



**iccMAX:
New Colour
Management
Paradigm**





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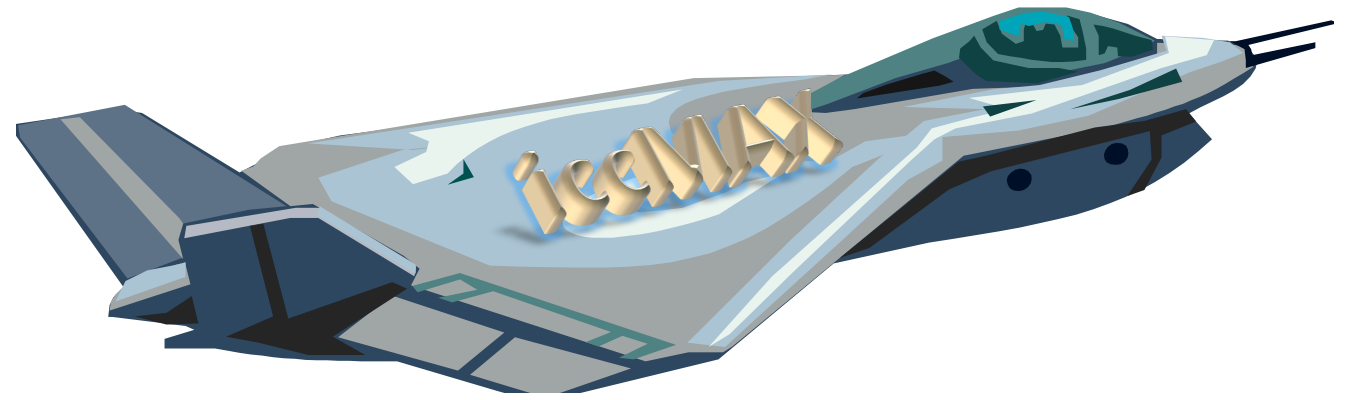
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What is v4 Good For?



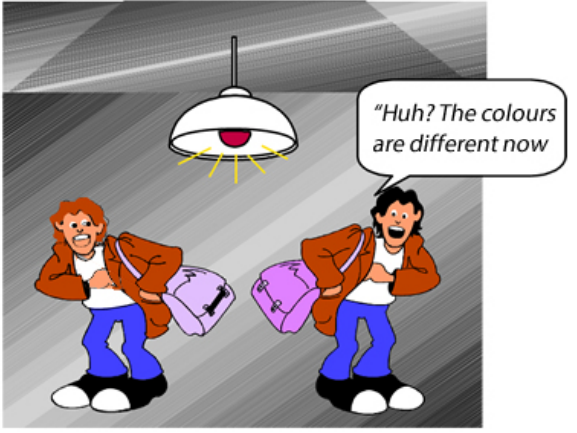
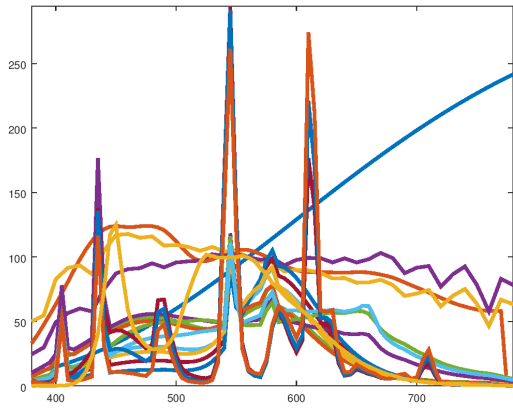
iccMAX vs. v4: Related but Different



#1: Light (and Observer) Independent Color Capture and Reproduction



#2: Handle (predict) changes in lighting



(Picture from <http://www.coatsindustrial.com/en/information-hub/apparel-expertise/metamerism-and-illuminants>)

