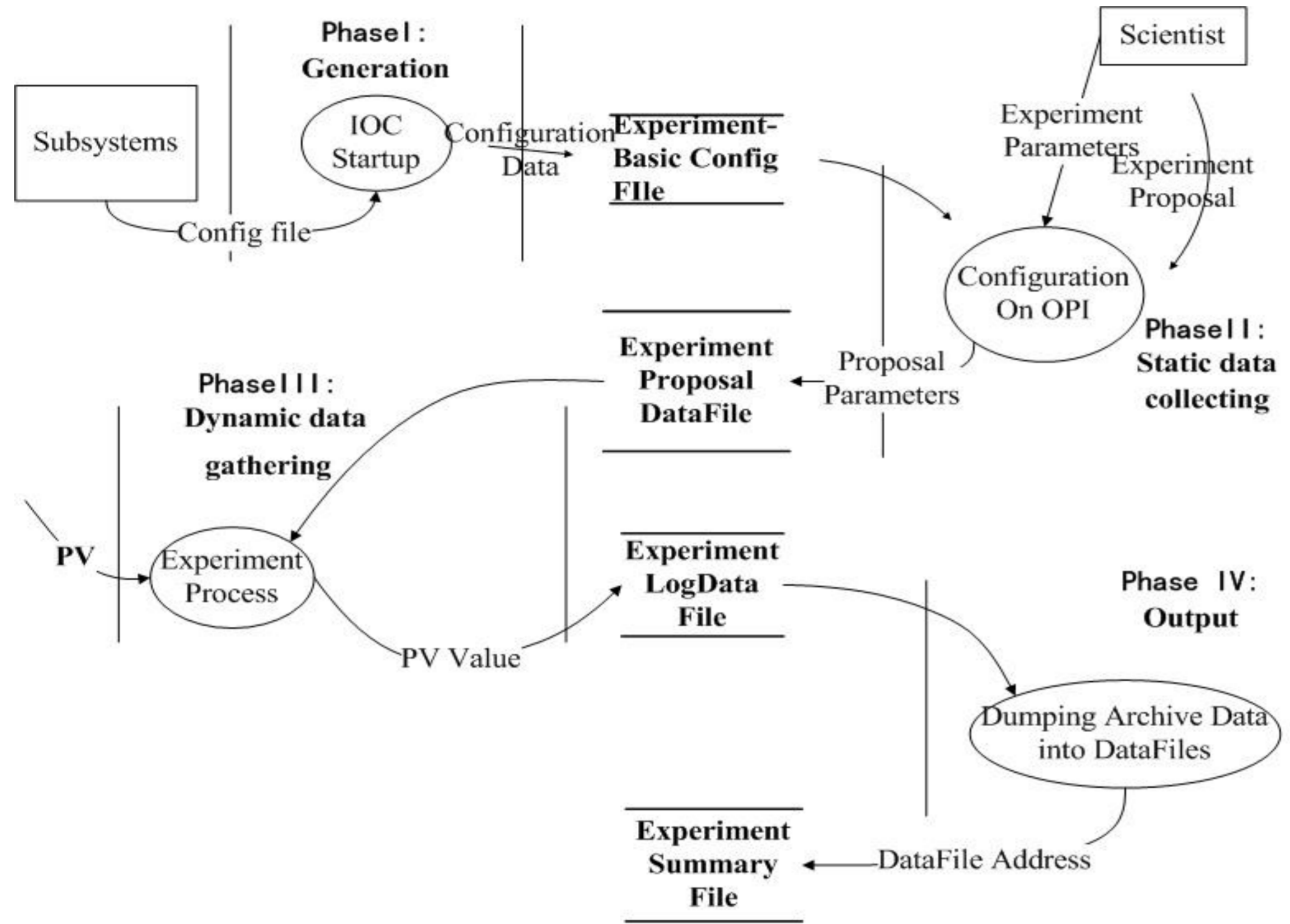


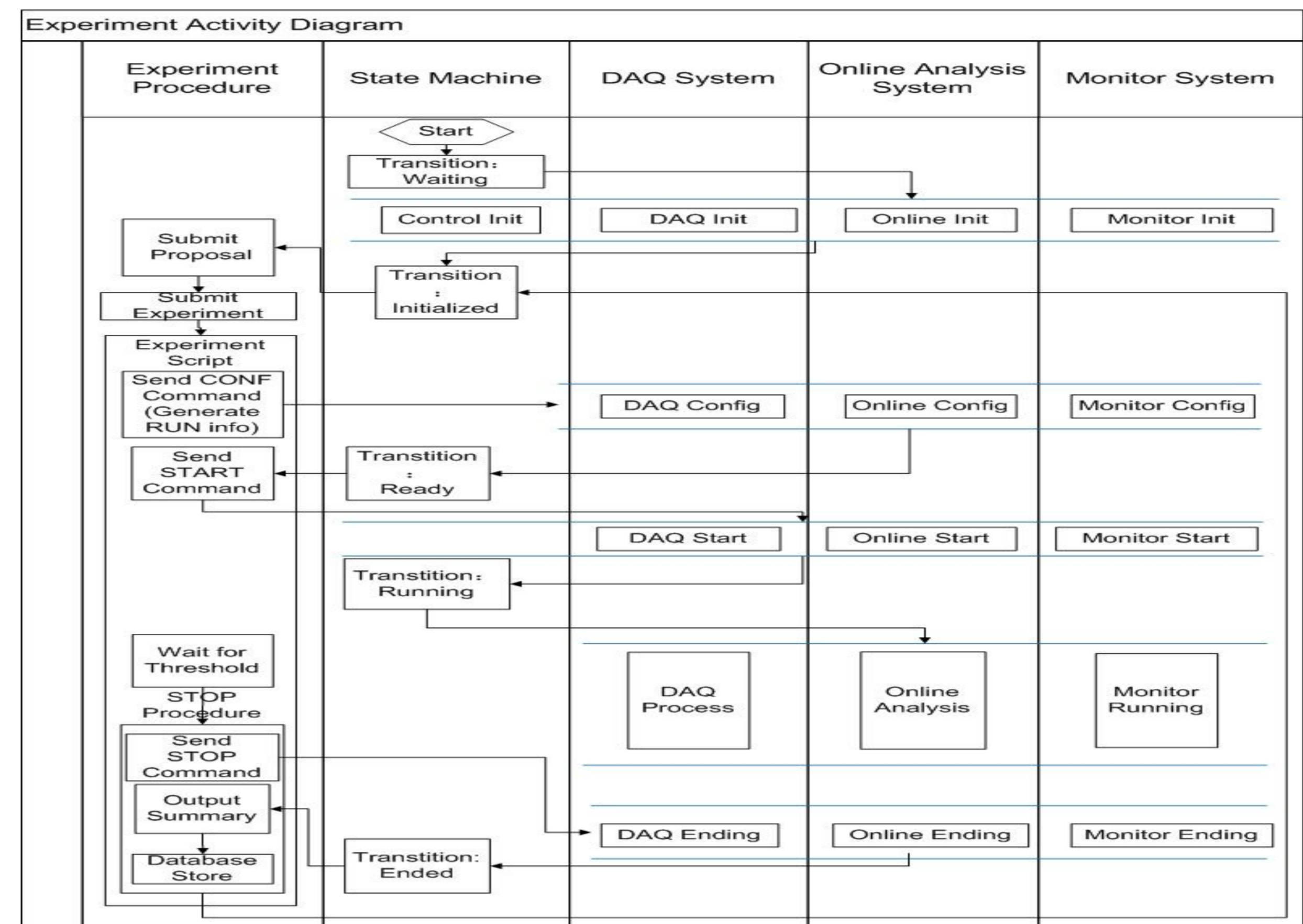
STATE MACHINE DESIGN FOR CSNS EXPERIMENT CONTROL SYSTEM

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CSNS Experiment Control System works as an overall controller of all standalone modules such as DAQ, online Analysis, Detectors and Monitors

