Purpose:

The diagrams below are meant to describe the simplest process used to generate a normalized data set in real units (normalized counts vs. lambda).

Normally after this data set is generated it would be viewed graphically (mainly for diagnostic purposes) and/or kept for further processing. Further data processing for example may include but is not limited to conversion to q-space.

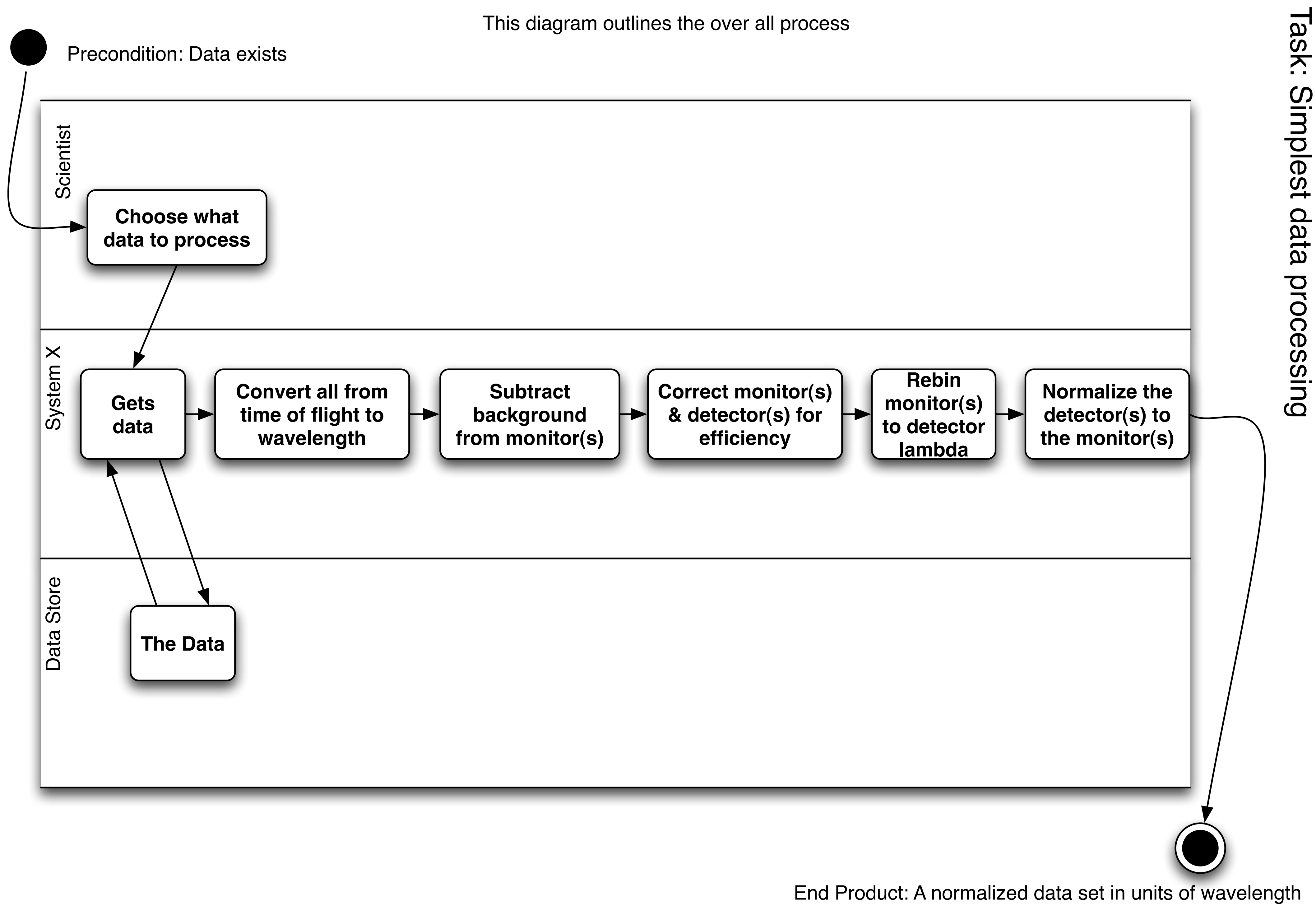
Required information:

* The particular data to process (Scientist)

  From the data we will need the following:
    * Time channel boundary array (Experimental Raw Data)
    * The detector distances (Instrument Parameters)

If we treat this as a "Filter" then it makes sense to add the *Detector count array (Experimental Raw Data)* so that at the end of the "Filter" we have complete data set which can be easily viewed by the visualization component of the software.

