a) Posts results of Congestion Management analysis of schedules	RTO Energy & A/S Schedules	WMI Web Server	Day Ahead Energy schedules		RTOs / Market Participants
2.8b	Simultaneous with previous step	Other 2 RTOs Energy Schedule Processing	Post results of cross-RTO security analysis	(8b) Posts results of Congestion Management analysis of cross-RTO schedules	Other 2 RTOs Energy Schedule Processing	WMI Web Server	Day Ahead Energy schedules		RTOs / Market Participants
2.8c	Simultaneous with previous step	Other 2 RTOs Energy Schedule Processing	Cross-RTO conflicts	(8c) Notify of cross-RTO conflicts or inconsistencies	Other 2 RTOs Energy Schedule Processing	RTOScheduler	Cross-RTO conflicts		RTOs / Market Participants
2.9	After step 8c	RTOScheduler	Resolve cross-RTO conflicts	(9) Posts resolutions to cross-RTO conflicts and inconsistencies	RTOScheduler	WMI Web Server	Resolved cross-RTO conflicts		User Interface
2.10	After previous step	WMI Web Server	Notify SchedulingCoordinator	(10) Notifies of schedule acceptances and rejections	WMI Web Server	SchedulingCoordinator	Accepted Energy schedules		User Interface

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.11	Upon request by SchedulingCoordinator	SchedulingCoordinator	Revisions to energy schedules	(11) Enter revisions to schedules as needed, until Revision Close	SchedulingCoordinator	WMI Web Server	Revised energy schedules		User Interface

2.2.3 DAES – Steps – Alternative / Exception Sequences

Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

2.2.4 DAES – Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

Actor/Activity	***Post-conditions Description and Results***

2.2.5 DAES – Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number. Double click on the embedded excel file – record the changes and save the excel file (this updates the embedded attachment).

2.2.6 DAES – Current Implementation Status

Describe briefly the current implementation status of the function and/or parts of it, referring to Steps above
Identify the key existing products, standards and technologies

Product/Standard/Technology Eg. DNP 3	***Ref - Usage*** 2.1.2.1[1] - Exchange of SCADA information

Current Implementations:

Relative maturity of function across industry:	***Ref - Status Discussion***
Very mature and widely implemented	
Moderately mature	
Fairly new	Fairly new
Future, no systems, no interactions	

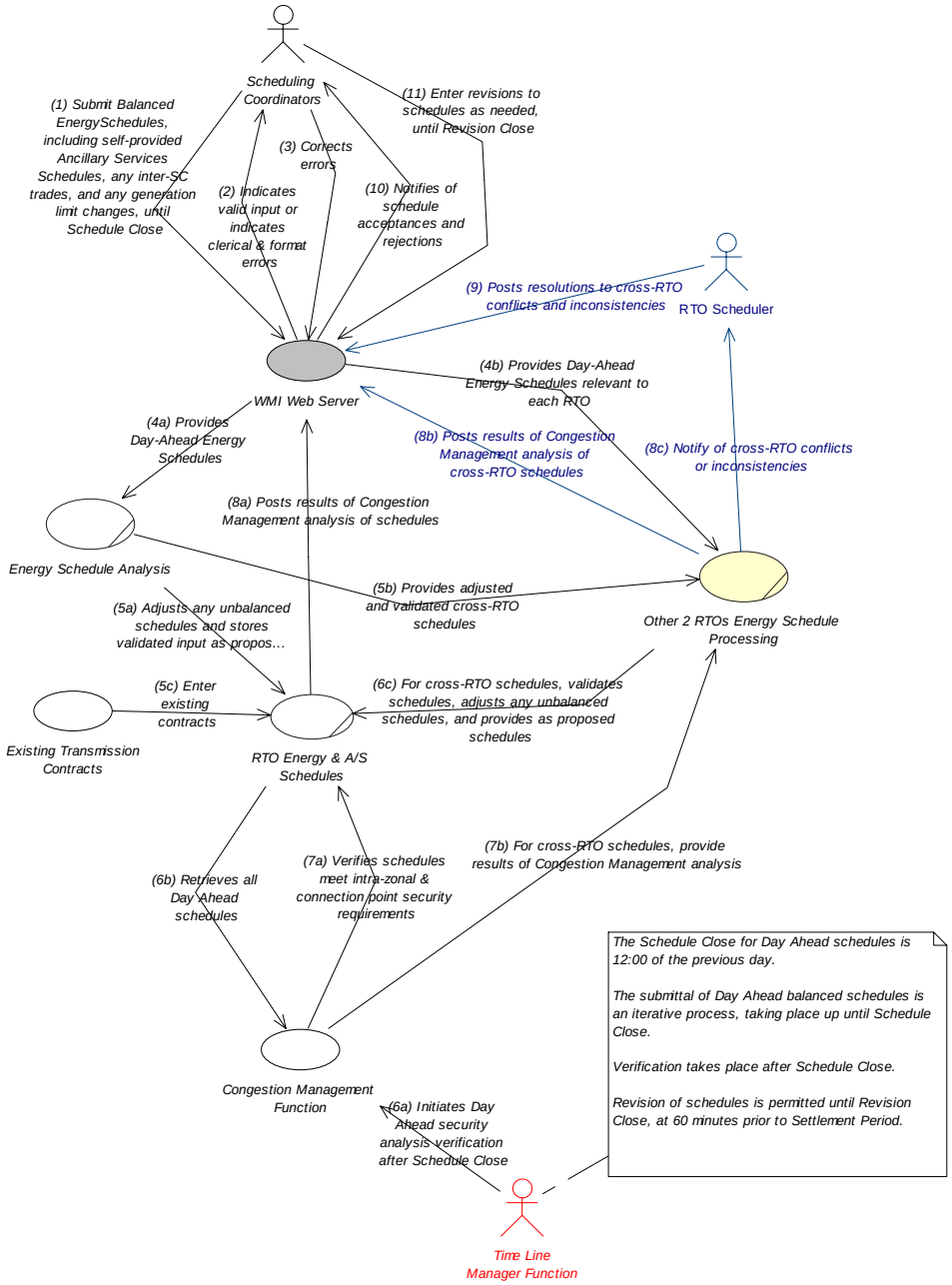
Existence of legacy systems involved in function:	*Ref - Status Discussion*
Many legacy systems	
Some legacy systems	
Few legacy systems	Very few legacy systems
No legacy systems	
Extensive changes will be needed for full functionality	
Moderate changes will be needed	
Few changes will be needed	
No changes will be needed	