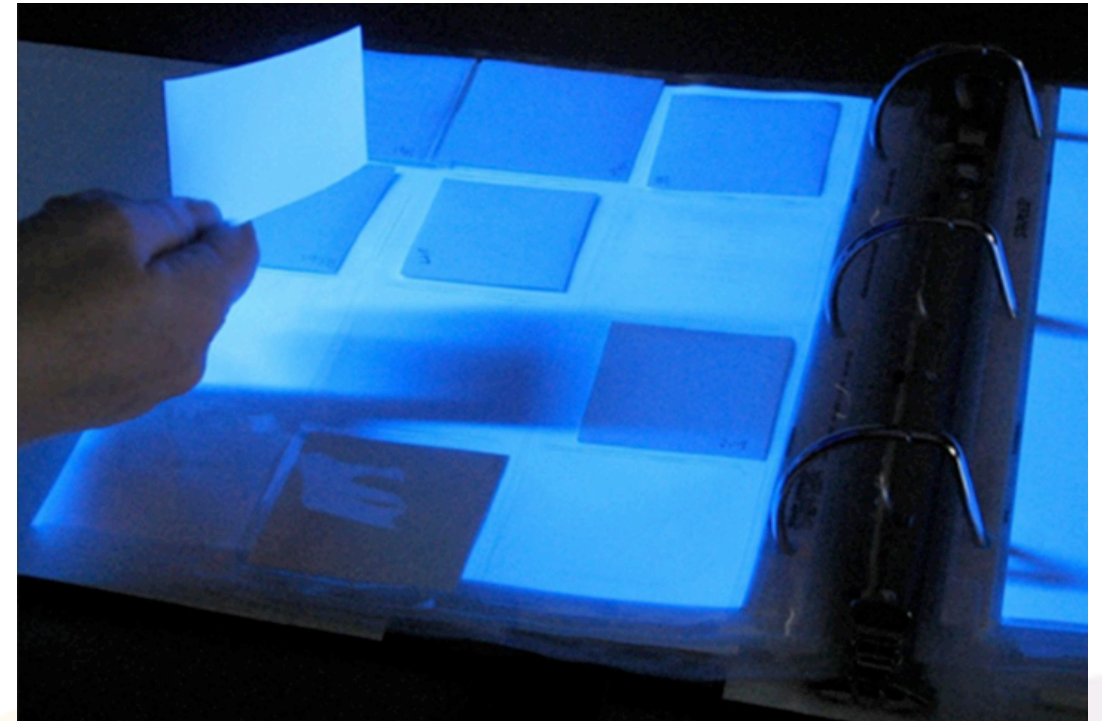
#3: Lightweight Profiles for Capture



#4: Wavelength Changes in Reflected Light (Fluorescence)

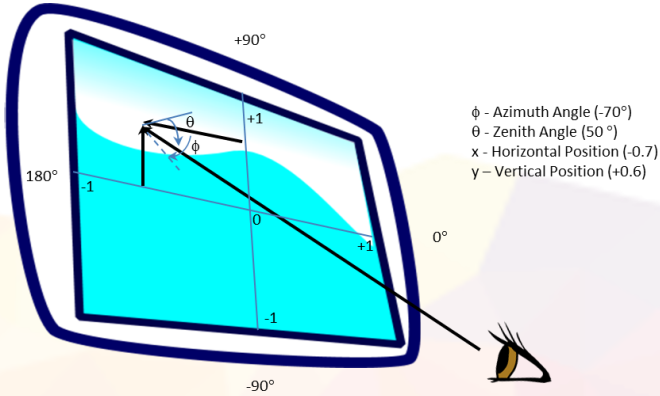


(Picture from <https://www.keech.org.uk/about/news-media/273-fluorescent-fun-for-keech-mum>)