The exact nature of this diagram can only be decided once we know that math facilities we have. For now I'll assume the bare minimum and build the calculation from the list provided by Keith.



Task: Simplest data processing
This diagram outlines the over all process
Precondition: Data exists
Scientist
System X
Data Store
Choose what data to process
Gets data
Convert all from time of flight to wavelength
Subtract background from monitor(s)
Correct monitor(s) & detector(s) for efficiency
Rebin monitor(s) to detector lambda
Normalize the detector(s) to the monitor(s)
The Data
End Product: A normalized data set in units of wavelength

Precondition: Time channel boundaries for each detector and detector distances. Assuming a convenient set of units

Task: Apply Conversion

Required conversion equation: (In other cases this may be more complicated algorithm)

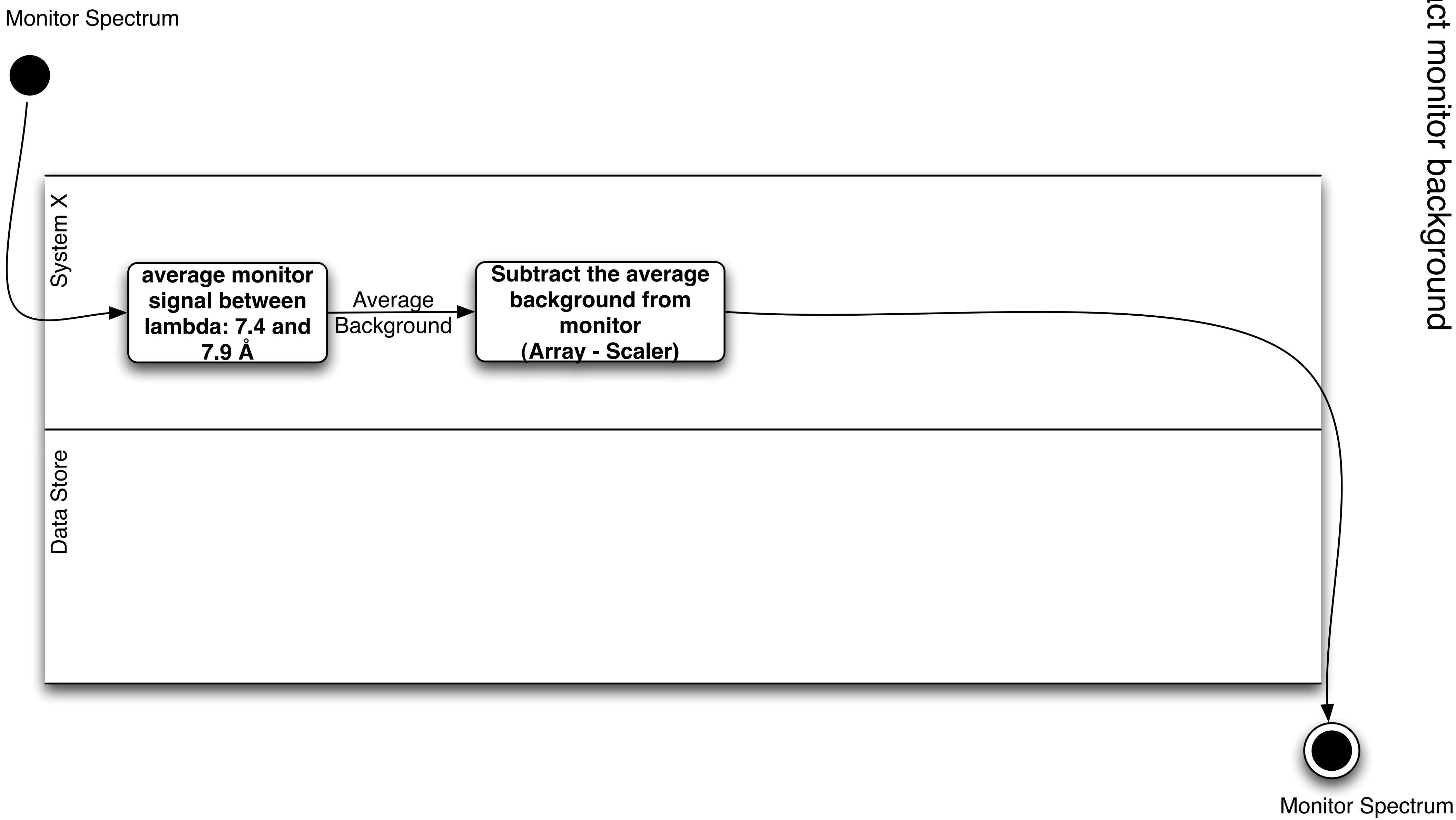
Lambda = time * h / mn / Distance

Here h = plancks constant (Scaler)
mn = Mass of the neutron (Scaler)
Distance = Distance to the detector(s) (array 1-D, [Nx1])
time = Time in seconds associated with each detector (array, 1-D, [1xM])
lambda = the wavelengths (array, 2-D [NxM])

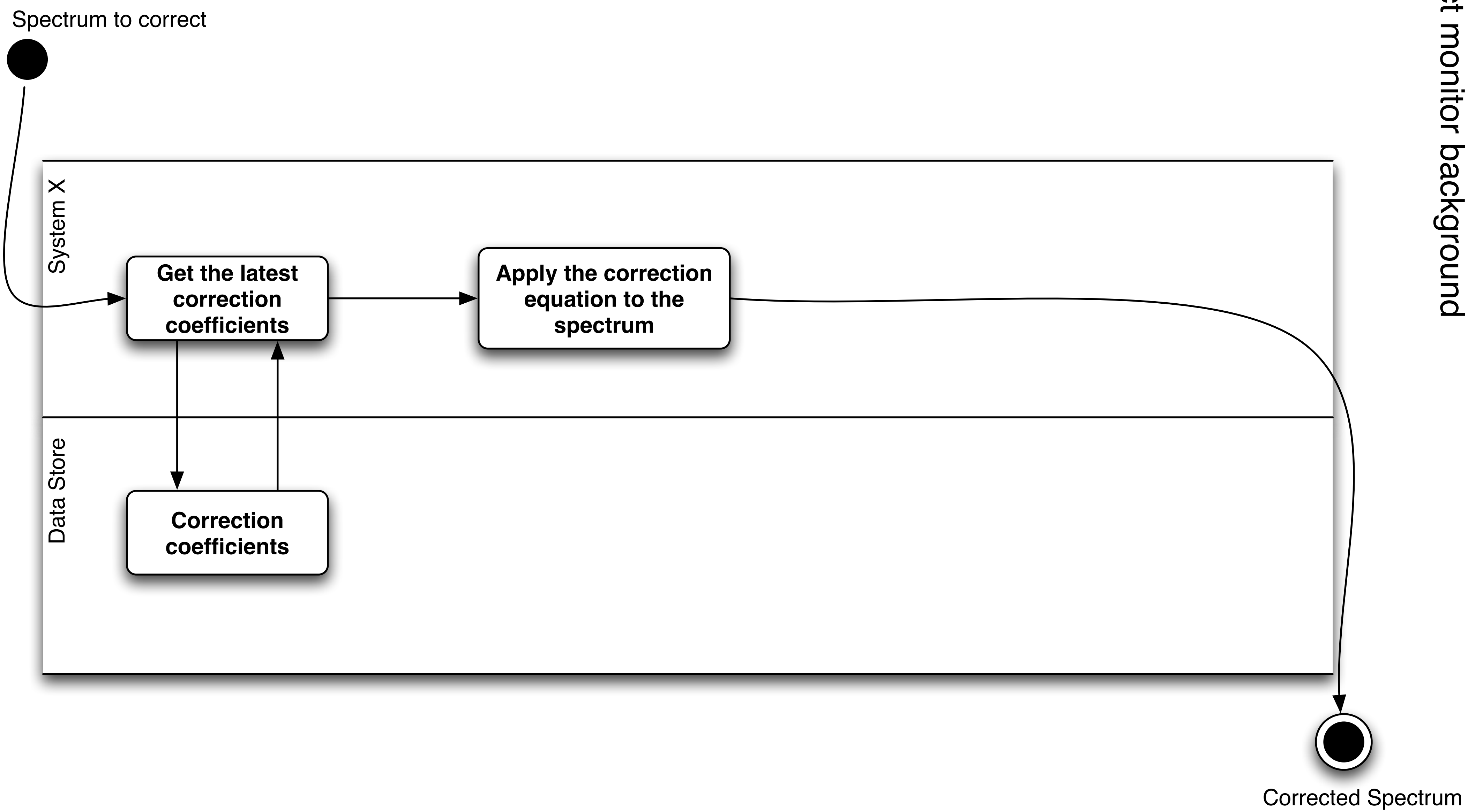
N= number of detectors and M=number of time points