Implementation Concerns	*Ref - Status Discussion*
Data availability and accuracy	
Known and unknown market pressures	Could have market pressures changing functionality
Known and unknown technology opportunities	
Validation of capabilities of function	
Cost vs. benefit	

2.2.7 DAES – Diagram

For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.

Day Ahead SCs Submittal of Balanced Energy Schedules - Business Processes



2.3 Day Ahead Submittal of Ancillary Services Bids (DAAS)

2.3.1 DAAS – Preconditions and Assumptions

Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities

Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place

Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be 'filled in but unapproved'.

Actor/System/Information/Contract	***Preconditions or Assumptions***

2.3.2 DAAS – Steps – Normal Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
									Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.
3.1	On-going	SchedulingCoordinator	Submit ancillary services bids	(1) Submit Ancillary Services resources and bid prices, until Schedule Close	SchedulingCoordinator	WMI Web Server	Ancillary services bids		User Interface
3.2	Upon receipt of submittal	WMI Web Server	Validation of A/S bids	(2) Indicates valid input or indicates clerical & format errors	WMI Web Server	SchedulingCoordinator	Validity checks on ancillary services bids		User Interface
3.3	Correction of errors	SchedulingCoordinator	Corrections of A/S bids	(3) Correct errors	SchedulingCoordinator	WMI Web Server	Corrections to ancillary services resources and bid prices		User Interface
3.4a	Enter A/S	WMI Web Server	Enter A/S bids	(4a) Enter A/S resources and bid prices	WMI Web Server	RTO Energy & A/S Schedules	Ancillary services bids		User Interface
3.4b	Notify other RTOs	Other 2 RTOs	Notify other RTOs	(4b) Notify of A/S services accepted by other RTOs	Other 2 RTOs	Ancillary Services Procurement Analysis	Ancillary services bids		RTOs / Market Participants
3.5	Day ahead market close	TimeLineManager	Analyze A/S bids	(5) Initiates Day Ahead A/S analysis at Schedule Close	TimeLineManager	Ancillary Services Procurement Analysis	Ancillary services bids		RTOs / Market Participants

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
3.6	Previous step	Ancillary Services Procurement Analysis	Determine which A/S	(6) Determines which A/S are needed, and calculates either one Market Clearing Price or separate Market Clearing Prices for each Congestion Zone	Ancillary Services Procurement Analysis	RTO Energy & A/S Schedules	Selected A/S bids		RTOs / Market Participants
3.7a	Previous step	RTO Energy & A/S Schedules	Create Balancing Energy Stack	(7a) Creates the Balancing Energy Stack entries for each Settlement Period	RTO Energy & A/S Schedules	Balancing Energy Stack	Selected A/S bids		RTOs / Market Participants
3.7b	Simultaneous with previous step	RTO Energy & A/S Schedules	Post results	(7b) Posts results of selection of A/S resources and the Market Clearing Price	RTO Energy & A/S Schedules	WMI Web Server	Selected A/S bids		RTOs / Market Participants
3.7c	Simultaneous with previous step	RTO Energy & A/S Schedules	Inform other RTOs	(7c) Inform other RTOs of accepted A/S resources	RTO Energy & A/S Schedules	Other 2 RTOs	Selected A/S bids		RTOs / Market Participants
3.8	Previous step	WMI Web Server	Notify SchedulingCoordinator	(8) Notifies of A/S resource status	WMI Web Server	SchedulingCoordinator	Selected A/S bids		User Interface
3.9	Previous step	SchedulingCoordinator	Withdraw A/S	(9) Withdrawal of Ancillary Service resources not yet selected by DStar	SchedulingCoordinator	WMI Web Server	Withdrawn A/S bids		User Interface

2.3.3 DAAS – Steps – Alternative / Exception Sequences

Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

2.3.4 DAAS – Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

Actor/Activity	***Post-conditions Description and Results***

2.3.5 DAAS – Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number. Double click on the embedded excel file – record the changes and save the excel file (this updates the embedded attachment).