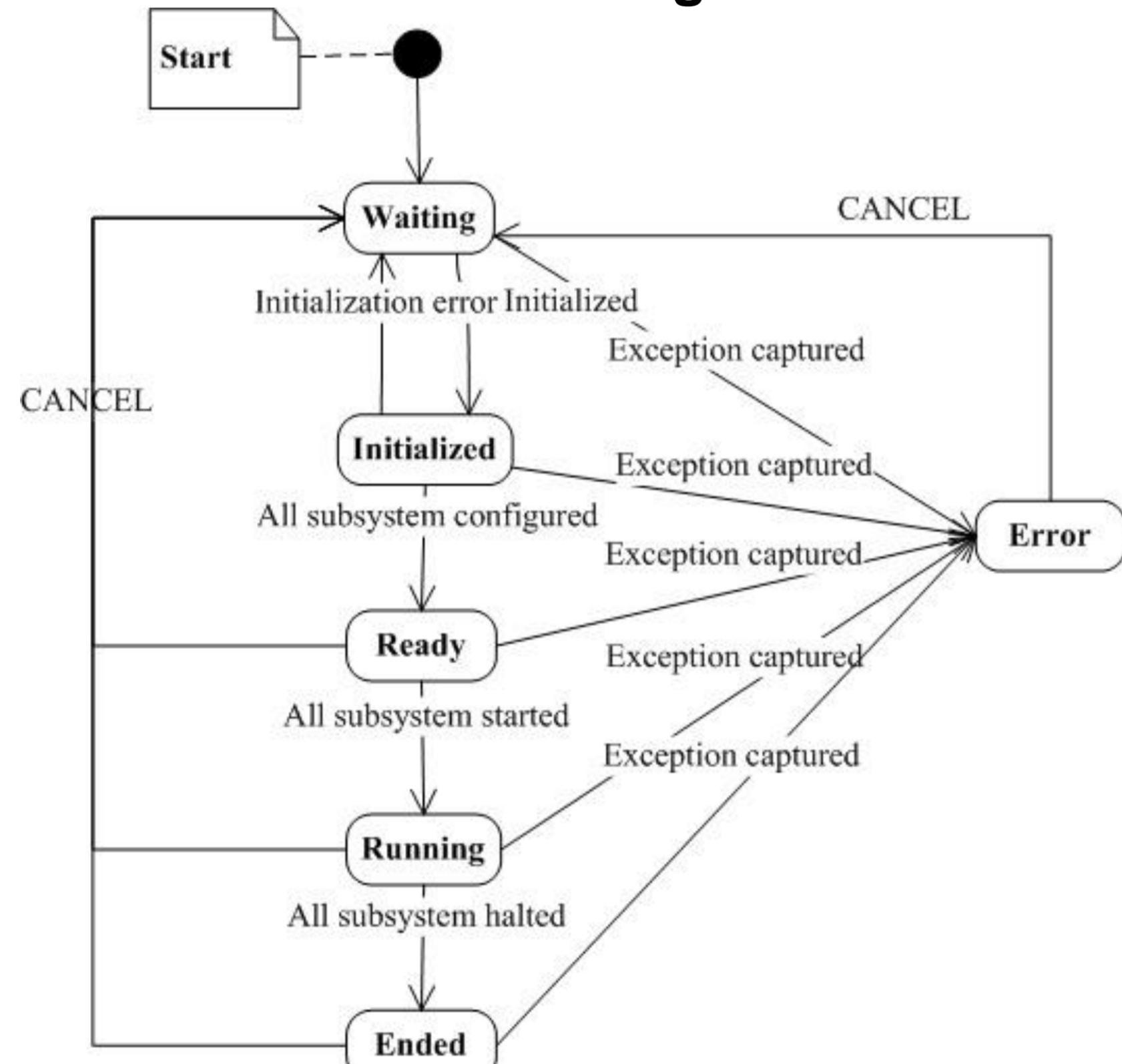


Data Flow of CSNS Experimental Control



Interactive Process of CSNS Experiment Control

State Diagram



State diagram illustrates the design of the state machine that includes the states of Waiting, Initialized, Ready, Running, Ended and Error. Each state represents one phase of the experiment.

- Waiting state is a 'head state' when state machine start-up or reset up. It will unconditionally transit to the Initialized state.
- Initialized state means the control system and all the other subsystems are ready for configuration.
- Ready state indicates that the experiment data can be acquired for online analysis.
- Running state shows that all the experiment system is running.
- Ended state means DAQ has already stopped. All the experiment data is analyzed.
- In the above each state, any exception or fault occurred, control system state will make a transition to Error, waiting for manually handling.