End Product: A data set in terms of lambda

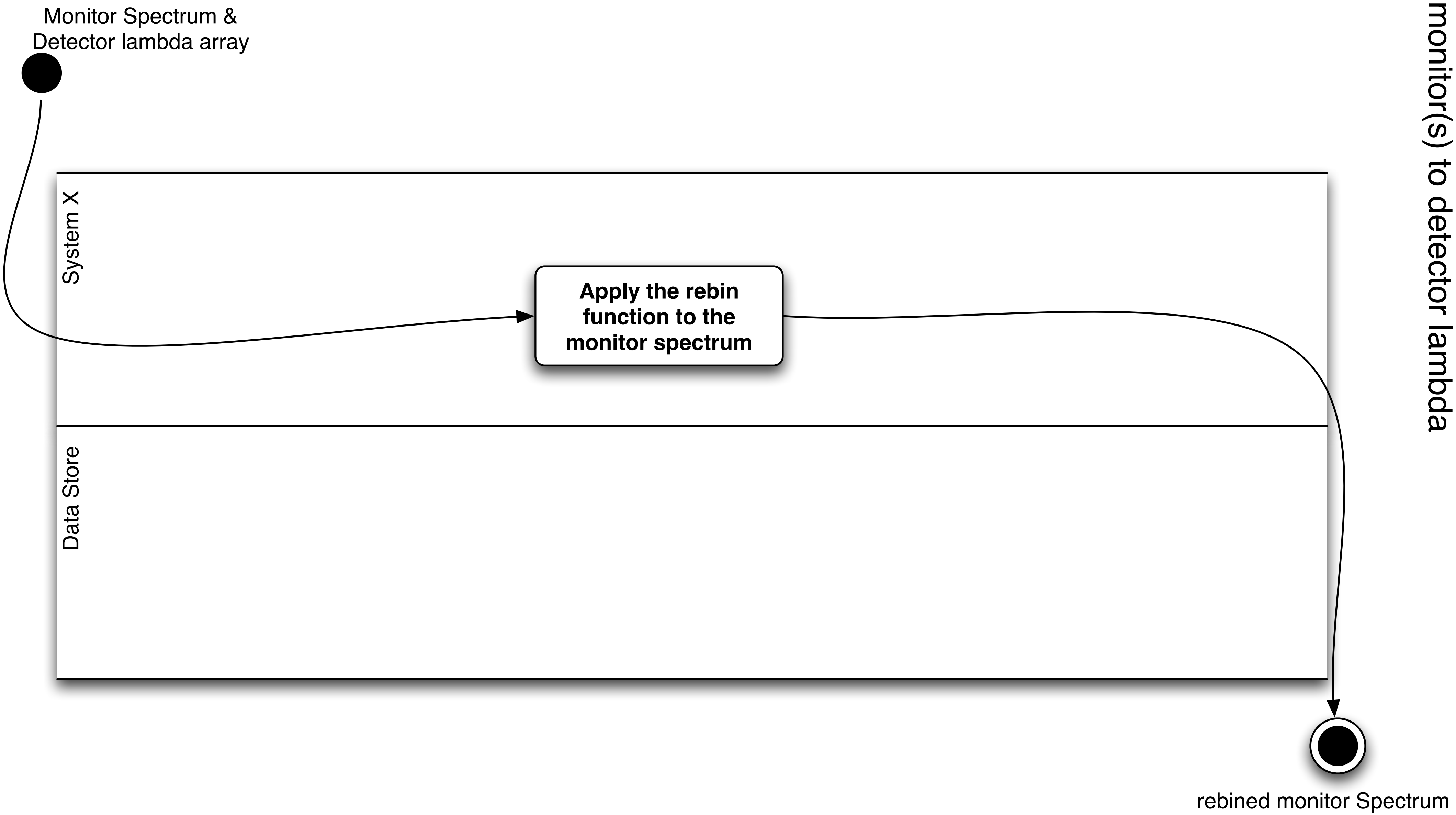
Task: Subtract monitor background



Task: Subtract monitor background



Task: Rebin monitor(s) to detector lambda



Task: Normalize the detector(s) to the monitor(s)