2.3.6 DAAS – Current Implementation Status

Describe briefly the current implementation status of the function and/or parts of it, referring to Steps above
Identify the key existing products, standards and technologies

Product/Standard/Technology	***Ref - Usage***
Eg. DNP 3	2.1.2.1[1] - Exchange of SCADA information

Current Implementations:

Relative maturity of function across industry:	***Ref - Status Discussion***
Very mature and widely implemented	
Moderately mature	
Fairly new	Fairly new
Future, no systems, no interactions	

Existence of legacy systems involved in function:	***Ref - Status Discussion***
Many legacy systems	
Some legacy systems	
Few legacy systems	Very few legacy systems
No legacy systems	
Extensive changes will be needed for full functionality	
Moderate changes will be needed	

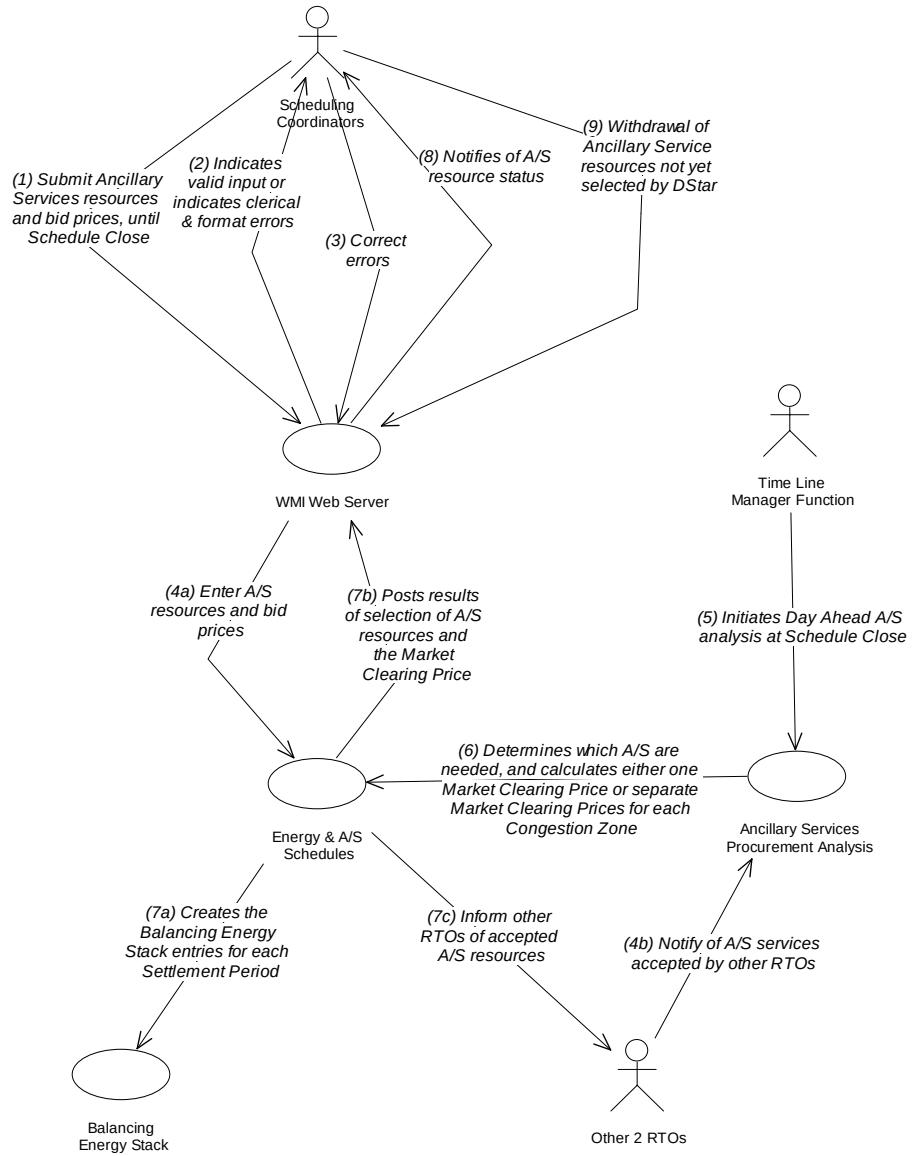
Few changes will be needed
No changes will be needed

Implementation Concerns	*Ref - Status Discussion*
Data availability and accuracy	
Known and unknown market pressures	Could have market pressures changing functionality
Known and unknown technology opportunities	
Validation of capabilities of function	
Cost vs. benefit	

2.3.7 DAAS – Diagram

For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.

Day Ahead SCs Submittal of Ancillary Services Bids (including LGRs) into the Auction Process



2.4 Adjust Energy Schedules (AES)

2.4.1 AES – Preconditions and Assumptions

Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities

Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place

Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be 'filled in but unapproved'.