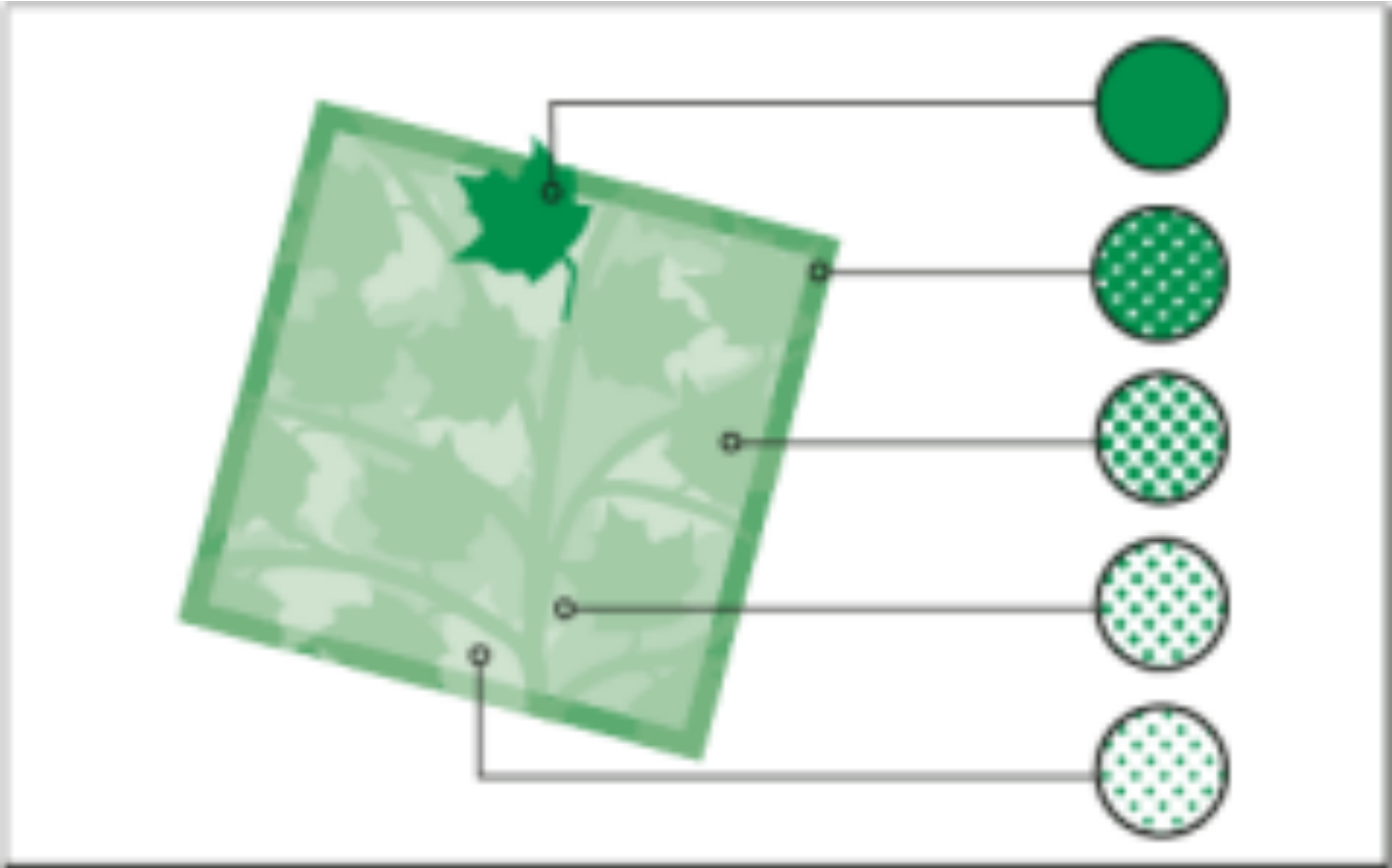
(Picture from <http://news.yale.edu/2015/02/19/yale-launch-lens-media-lab-photograph-research-and-conservation>)

