are exceedingly large and typically require large rooms that are accessible through oversized doors that allow for delivery of such systems. These types of rooms are typically found in a clean setting of a hospital or laboratory and often must be specially built or modified to allow the system to be delivered and installed. This can require tremendous capital costs, in addition to the considerably high costs of the system, which can put installation of high throughput analytical systems beyond the reach of some diagnostic testing centers and laboratories. Such systems are also exceedingly large and since floor space in such facilities can be difficult and costly to obtain without displacing existing equipment or personnel, some facilities rely on undersized systems or multiple smaller systems, which often cannot meet the high throughput demands of the facility. These issues can result in a backlog or excessive wait times for analytical results. For example, such facilities may take one to three days (or more) to report a requested diagnostic test to the patient or physician from when the sample is first collected, even though the associated diagnostic assay may take only a few hours. Similar delay problems are faced by systems that use "batch" processing. Such delays are troubling, particularly when attempting to diagnose life threatening illnesses or screening individuals exposed to an outbreak of a pathogen or disease where unnecessary delays or isolation can cost lives and increases overall healthcare costs.

[0009] Thus, there is a need for a high throughput handling system that allows for processing of a large volume of samples in a more efficient and expedient manner. There is further need for such high throughput handling systems that are amenable to being incorporated into existing testing facilities where access, space and costs are of particular concern.

BRIEF SUMMARY OF THE INVENTION

[0010] The present invention relates to high throughput handling systems, devices and methods for processing of large volumes of biological samples, and in particular systems for performing diagnostic assays as detailed in the various embodiments as described herein.

[0010a] According to a first aspect of the present invention, there is provided a handling system for high throughput processing of a plurality of biological samples, each being within a respective diagnostic assay cartridge of a plurality of diagnostic assay cartridges, the system

including: an array support assembly adapted to support a plurality of diagnostic assay modules in an array having at least two dimensions, each diagnostic assay module comprising a diagnostic assay system adapted for receiving a diagnostic assay cartridge of the plurality and performing a diagnostic assay on the biological sample within the respective cartridge; and a loader adapted to load the plurality of diagnostic assay cartridges within the plurality of diagnostic assay modules while supported within the array support assembly, wherein the array support assembly is movable relative the loader such that the diagnostic assay cartridge is loadable in any of the diagnostic assay modules within the array by moving the array support structure relative the loader in combination with the loader.

[0010b] According to a second aspect of the present invention, there is provided a method of handling a plurality of biological samples with a high throughput processing system, each of the plurality of biological samples being within a diagnostic assay cartridge of a plurality of diagnostic assay cartridges, the method including: receiving the plurality of diagnostic assay cartridges in a high throughput processing system; and loading, with a loader, each of the plurality of diagnostic assay cartridges into a respective diagnostic assay module of a plurality of diagnostic assay modules within an array support defining an array having at least two dimensions, each diagnostic assay module comprising a diagnostic assay system adapted for receiving a diagnostic assay cartridge of the plurality and performing a diagnostic assay on a biological sample within the respective cartridge, wherein loading comprises moving the array support relative the loader such that the diagnostic assay cartridge is loadable in any of the diagnostic assay modules within the array by moving the array support structure relative the loader in combination with the loader.

[0011] In some embodiments, the invention provides a handling system for high throughput processing of a plurality of biological samples, each sample being within a respective cartridge of a plurality of diagnostic assay cartridges. The system can include an array support assembly adapted to support a plurality of diagnostic assay modules in an array having at least two dimensions, typically a cylindrical array. In some embodiments, the array