Actor/System/Information/Contract	***Preconditions or Assumptions***

2.4.2 AES – Steps – Normal Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
									Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.
4.1a	Whenever energy schedules need to be adjusted	SchedulingCoordinator	Submit adjusted schedules	(1a) Submits adjusted schedules for withdrawn RTR and other reasons, during Schedule Adjustment Period	SchedulingCoordinator	WMI Web Server	Adjusted schedules		User Interface
4.1b	Whenever RTRs need to be recalled	SC-FTROwner	Recall RTR	(1b) Recalls RTR (up to 2 hrs before Settlement Period) and submits new schedule using FTR	SC-FTROwner	WMI Web Server	Recalled RTRs New schedule		User Interface
4.2a	After previous step	WMI Web Server	Validation	(2a) Indicates valid input or indicates clerical & format errors	WMI Web Server	SchedulingCoordinator	Validated data		User Interface
4.2b	After validation	WMI Web Server	Reverts RTRs	(2b) Reverts RTR to original owner as FTR	WMI Web Server	TransmissionRightOwnershipDatabase	RTR ownership		RTOs / Market Participants
4.3a	Errors are corrected	SchedulingCoordinator	Error correction	(3a) Correct errors	SchedulingCoordinator	WMI Web Server	Corrected data		User Interface

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
4.3b	After 2b	TransmissionRightOwnershipDatabase	Provide updated FTR	(3b) Provides FTR ownership information	TransmissionRightOwnershipDatabase	RTO Energy & A/S Schedules	FTR ownership data		RTOs / Market Participants
4.4	After 3	WMI Web Server	Store validated input	(4) Stores validated input as proposed schedules	WMI Web Server	RTO Energy & A/S Schedules	Validated input		RTOs / Market Participants
4.5	At specified date and time	TimeLineManager	Initiate security analysis	(5) Initiates security analysis as needed for adjusted schedules	TimeLineManager	CongestionManagementSystem	Energy schedules		RTOs / Market Participants
4.6	After previous step	CongestionManagementSystem	Test for congestion	(6) Verifies schedules meet intra-zonal & connection point security requirements	CongestionManagementSystem	RTO Energy & A/S Schedules	Energy schedules		RTOs / Market Participants
4.7	At specified date and time	RTO Energy & A/S Schedules	Post results	(7) Posts results of FTR ownership and security analysis of schedules	RTO Energy & A/S Schedules	WMI Web Server	Energy schedules		RTOs / Market Participants
4.8	After close of schedule adjustment period	RTO Energy & A/S Schedules	Update operating plan	(8) Updates OperatingPlan after close of Schedule Adjustment period	RTO Energy & A/S Schedules	OperatingPlan	Energy schedules and A/S schedules		RTOs / Market Participants
4.9a	One hour before Settlement Period	OperatingPlan	Review OperatingPlan	(9a) Reviews Final OperatingPlan one hour ahead of Settlement Period	OperatingPlan database	Area & Resource Operation Centers	OperatingPlan		RTOs / Market Participants

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
4.9b	One hour before Settlement Period	OperatingPlan	Review OperatingPlan	(9b) Reviews Final OperatingPlan one hour ahead of Settlement Period	OperatingPlan database	TransmissionOwner	OperatingPlan		RTOs / Market Participants
4.9c	One hour before Settlement Period	OperatingPlan	Provide OperatingPlan	(9c) Provides OperatingPlan to other RTOs	OperatingPlan database	Other 2 RTOs	OperatingPlan		RTOs / Market Participants
4.10a	After previous step	Area & Resource Operation Centers	Confirm OperatingPlan	(10a) Confirms OperatingPlan	Area & Resource Operation Centers	OperatingPlan database	OperatingPlan		RTOs / Market Participants
4.10b		TransmissionOwner	Confirm OperatingPlan	(10b) Confirms OperatingPlan	TransmissionOwner	OperatingPlan database	OperatingPlan		RTOs / Market Participants
4.11	At specific date and time	OperatingPlan database	Post OperatingPlan	(11) Posts public information of OperatingPlan	OperatingPlan database	WMI Web Server	OperatingPlan		RTOs / Market Participants

2.4.3 AES – Steps – Alternative / Exception Sequences

Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

2.4.4 AES – Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

Actor/Activity	***Post-conditions Description and Results***

2.4.5 AES – Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number. Double click on the embedded excel file – record the changes and save the excel file (this updates the embedded attachment).

2.4.6 AES – Current Implementation Status

Describe briefly the current implementation status of the function and/or parts of it, referring to Steps above
Identify the key existing products, standards and technologies

Product/Standard/Technology Eg. DNP 3	***Ref - Usage*** 2.1.2.1[1] - Exchange of SCADA information

Current Implementations:

Relative maturity of function across industry:	***Ref - Status Discussion***
Very mature and widely implemented	
Moderately mature	
Fairly new	Fairly new
Future, no systems, no interactions	

