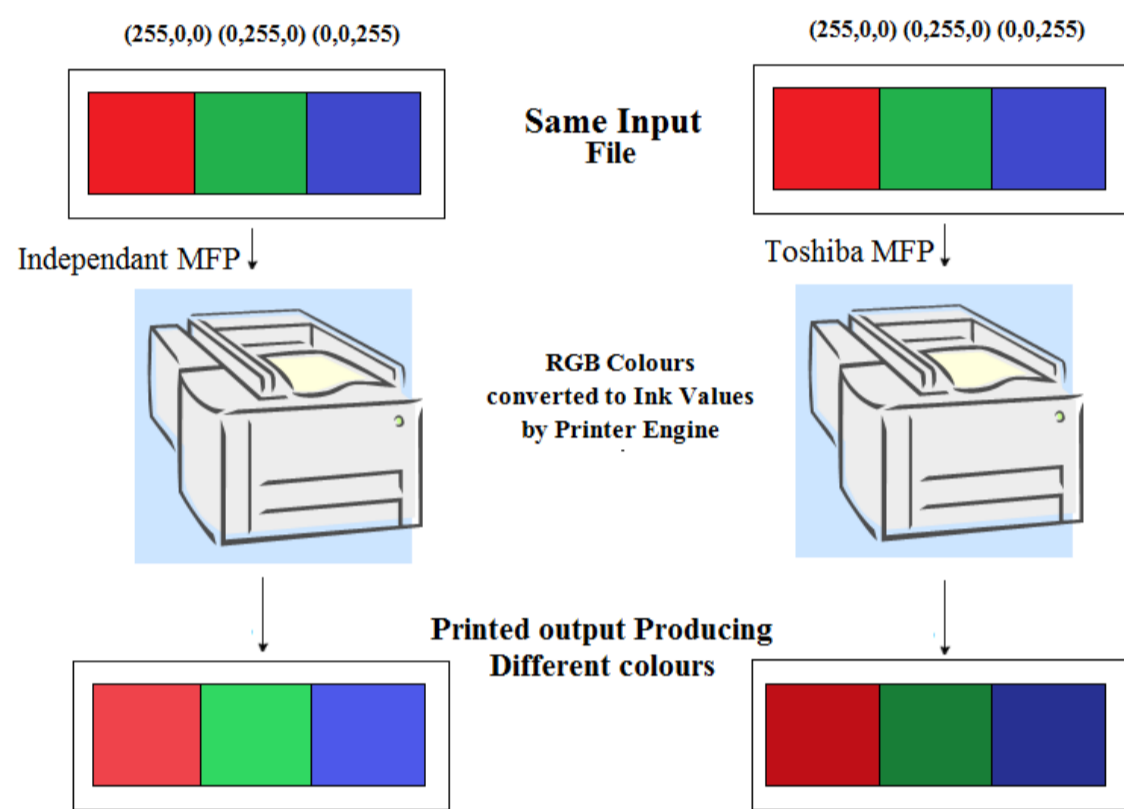


## 1. Research Achievements

- Successfully designed a workflow for achieving device RGB colour matching between Toshiba Multi-Function Printers (MFP's) and devices from independent manufacturers.
- Achieved an average colour difference improvement in excess of 55% within the deployed workflow.

## 2. Introduction & Motivation

- Unmanaged Device RGB values are interpreted differently among various colour reproduction devices.



- This is due to the RGB colour space being device dependent.
- If Toshiba MFP's can simulate the output colour characteristics from other printing devices, a market advantage is gained.
- Particularly beneficial when a fleet of printer are deployed in a Managed Print Service (MPS), and the addition of a new printer causes colour inconsistencies