#5: Dependency of Lighting and Viewing Angles

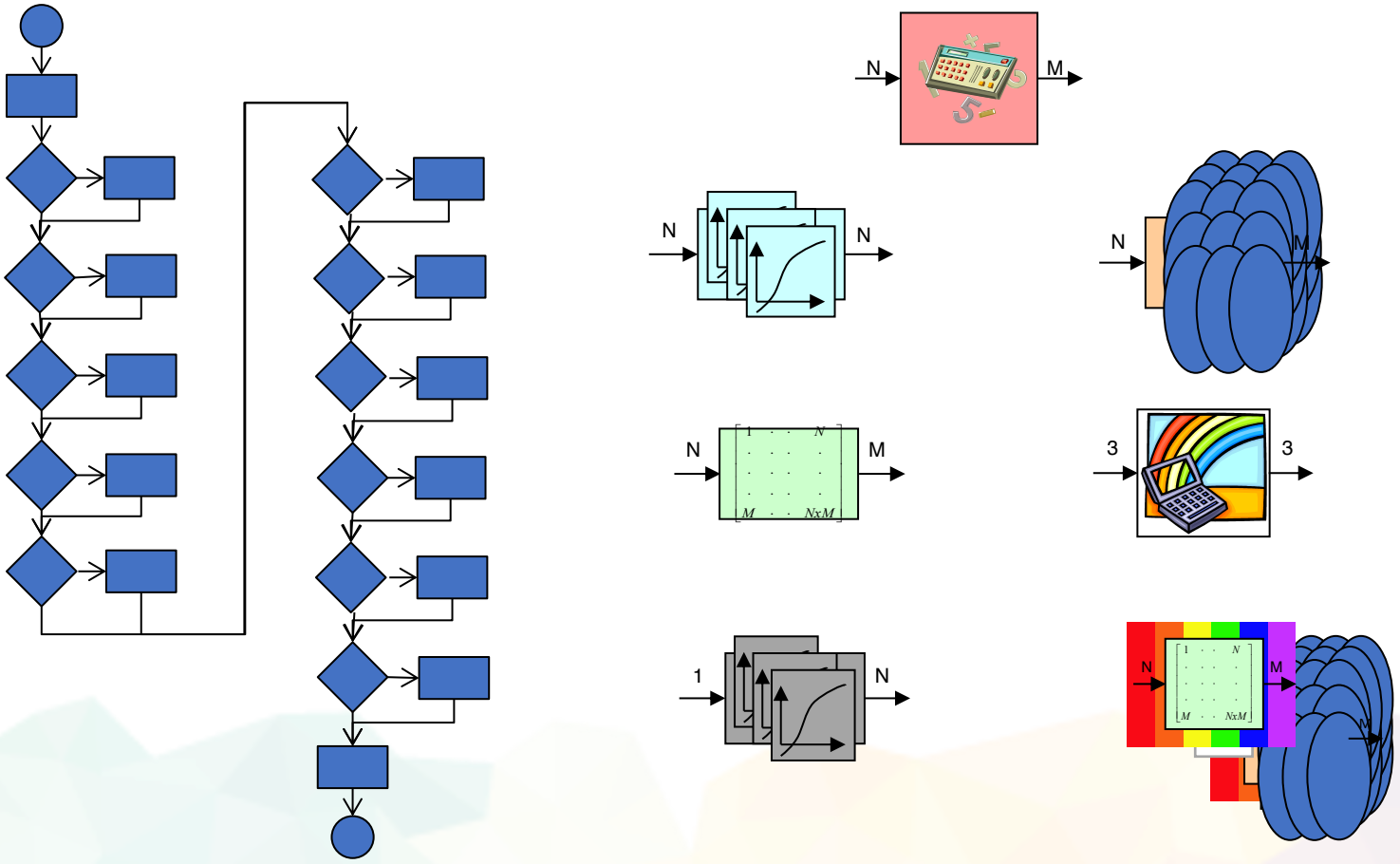


ϕ - Azimuth Angle (-70°)
 θ - Zenith Angle (50°)
x - Horizontal Position (-0.7)
y - Vertical Position (+0.6)

#6: Describe tints of named colors



#7: Compact Profiles Using Algorithms



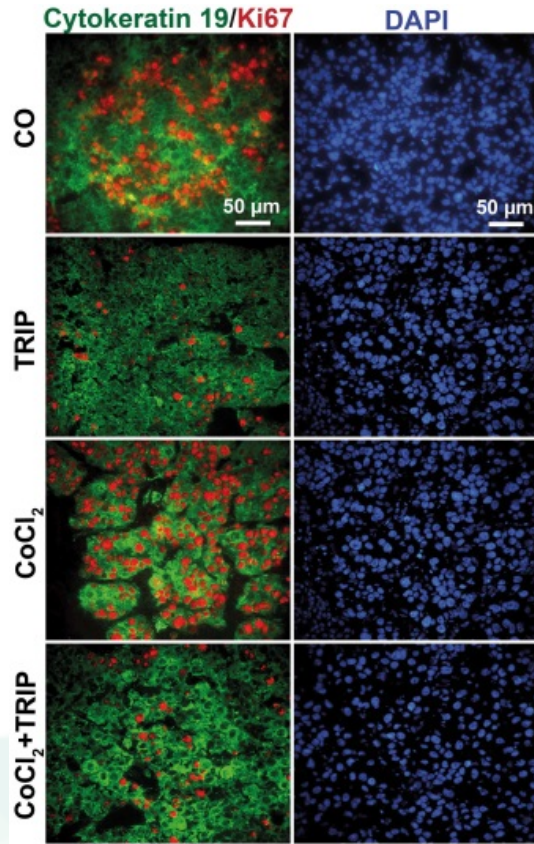
#8: Account for differences between observers