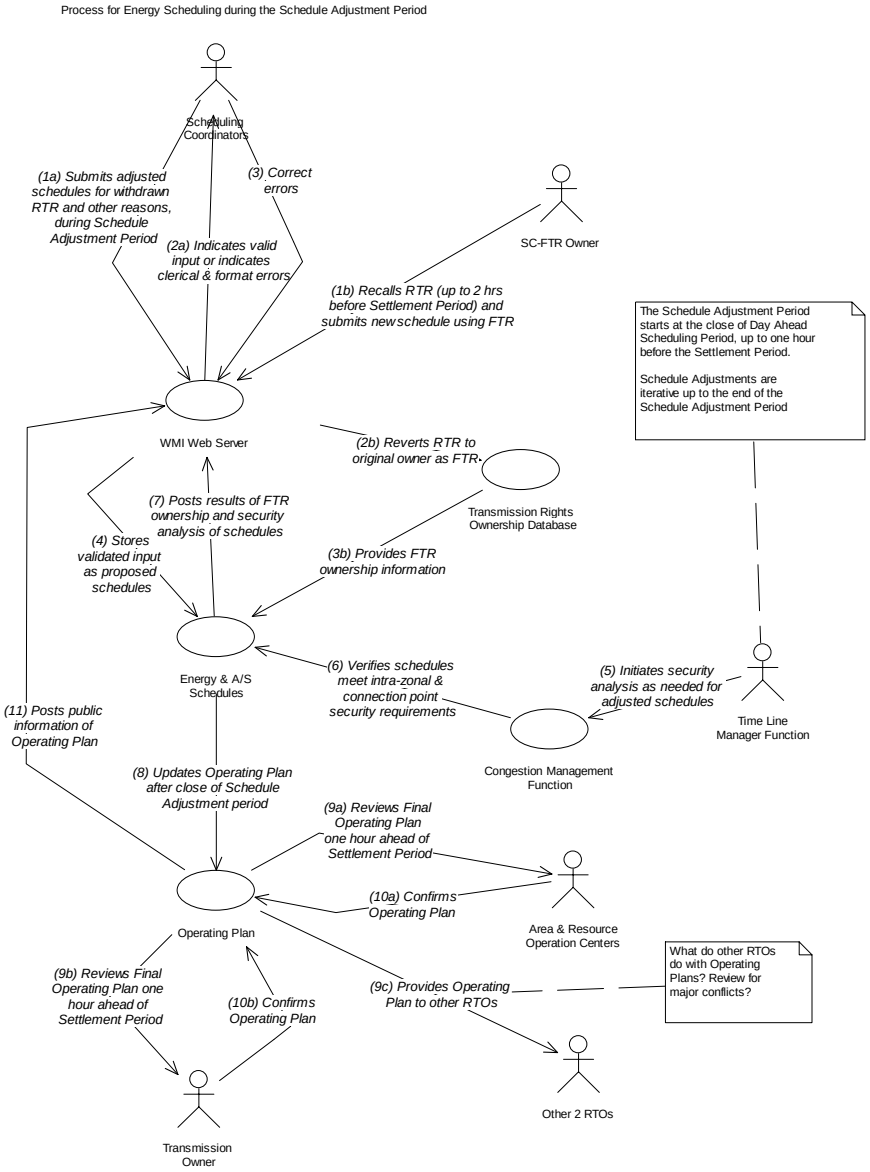
Existence of legacy systems involved in function:	***Ref - Status Discussion***
Many legacy systems	
Some legacy systems	
Few legacy systems	Very few legacy systems
No legacy systems	
Extensive changes will be needed for full functionality	
Moderate changes will be needed	
Few changes will be needed	

No changes will be needed

Implementation Concerns	*Ref - Status Discussion*
Data availability and accuracy	
Known and unknown market pressures	Could have market pressures changing functionality
Known and unknown technology opportunities	
Validation of capabilities of function	
Cost vs. benefit	

2.4.7 AES – Diagram

For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.


Process for Energy Scheduling during the Schedule Adjustment Period
Scheduling Coordinators
(1a) Submits adjusted schedules for withdrawn RTR and other reasons, during Schedule Adjustment Period
(2a) Indicates valid input or indicates clerical & format errors
(3) Correct errors
SC-FTR Owner
(1b) Recalls RTR (up to 2 hrs before Settlement Period) and submits newschedule using FTR
The Schedule Adjustment Period starts at the close of Day Ahead Scheduling Period, up to one hour before the Settlement Period.
Schedule Adjustments are iterative up to the end of the Schedule Adjustment Period
WMI Web Server
(2b) Reverts RTR to original owner as FTR.
Transmission Rights Ownership Database
(7) Posts results of FTR ownership and security analysis of schedules
(4) Stores validated input as proposed schedules
(3b) Provides FTR ownership information
Energy & A/S Schedules
(6) Verifies schedules meet intra-zonal & connection point security requirements
(5) Initiates security analysis as needed for adjusted schedules
Time Line Manager Function
(11) Posts public information of Operating Plan
Congestion Management Function
(8) Updates Operating Plan after close of Schedule Adjustment period
(9a) Reviews Final Operating Plan one hour ahead of Settlement Period
(10a) Confirms Operating Plan
Area & Resource Operation Centers
Operating Plan
(9b) Reviews Final Operating Plan one hour ahead of Settlement Period
(10b) Confirms Operating Plan
(9c) Provides Operating Plan to other RTOs
What do other RTOs do with Operating Plans? Review for major conflicts?
Other 2 RTOs
Transmission Owner

2.5 Adjust Ancillary Services (AAS)

2.5.1 AAS – Preconditions and Assumptions

Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities

Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place

Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be 'filled in but unapproved'.