States\Events	Waiting	Initialized	Ready	Running	Ended	Error
/	Initialized					Waiting
CONF signaled		Ready				Waiting
Online Analysis startup			Running			Waiting
START signaled				Running		Waiting
DAQ startup				Running		Waiting
STOP signaled					Ended	Waiting
DAQ stopped					Ended	Waiting
EXIT signaled					Initialized	Waiting
Online Analysis stop					Initialized	Waiting
CANCEL Signaled						Waiting
Error occurred	Error	Error	Error	Error	Error	Error

State Transition Table

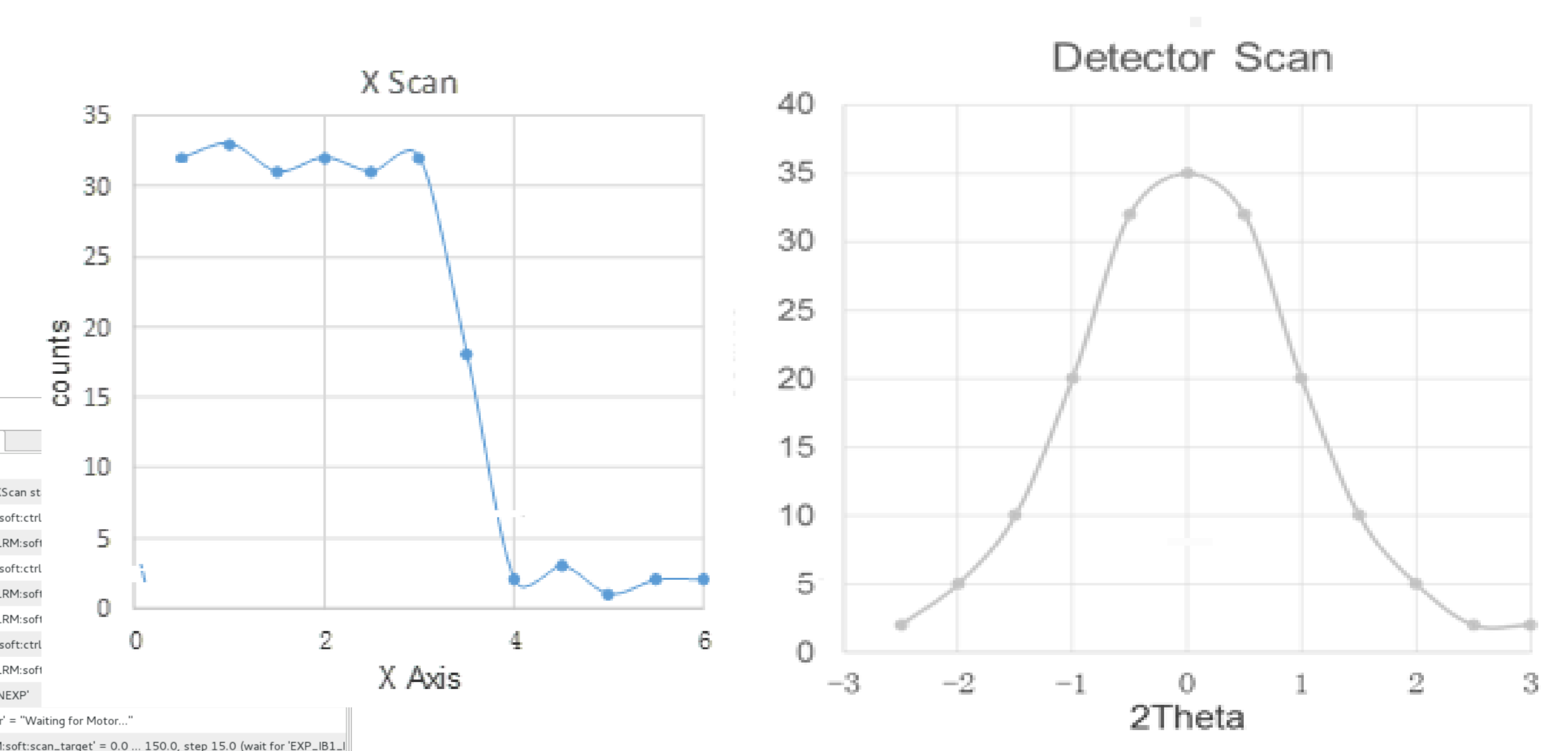
Commands Table

DEFINITION	COMMANDS
Start Online Analysis	CONF
Start DAQ system	START
Stop DAQ system	STOP
Stop Online Analysis	EXIT
Reset all states	CANCEL

Experiment Control UI

Experiment Process

Scan Process with State Machine



The Scan Experiment Data Plot