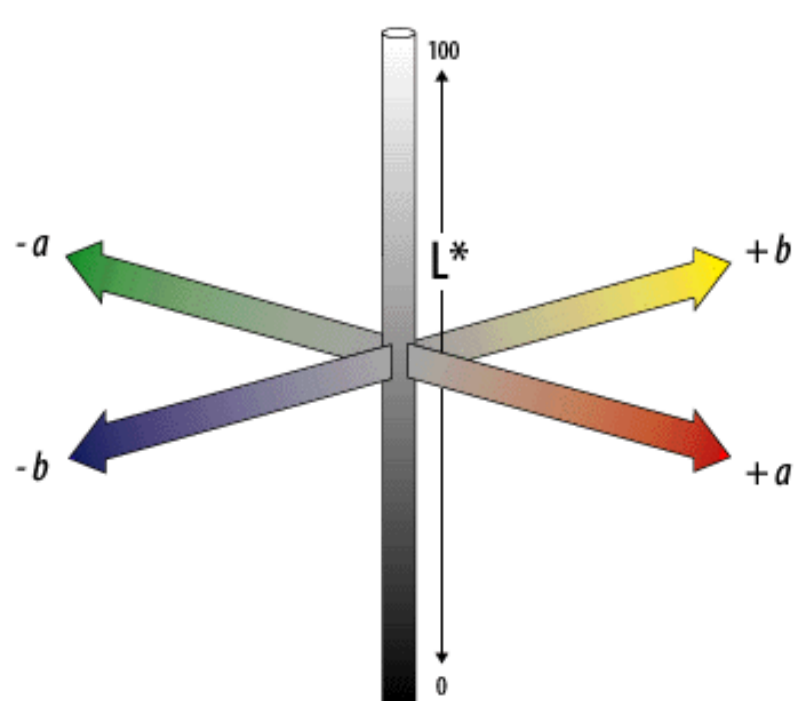
## Research Objective

- "What is the process workflow required to Achieve Device RGB Colour Matching between two different printer engines".

## 3. Background

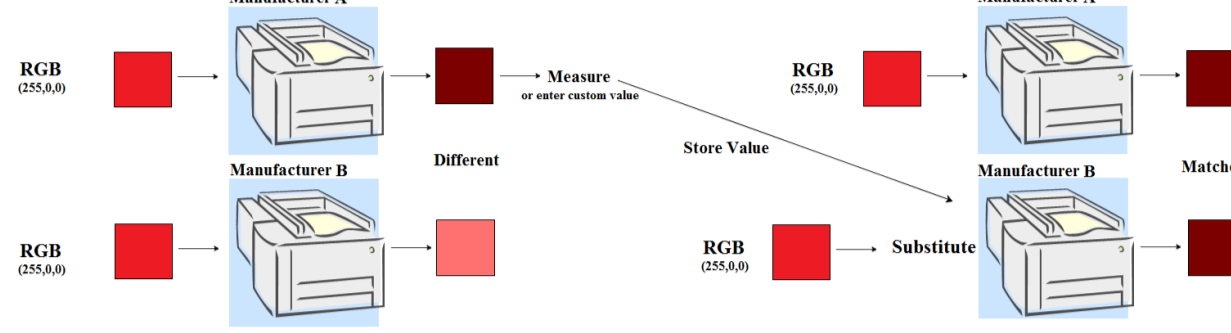
### The International Colour Consortium and Color Management

- The International Colour Consortium (ICC) contributed to the area of Colour Management by developing what is known as the ICC colour profile specification.
- This specification details the workflow required to develop colour profiles, which provide the data necessary to transform the colours of an image represented by the colour characteristics on one device, to those of another.
- These Profiles utilize the device independent CIELAB Colour space developed by the International Commission on Illumination.