Actor/System/Information/Contract	***Preconditions or Assumptions***

2.5.2 AAS – Steps – Normal Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
									Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.
5.1	Anytime up to 30 minutes before Settlement Period	SchedulingCoordinator	Submit one-time A/S bids	(1) Submittal of one-time Bids for Ancillary Services up to 30 minutes before Settlement Period	SchedulingCoordinator	WMI Web Server	A/S bids		User Interface
5.2	After previous step	WMI Web Server	Validate	(2) Indicates valid input or indicates clerical & format errors	WMI Web Server	SchedulingCoordinator	Error indications		User Interface
5.3	After previous step	SchedulingCoordinator	Correct errors	(3) Correct errors	SchedulingCoordinator	WMI Web Server	Corrected A/S bids		User Interface
5.4a	After previous step	WMI Web Server	Enter A/S bids	(4a) Enter A/S resources and bid prices	WMI Web Server	RTO Energy & A/S Schedules	A/S bids		RTOs / Market Participants
5.4b		Other 2 RTOs	Notify of accepted A/S bids	(4b) Notify of A/S services accepted by other RTOs	Other 2 RTOs	Ancillary Services Procurement Analysis	Accepted A/S bids		RTOs / Market Participants

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
5.5a	After previous step	Data Acquisition and Control (DAC) Subsystem	Indicate possible need for A/S services	(5a) Indicate probable need for additional A/S resources	Data Acquisition and Control (DAC) Subsystem	Ancillary Services Procurement Analysis	Indication of need for A/S		RTOs / Market Participants
5.5b		Balancing Energy Stack	Indicate possible need for A/S services	(5b) Indicate probable need for additional A/S resources	Balancing Energy Stack	Ancillary Services Procurement Analysis	Indication of need for A/S		RTOs / Market Participants
5.6	After previous step	Ancillary Services Procurement Analysis	Determine needed A/S	(6) Determines need for additional A/S resources, and selects lowest bids	Ancillary Services Procurement Analysis	RTO Energy & A/S Schedules	Selected A/S schedules		RTOs / Market Participants
5.7a	After previous step	RTO Energy & A/S Schedules	Post	(7a) Posts selected A/S resources	RTO Energy & A/S Schedules	WMI Web Server	Selected A/S schedules		RTOs / Market Participants
5.7b		RTO Energy & A/S Schedules	Provide A/S	(7b) Provides selected A/S resources	RTO Energy & A/S Schedules	Balancing Energy Stack	Selected A/S schedules		RTOs / Market Participants
5.7c		RTO Energy & A/S Schedules	Inform RTOs	(7c) Inform other RTOs of selected A/S resources	RTO Energy & A/S Schedules	Other 2 RTOs	Selected A/S schedules		RTOs / Market Participants
5.8	After previous step	WMI Web Server	Notify	(8) Notifies of A/S resource status	WMI Web Server	SchedulingCoordinator	Selected A/S schedules		User Interface
5.9	Anytime after previous step	SchedulingCoordinator	Withdraw A/S	(9) Can withdraw Ancillary Service bids if not already selected by RTO	SchedulingCoordinator	WMI Web Server	Withdrawn A/S		User Interface

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
5.10	After previous step	WMI Web Server	Notify	(10) Notify other RTOs of withdrawn A/S bids	WMI Web Server	Other 2 RTOs	Withdrawn A/S		RTOs / Market Participants

2.5.3 AAS – Steps – Alternative / Exception Sequences

Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

2.5.4 AAS – Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

Actor/Activity	***Post-conditions Description and Results***

2.5.5 AAS – Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number. Double click on the embedded excel file – record the changes and save the excel file (this updates the embedded attachment).

2.5.6 AAS – Current Implementation Status

Describe briefly the current implementation status of the function and/or parts of it, referring to Steps above
Identify the key existing products, standards and technologies

Product/Standard/Technology	***Ref - Usage***
Eg. DNP 3	2.1.2.1[1] - Exchange of SCADA information

Current Implementations:

Relative maturity of function across industry:	***Ref - Status Discussion***
Very mature and widely implemented	
Moderately mature	
Fairly new	Fairly new
Future, no systems, no interactions	