The central part of the slide features a grid of 18 icons representing various professions and roles: a man in a white shirt, a woman in a pink top, a man in a brown shirt with a camera, a man in a blue uniform with a yellow hard hat, a man in a green uniform with a green cap and a wrench, a man in a white lab coat with a stethoscope, a man in an orange uniform with a hard hat and a pizza, a woman in a white headscarf, a man in a red sombrero, a man in a white lab coat with a stethoscope, a man in an orange uniform with a red cap and a camera, and a man in a brown suit. Three thought bubbles are connected to these icons: one above the man in the white shirt says "I see grey", one above the man in the blue uniform says "I see blue", and one above the man in the brown suit says "I see green".

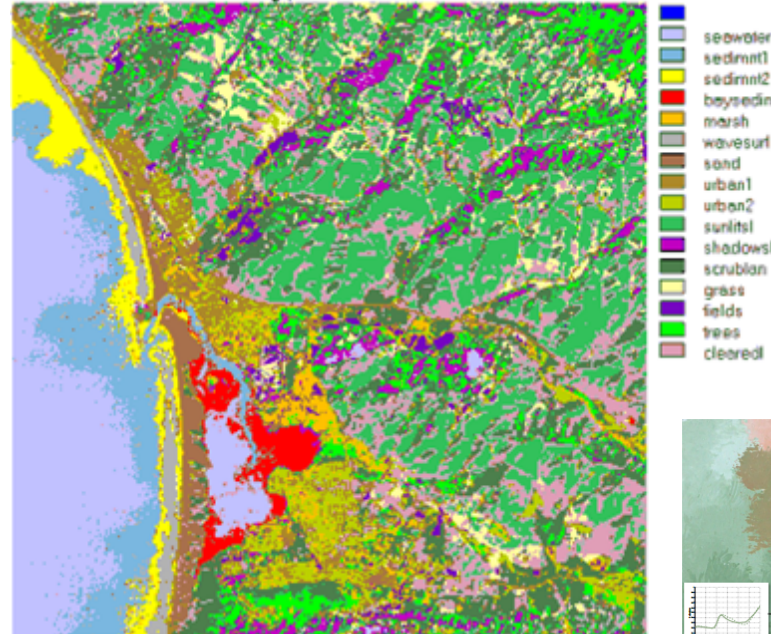
On the left side, there are two spectral graphs. The top one is labeled "LCD Display" and shows a broad spectrum with peaks in the blue, green, and red regions. The bottom one is labeled "Quantum Dot Display" and shows three very narrow, distinct peaks in the blue, green, and red regions.

On the right side, there is a graph titled "CIE 2006 Color Matching Functions". The x-axis is labeled "Wavelength (nm)" and ranges from 400 to 700. The y-axis is labeled "Relative Sensitivity" and ranges from 0 to 1.5. The graph shows three curves: a blue curve peaking at approximately 440 nm, a green curve peaking at approximately 530 nm, and a red curve peaking at approximately 610 nm. A dashed black line represents the sum of these three curves, which is the luminance function.

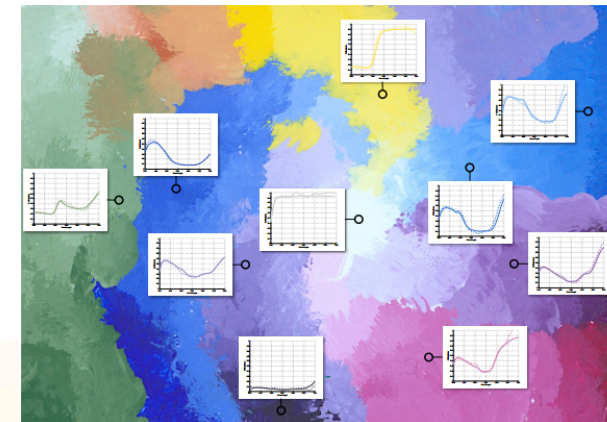
#9: Describe and visualize “color” in terms of “What is it?”