## Previous Work

- RGB Colour Substitution Mechanism

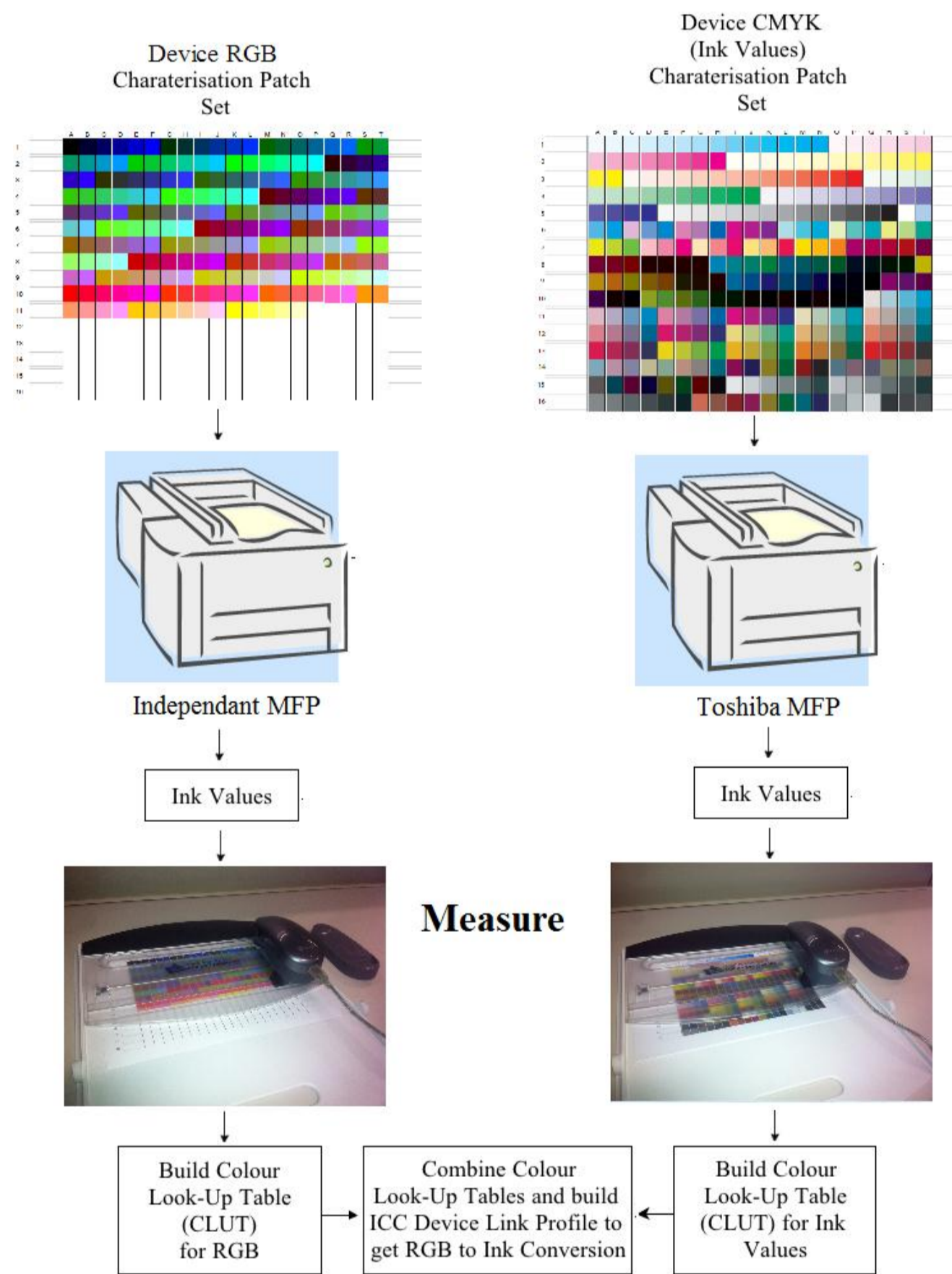


- Limited to only working for one RGB to one Ink value, with painstaking measurement and adjustment steps.

## 4. Methodology

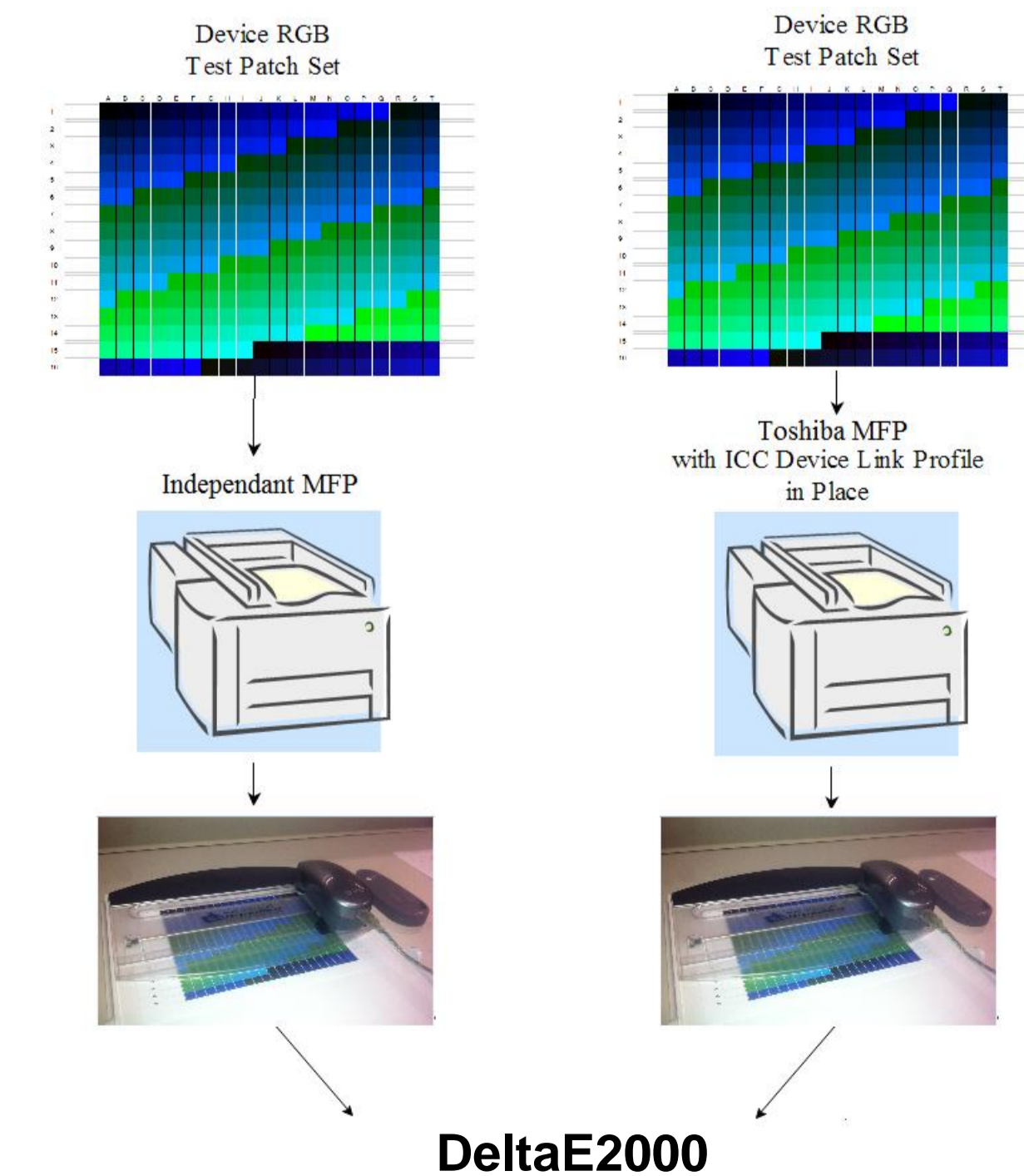
### Configurable Printer Re-targeting

- Designed colour matching workflow, where colour characterisation data generated from one printing device is used in a Toshiba MFP, so as to match the output colour characteristics when printing the same input Device RGB print file.