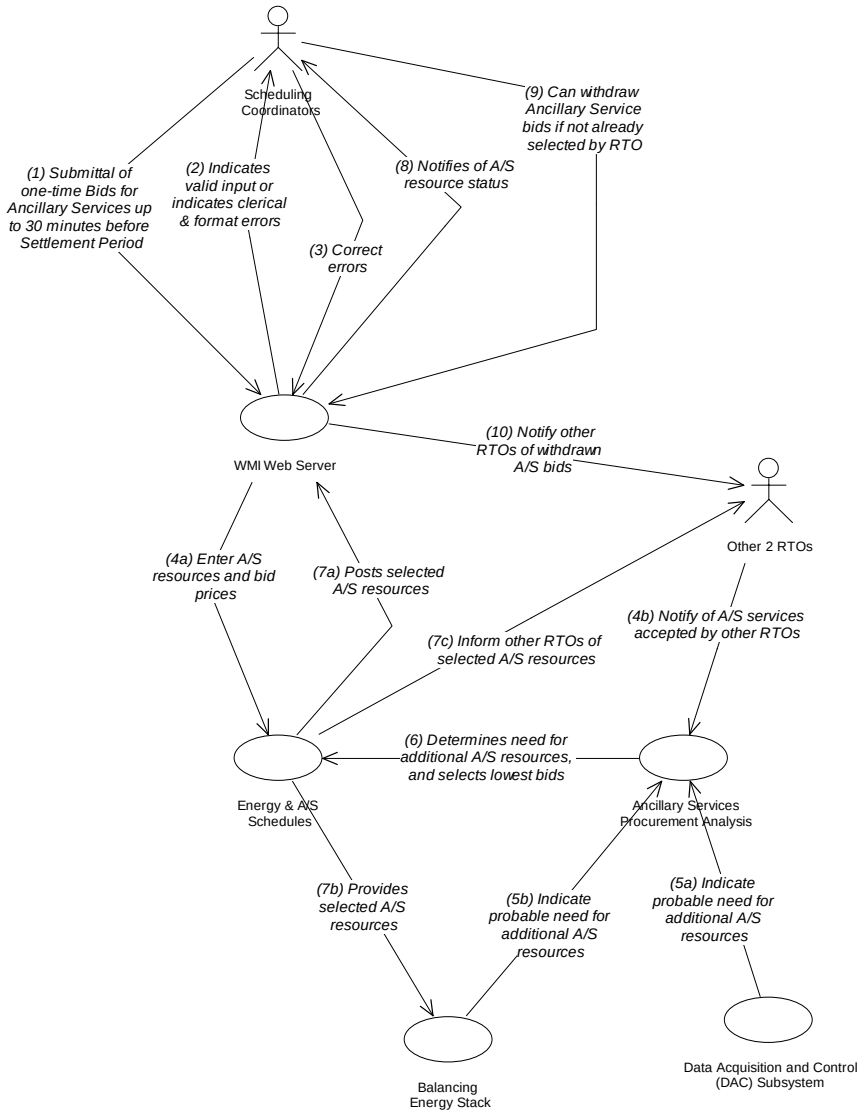
Existence of legacy systems involved in function:	*Ref - Status Discussion*
Many legacy systems	
Some legacy systems	
Few legacy systems	Very few legacy systems
No legacy systems	
Extensive changes will be needed for full functionality	
Moderate changes will be needed	
Few changes will be needed	
No changes will be needed	

Implementation Concerns	*Ref - Status Discussion*
Data availability and accuracy	
Known and unknown market pressures	Could have market pressures changing functionality
Known and unknown technology opportunities	
Validation of capabilities of function	
Cost vs. benefit	

2.5.7 AAS – Diagram

For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.

Auction of Ancillary Services (including LGRs) during Schedule Adjustment Period



2.6 NERC E-Tagging Management (ETAG)

2.6.1 ETAG – Preconditions and Assumptions

Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities

Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place

Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be 'filled in but unapproved'.

Actor/System/Information/Contract	***Preconditions or Assumptions***

2.6.2 ETAG – Steps – Normal Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
									Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.
6.1	At appropriate times	SchedulingCoordinator	Submit tags	(1) Submit tags to Tag Authority	SchedulingCoordinator	Tag Authority	Etag information		User Interface
6.2	After previous step	Tag Authority	Submit tags	(2) Submit all tags requiring RTO approval	Tag Authority	WMI Web Server	Etag information		RTOs / Market Participants
6.3	After previous step	WMI Web Server	Submit tags	(3) Submit tags for validation and approval	WMI Web Server	Tag Approval Service	Etag information		RTOs / Market Participants
6.4	After previous step	RTO Energy & A/S Schedules	Provide approval status	(4) Provide approval status of energy schedules and ancillary services procurements	RTO Energy & A/S Schedules	Tag Approval Service	Etag information		RTOs / Market Participants
6.5	After previous step	Tag Approval Service	Provide approval status	(5) Indicate status of tags, based on status of energy and A/S schedules	Tag Approval Service	WMI Web Server	Etag information		RTOs / Market Participants
6.6	After previous step	WMI Web Server	Submit tags	(6) Send updated tag information	WMI Web Server	Tag Authority	Etag information		RTOs / Market Participants
6.7	After previous step	Tag Authority	Submit tags	(7) Submit tagging information to NERC	Tag Authority	NERC	Etag information		Inter-Corporation

2.6.3 ETAG – Steps – Alternative / Exception Sequences

Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

2.6.4 ETAG – Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

Actor/Activity	***Post-conditions Description and Results***

2.6.5 ETAG – Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number. Double click on the embedded excel file – record the changes and save the excel file (this updates the embedded attachment).