(Picture from <https://www.spandidos-publications.com/10.3892/or.2014.3196>)



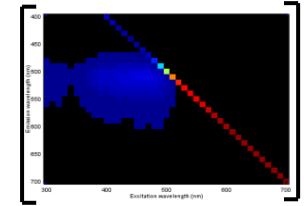
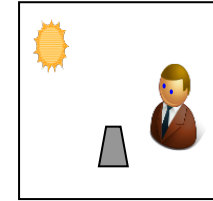
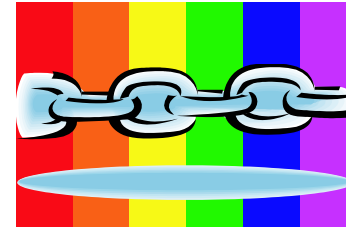
(Picture from <http://wgbis.ces.iisc.ernet.in/envisrs/?q=node/26/>)



iccMAX: From the Bottom Up

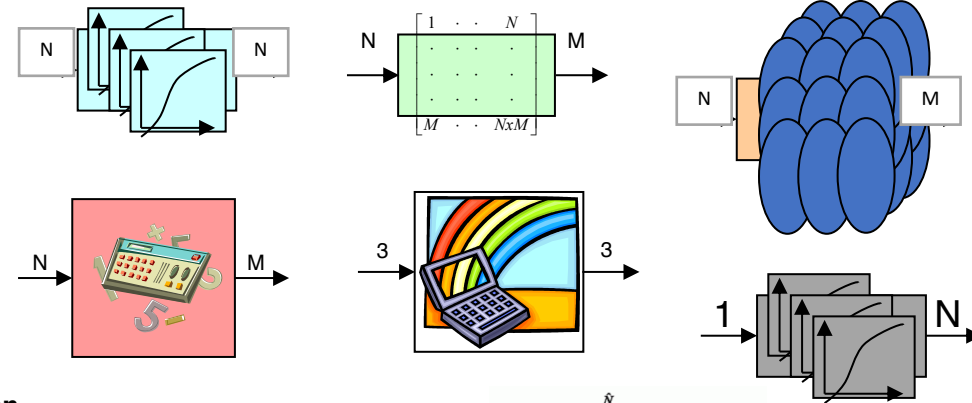
Connection Space Extensions

- Spectral profile header extensions
- Profile Connection Condition (PCC) tags
- PCS Transforms
- Sparse matrix encoding
- Multiplex Connection Spaces



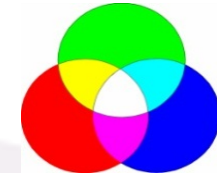
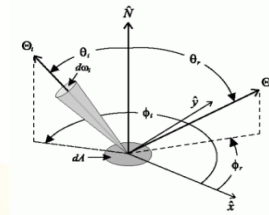
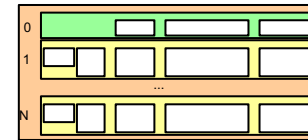
multiProcessingElements

- 1-D Look Up Tables (LUTs)
- Matrices
- N-dimensional LUTs
- Calculator element
- ICC Color Appearance Model element
- Tint Array element



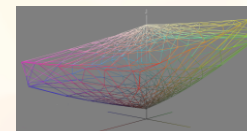
Hierarchical tag types

- Named Color Tag Array
- Support for angular dependencies via Bidirectional Reflectance Distribution Functions (BRDF)
- Profile Sequence Information



Other Extensions

- Color Space Encoding profiles
- Gamut Boundary Description encoding
- Color Measurement (CxF) tag encoding
- UTF8 text & UTF16 encoding
- Additional Numeric Array Types



CxF

iccMAX (v5) vs. v4

iccMAX profiles have same header + tag structure as v4 profiles, but:

- Different values possible in header.
- Some retained tag types from v4, some new tag types.
- Some v4 tag types deprecated.
- New color space types, PCS types, data tags.

iccMAX CMMs generally intended to use v4 profiles, but v4 CMMs will not need to be compatible with iccMAX profiles.



**See You All
November 23, 2020**