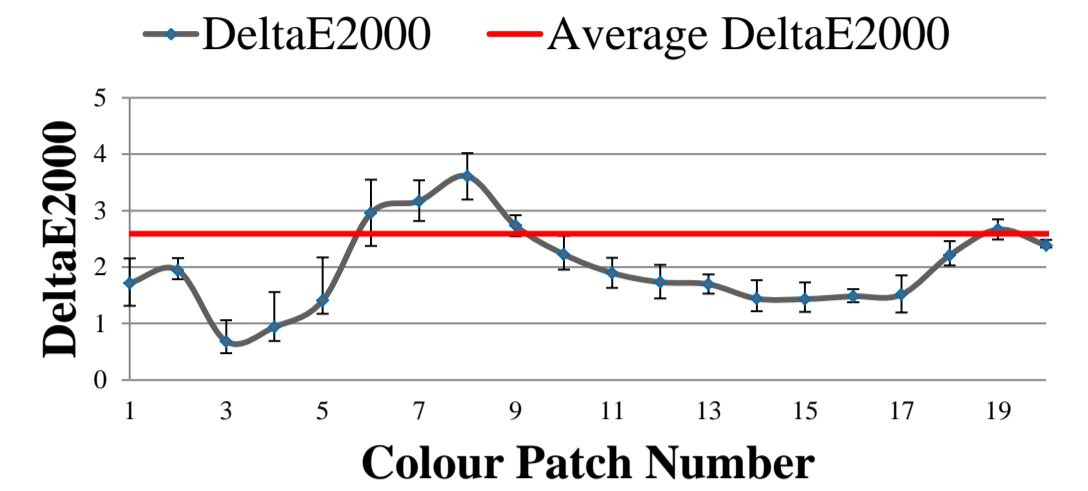


### Performance Evaluation Workflow

- Designed a system to evaluate the colour matching performance accuracy through utilizing the Colour difference equation DeltaE2000.



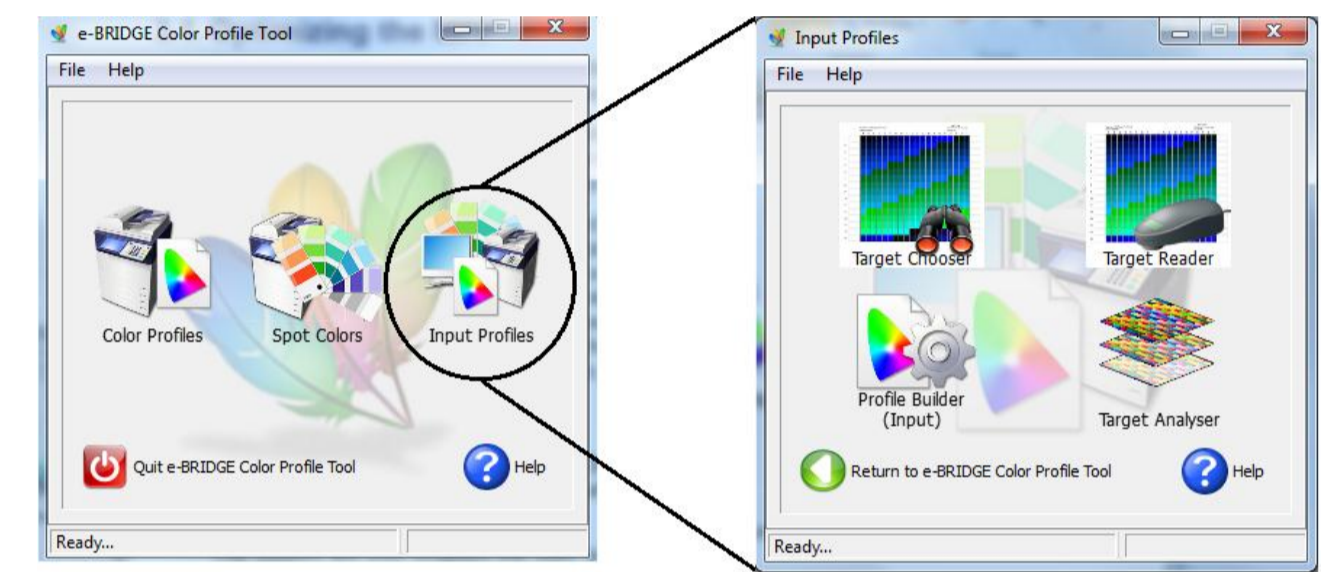
## Delta E2000



## 5. Implementation

### Input Profiles

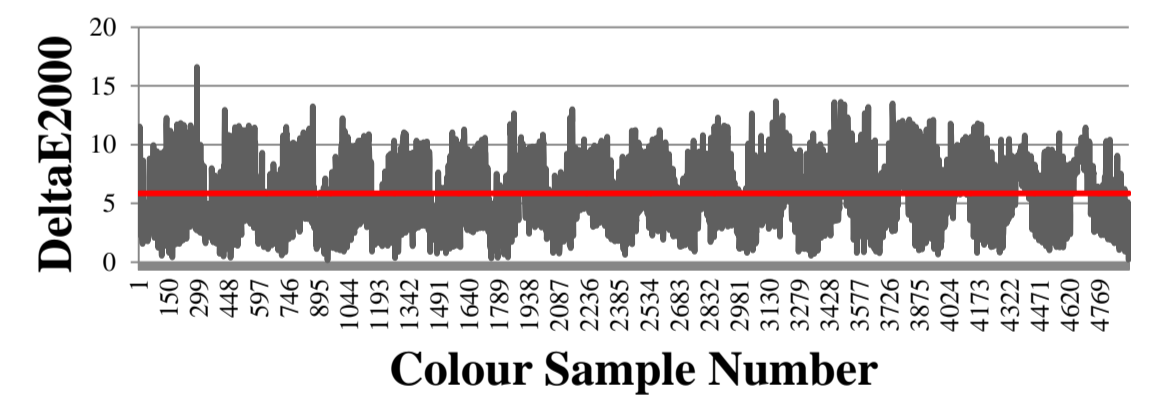
- Four new applications developed within an existing software application for employing workflow



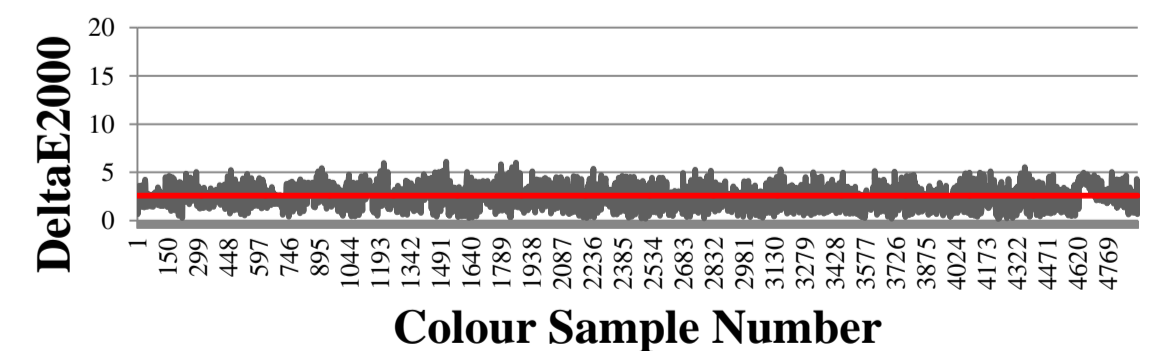
- Target Chooser: Create RGB colour patches
- Target Reader: Obtain characterization data
- Input Profile Builder: Create ICC Input Profile for RGB to device independent transformation
- Target Analyser: Performance evaluation

## 6. Results

HP LaserJet 4650 Toshiba e-STUDIO 6550c



HP LaserJet 4650 eS-6550c Re-Targeted to HP4650



## 7. Future Direction

- Colour Gamut Volume Comparison for determining suitability of printers for re-targeting.
- Automate the process of loading the Device Link Profile into the Toshiba MFP.

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