2.6.6 ETAG – Current Implementation Status

Describe briefly the current implementation status of the function and/or parts of it, referring to Steps above
Identify the key existing products, standards and technologies

Product/Standard/Technology	***Ref - Usage***
Eg. DNP 3	2.1.2.1[1] - Exchange of SCADA information

Current Implementations:

Relative maturity of function across industry:	***Ref - Status Discussion***
Very mature and widely implemented	
Moderately mature	
Fairly new	Fairly new
Future, no systems, no interactions	

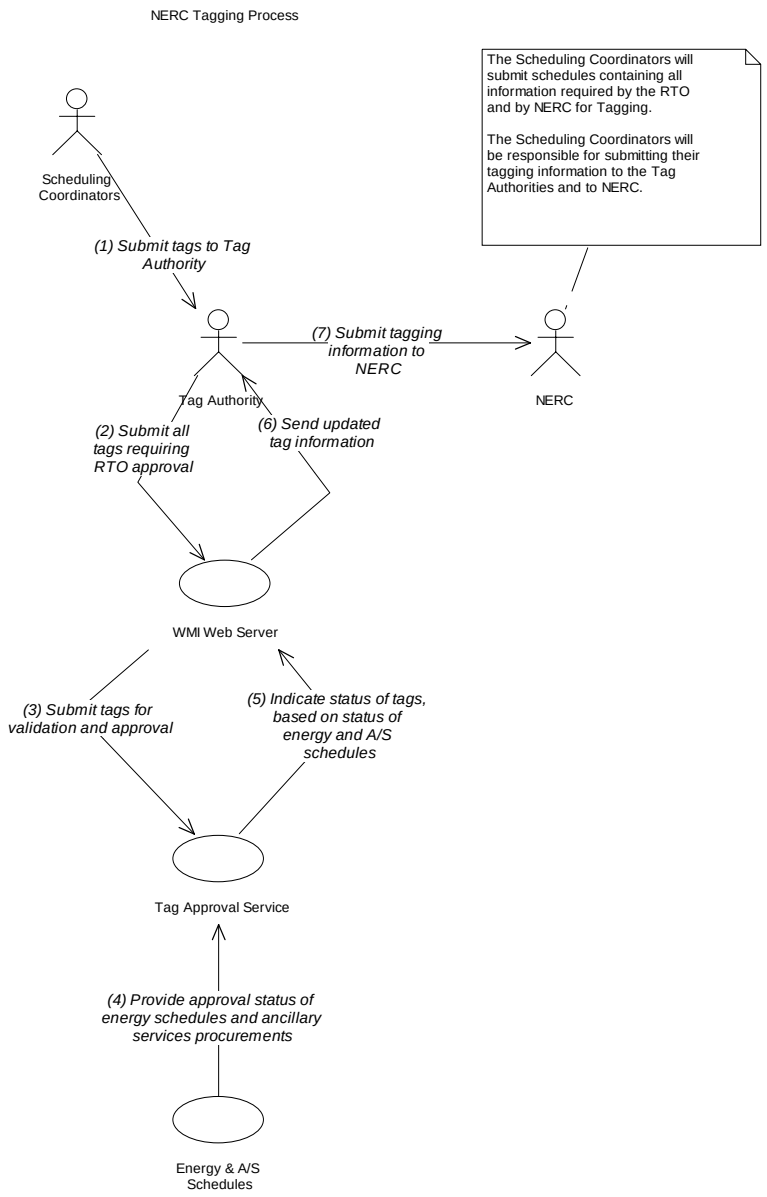
Existence of legacy systems involved in function:	***Ref - Status Discussion***
Many legacy systems	
Some legacy systems	
Few legacy systems	Very few legacy systems
No legacy systems	

Extensive changes will be needed for full functionality	
Moderate changes will be needed	
Few changes will be needed	
No changes will be needed	

Implementation Concerns	*Ref - Status Discussion*
Data availability and accuracy	
Known and unknown market pressures	Could have market pressures changing functionality
Known and unknown technology opportunities	
Validation of capabilities of function	
Cost vs. benefit	

2.6.7 ETAG – Diagram

For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.


NERC Tagging Process
The Scheduling Coordinators will submit schedules containing all information required by the RTO and by NERC for Tagging.
The Scheduling Coordinators will be responsible for submitting their tagging information to the Tag Authorities and to NERC.
Scheduling Coordinators
(1) Submit tags to Tag Authority
Tag Authority
(7) Submit tagging information to NERC
NERC
(2) Submit all tags requiring RTO approval
(6) Send updated tag information
WMI Web Server
(3) Submit tags for validation and approval
(5) Indicate status of tags, based on status of energy and A/S schedules
Tag Approval Service
(4) Provide approval status of energy schedules and ancillary services procurements
Energy & A/S Schedules

3 Auxiliary Issues

3.1 References and contacts

Documents and individuals or organizations used as background to the function described; other functions referenced by this function, or acting as "sub" functions; or other documentation that clarifies the requirements or activities described. All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work must be so noted.

ID	Title or contact	Reference or contact information
[1]		
[2]		

3.2 Action Item List

As the function is developed, identify issues that still need clarification, resolution, or other notice taken of them. This can act as an Action Item list.

ID	Description	Status
[1]		
[2]		

3.3 Revision History

For reference and tracking purposes, indicate who worked on describing this function, and what aspect they undertook.

No	Date	Author	Description
0.	Feb 27, 2004	Frances Cleveland	

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