Use Case 15: Volt Var Optimization

Summary:

Provide Volt-Var optimization through capacitor bank control when there is a Kvar limit excursion on an analog measurement.

Actor(s):

Name	Role description
System Operator	Monitors and controls system operation
Telemetry Interface	Provides telemetry data in the form of analog measurements, status, or accumulator data from substation, neighboring control center, or field device
Controls Interface	Implements control requests in the field (may be same as Telemetry Interface)

Participating Systems:

System	Services or information provided
User Interface	Handles operator communication.
Control Coordinator	Manages control requests.
Power System State Model	Creates the best estimate of current state of the power system.
Alarm System	Forces notifications to the human user's attention.
History/Logging	Records power system events.
Network Applications	Applications to ensure network security and reliability

Pre-conditions:

System is operational.

Assumptions / Design Considerations:

None

Normal Sequence:

2 Use Case Step	Description
Step 1	New raw measurement set is made available.
Step 2	Measurements are associated with the power system model, which is reevaluated.
Step 3	New model state is made available.
Step 4	Status changes in the new state are made available, such as: • Branches open or closed • Equipment energized or deenergized • Islands created or combined • Limits crossed
Step 5	Active user interfaces are updated.
Step 6	All power system changes are logged. • For reporting • For reconstruction of state if required
Step 7	If there is a Kvar limit excursion, an alarm is generated and the excursion is evaluated to determine if there is a need for a capacitor bank control action
Step 8	The System Operator is sent an alarm notifying him of the Kvar limit excursion and a request for a capacitor bank control action
Step 9	The System Operator issues a capacitor bank field control request
Step 10	Request in progress is noted at the user's console and is logged.
Step 11	The control request is examined for: • permission to execute the request • conflicts with other controls • who should handle the request
Step 12	The field control request is issued to Controls Interface and is logged.
Step 13	Request in progress is noted in the power system model.
Step 14	Field status change is detected and reported back by Telemetry Interface. (Perhaps through the normal data update channels, except that the power system model observes that this change was requested.) **Exception:** Field control request is not executed
Step 15	User interfaces are updated.
Step 16	Change is logged.

Exceptions / Alternate Sequences:

If the field control request is not executed, the System Operator is notified including the reason if known.

Post-conditions:

Operation model and active displays updated

References:

- Extends the SCADA Data Update use case.
- Uses the Field Control Request use case.

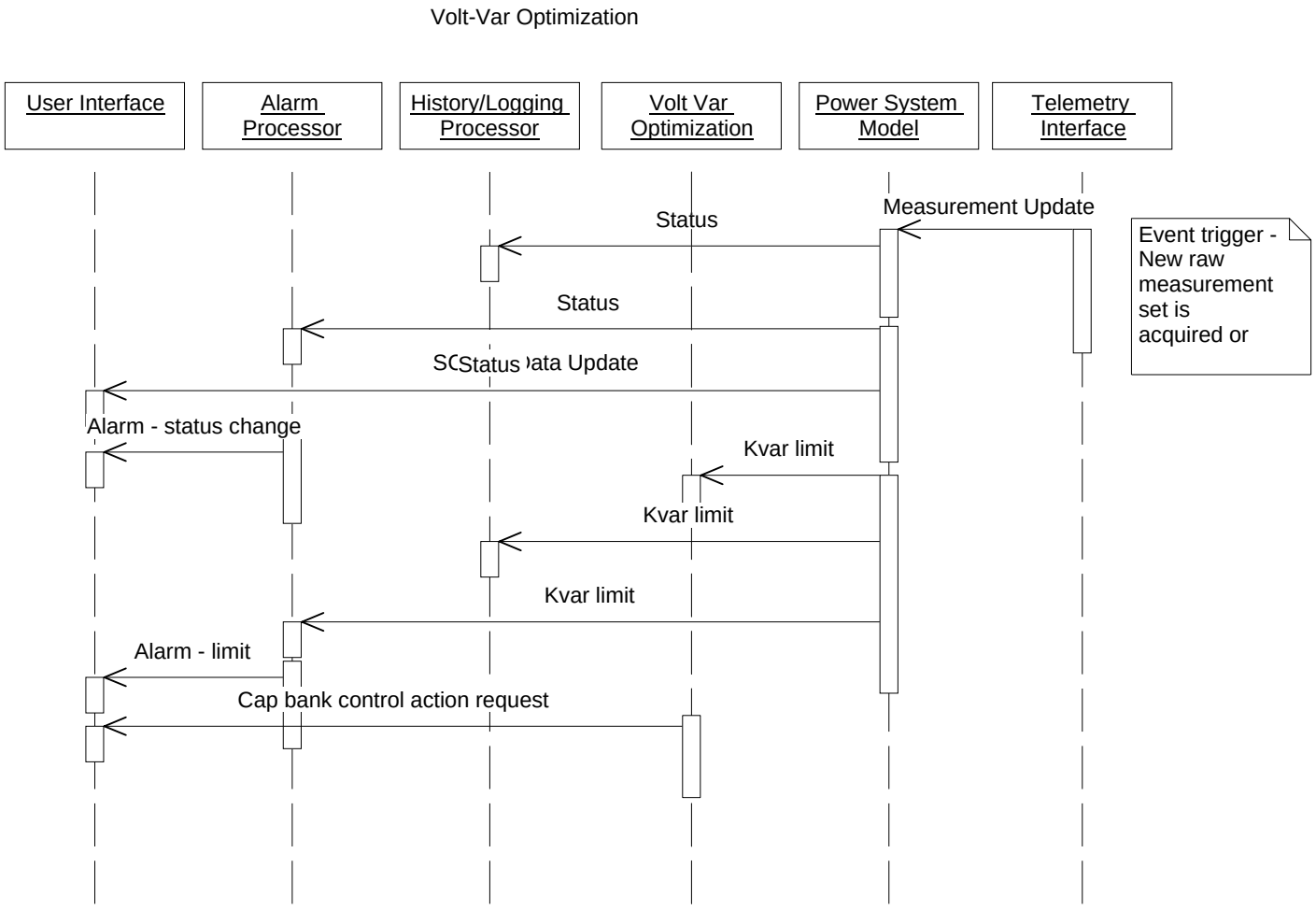
Issues:

ID	Description	Status
1.		

Revision History:

No	Date	Author	Description
0.	3/11/98	T. Saxton	Original
1	3/19/97	T. Saxton	Added Controls Interface

Event Sequence Diagram:



"Uses" Field Control Request

Use Case Diagram: