

International Color Consortium®

2001 Report



Creating, Promoting and Encouraging the Standardization and Evolution of an Open, Vendor-Neutral,
Cross-Platform Color Management System Architecture and Components.

The ICC at work...Boca Raton, Florida, February 2002

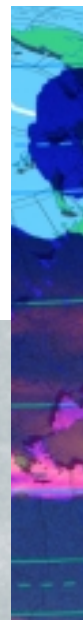


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Purpose:



From left to right: William K. Smythe, Lars Borg, Professor Tony Johnson and Uwe-Jens Krabbenhoeft

The International Color Consortium is an organization established for the purpose of creating, promoting and encouraging the standardization and evolution of an open, vendor-neutral, cross-platform color management system architecture and components. The work of the ICC shall be made available to the public and encouraged for adoption by all relevant suppliers of the “color” industry. Where appropriate, ICC documents will be forwarded to national and international standards organizations.

ICC Officers 2002

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Vice Chairman:	Uwe-Jens Krabbenhoeft	Heidelbergerer Druckmaschinen AG
Technical Secretary:	Professor Tony Johnson	London College of Printing
Secretary:	William K. “Kip” Smythe	NPES The Association for Suppliers of Printing, Publishing and Converting Technologies

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Organization Represented

EPFL

FOGRA-Institut

London College of Printing

Name

Sabine Susstrunk (D)

Fred Dolezalek (D)

Professor Tony Johnson

Liaison Members

Organization Represented

CIE Division 8

CIP4

European Color Initiative (ECI)

JPEG 2000

SCIT

TC 42/WG18

TC 130

Name

Marc Mahy

Lawrence Warter

Dr. Stephan Brües

Bill Radcliffe

Professor Tony Johnson

Jack Holm

Larry Warte

Chairman's Message



Lars Borg,
Adobe Systems Incorporated

When the International Color Consortium (ICC) was created in 1993, its mandate was to solve what might well be the most difficult and important technical problem facing the graphic communications industry.

Printed communication clearly would remain vital and competitive well into the future. But our industry was increasingly challenged to share data, workflows, and content with other media and other users. To secure its future fully, print would have to *integrate* its processes with all of the other tools being applied in today's complex, multimedia communications environment.

These tools can include everything from web pages to motion pictures, from photographs to textiles. Creators and users of all these tools share a common need for consistent, predictable color reproduction, regardless of individual devices, computer platforms, software environments, output technologies, substrates and other variables.

Create dependable color management tools that could be broadly accepted and used throughout the communications world: This was the challenge ICC accepted in 1993.

Moreover, ICC set out to create a color management system by working toward consensus among dozens of independent participants, including both vendors and users of technology products. ICC's objective was a truly open, vendor-neutral system. In pursuit of that goal, ICC participants had to subordinate their own organization's competitive interests for the sake of the industry's greater good and a brighter shared future.

As you read this, our first formal report, I believe it is fair to say the daunting technical challenges of ICC's mission have largely been solved.

By no means, however, is ICC's work done. It has become clear over the years that color management in general, and ICC's function in particular, are only partially understood. Full implementation of the ICC specification will require an ongoing education and promotion effort not only by the Consortium itself but by all of those whose talent and efforts have helped bring this significant achievement about.

Highlights of 2001

Publication of Version 4 of the ICC specification was **the** milestone of the year. This version is a significant advance over the previous specification in avoiding ambiguity and thereby promoting consistency and predictability of images exchanged between systems.

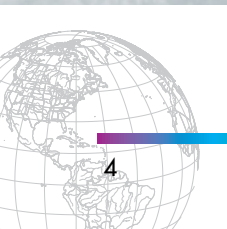
Early in the year ICC conducted an extensive survey among graphic arts technology users, gauging their awareness of color management and of the consortium, as well as their perceptions of problems they faced in their daily work. This survey prompted several initiatives by ICC during the year, including creation of three new working groups and a major expansion of our communications efforts.

New working groups were created to deal with communication, workflow and architecture. We also expanded our liaison efforts with other color-oriented organizations, including the European Color Initiative, CIE, CIP4, SCIT (the ISO Steering Committee for Imaging Technology) and the International Organization for Standardization (ISO) Technical Committee 130 on graphic technology.

The CIP4 liaison, in particular, was established in 2001, and a letter of understanding was created detailing how ICC's work will interface with other aspects of computer-integrated prepress, press and post-press operations.

We were also pleased to welcome new members in 2001, including Imaging Business Machines, Integrated Color Solutions, and Minolta QMS.

In this report, we would like to thank all of those who have devoted their time, knowledge and skill to ICC's work—as well as expressing our appreciation to the companies and other organizations that have supported these individuals in their contributions to ICC. We would also like to recognize the continuing administrative support of NPES The Association for Suppliers of Printing, Publishing and Converting Technologies, which has served as ICC's secretariat since the Consortium's founding.



Technical Secretary's Report

Publication of Version 4 of the ICC specification was the key event of 2001. The new version was released late in the year for a period of comment and review ending in February, 2002. Earlier in 2001, ICC had published an interim revision of the specification, Version 2.4.

Using Version 4, vendors will find it easier to develop color management profiles for their products that are unambiguous, so that when used they will inter-operate more successfully with those of other vendors and also be used in a more consistent manner by different CMMs. This trouble-free inter-operability has been a prime goal of the entire ICC specification development process, and we believe Version 4 achieves this goal more fully than any previous effort.

Version 4 addresses specific operational problems revealed by our user survey, as well as by ICC members' continuing support of their own customers. Among other provisions, Version 4 includes:

- Improved definition of the PCS for the perceptual rendering intent;
- Improved specification of Chromatic Adaptation;
- Clarification of the relationship of CIELAB and CIEXYZ to the PCS;
- A better explanation of the Profile Connection Space;
- New lookup table types which provide a common structure for color transformations in all profiles;
- Better definition of the encoding used with monochrome profiles;
- Improved naming and other conventions;
- A set of multilingual Unicode strings for better internationalization of profiles.

These are only a few of the many changes and enhancements incorporated in Version 4 of the ICC Specification. It is important to note that these enhancements result from the concerted effort of a truly industry-wide group, acting on direct input from a diverse range of technology users. We believe this version of the ICC specification provides users with the correct tools for communicating the color rendering associated with devices to implement in their workflows.

This does not mean that ICC sees its work as complete. The subject of color reproduction is not trivial; there are important issues still to address. Our user survey conducted earlier this year enabled us to identify a wide range of obstacles hindering the broader acceptance of the ICC Specification, and indeed the color management process itself. Some of these obstacles were matters of perception, properly addressed by a more ambitious communications effort. Others, however, were technical in nature.

The survey showed that many users would like to see the ICC ensure conformance of profiles and CMMs to the specification. Others have workflow needs that cannot easily be met with the existing architecture. In order to address these issues, ICC will need to work on developing procedures for conformance testing and also producing workflow recommendations to achieve desired results using ICC profiles conforming to the existing specification.

This conclusion led to the formation of our new working groups on workflow issues and architecture.

Further refinements to the ICC Spec itself (that is, new Versions 4.x) will also come under consideration as additional issues arise.

Communications

It has become clear that industry-wide acceptance of the color management process and ICC's Specifications hinges to a great degree on *awareness* of ICC and *perceptions* about the value of our work.

ICC has accepted the challenge of communicating more effectively with the industry, and during 2001 launched important new efforts to meet these challenges. These activities also form the continuing agenda of the new Communications Working Group.

The Consortium has written and placed a series of magazine articles, including reports in the International Prepress Association *Bulletin* and *IS&T Reporter*. ICC also developed an extensive and detailed response to an article on color management that appeared in the April 16 issue of *The Seybold Report*. The ICC reply appeared in the publication on June 18.

ICC representatives made presentations at a number of technical conferences and other venues in 2001, and both slide presentations and technical articles have been published at the ICC website. The organization continues actively to seek out opportunities to reach out to professional audiences through presentations, panel participation, and other vehicles.

The Consortium's website has been extensively redesigned, with a great deal of new material added, as well as a simpler navigational structure and an array of links to other color management resources.

This redesign attempts to address three different needs: First, to provide information about ICC and the specification to its members; second, to provide users with general information about color management

(continued on page 6)



Professor Tony Johnson,
London College of Printing



using ICC profiles; and third, to offer useful resources to members and users.

In the first category, a new section for technical notes has been added to help implementers find additional information that others have found useful.

To meet the second need, additional informational material and links to various other useful sites have been added along with a downloadable profile inspector so that those using PCs can investigate the content of their profiles. A facility entitled 'Ask Tony' enables users to ask questions about ICC and color management directly to the Technical Secretary.

"Ask Tony" has been particularly successful. This feature has routinely generated a dozen or more questions each week, ranging from the relatively simple to highly sophisticated queries.

In the third category, some new CMYK characterizations and a registry for RGB characterizations have been added.

In the coming year, ICC plans to publish a new booklet on "how to buy an ICC-based product." Without discussing specific products or vendors in detail, this booklet will help users identify their own needs and priorities, and suggest basic questions that will enable shoppers to evaluate which products will work best in their own circumstances.

The user survey not only taught the ICC much about the perceptions and attitudes of one of our key target audiences, but also emphasized once again how much is gained by involving end users in the ICC process. For this reason we intend to use the ICC website to conduct periodic user surveys on specific questions.

Tackling complex technical questions occupied nearly all of the Consortium's attention from its founding through last year. Now, however, it is clear that communication and education are coming to the fore as indispensable ICC activities. This theme will shape the organization's efforts profoundly throughout the coming years.

Secretary's Report

ICC closed 2001 in a very strong position in terms of three fundamentals of success: the Consortium's membership, financial condition, and operating procedures.

Membership at year's end stood at 68 and included virtually all of the leading companies involved in color reproduction. Since its launch with eight founding members in 1993, ICC has grown steadily and continues to attract a number of new companies each year.

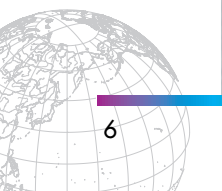
The Consortium's financial condition also continues to be strong and stable.

Operating procedures of the ICC have been developed to assure each member, and the industry at large, an opportunity to express opinions and concerns and to have input into the specification. During 2001 ICC conducted 14 ballots and held public review periods for several proposed documents.

We have also pursued an extensive investigation of issues surrounding third party Intellectual Property as it may be affected by ICC operations. Public review periods have been identified as an effective means of identifying third party IP issues. A formal policy for public reviews of all updates to the ICC specification was implemented in 2001, and both the minor and major revisions to the ICC specification went through a formal 60-day public review.



William K. Smythe,
NPES



Architecture Working Group

Charter: The Architecture Working Group will address issues relating to ICC Architecture by:

1. Documenting the current architecture, including its functionality for the purpose of defining the baseline for further work and internal usage
2. Investigating and proposing improvements and alternatives to the current architecture to address identified issues

Chairman: Canon Development Americas, Inc.

John Haikin

Members: Adobe Systems Incorporated

Peter McLeod

Agfa-Gevaert N.V.

Marc Mahy

Apple Computer, Inc.

Luke Wallis

B&R, groupe ODESSA

William Varoux

Canon Development Americas, Inc.

John Haikin

Creo

William Li

Fuji Film Electronic Imaging

Craig Revie

GretagMacbeth

Dr. Stefan Brües

Heidelbergerer Druckmaschinen AG

Uwe-Jens Krabbenhoef

Hewlett Packard Company

Jack Holm

Kodak Polychrome Graphics

Dr. Chris Edge

London College of Printing

Professor Tony Johnson

Onyx Graphics Corp.

Max Derhak

Que-Net Media

Bob Hallam

Ricoh Corporation

Hisao Shirisawa

Xerox Corporation

Ann McCarthy



John Haikin,
Canon Development Americas, Inc.

Chairman's Report

The new *Architecture Working Group* is closely related to the Workflow Working Group. One of the Workflow WG's mandates is to provide the Architecture WG with its study findings, so that the development directions established by the Architecture WG support the recommended workflow enhancements.

In general, the user survey in early 2001 broke perceived color management issues into four groups: Communications issues, issues of conformance with the ICC spec, workflow issues, and a fourth group of issues that could not be readily solved by the current color management model. This fourth group of issues is the arena in which the Architecture WG functions.

More specifically, the group's early activities are focusing on refinement of the current Profile Connection Space (PCS).

The Architecture WG is also charged with defining the baseline behavior of color management systems that implement the current profile specification. Further development of rendering intents will also be a key item for the group in 2002.



Chromatic Adaptation Transform Working Group

Charter: The Chromatic Adaptation Transform Working Group's goal is to resolve interoperability issues in the use of chromatic adaptation transforms.

Chairman: Adobe Systems Incorporated Lars Borg

Members:	Apple Computer, Inc.	Luke Wallis
	Eastman Kodak Company	George Pawle
	Heidelbergerer Druckmaschinen AG	Uwe-Jens Krabbenhoeft
	Hewlett Packard Company	Jack Holm
	Kodak Polychrome Graphics	Chris Edge
	Xerox Corporation	Ann McCarthy

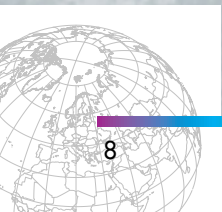
Chairman's Report

The *Chromatic Adaptation Transform Working Group* was formed in February, 2001 to address issues surrounding profiles with different chromatic adaptation tags. The group worked to clarify why the original "Annex E.2" proposal in this area would not satisfy user needs. After much work by various group members, an example was created in November showing how the Annex E.2 method could introduce serious problems, as soft proofing will not show the color difference that will appear in printing.

The group changed the wording of Annex E.2 to no longer recommend the method, and this new approach was forwarded to the spec-editing group.



Lars Borg,
Adobe Systems Incorporated



Communications Working Group

Charter: The Communications Working Group will:

1. Communicate what color management is and isn't from the ICC perspective (Develop and promote a consistent message of what the ICC is and does)
2. Produce regular press releases on ICC developments
3. Review and expand ICC information on the web site
4. Conduct regular surveys (or collect information) of current and potential users to identify their needs and perceptions
5. Help identify obstacles to ICC implementation
6. Identify and promote success stories on ICC implementations in the articles and the ICC website
7. Produce regular articles for placement in publications

Chairman: Imaging Business Machines, LLC Leonard J. Jowers

Members:	Adobe Systems Incorporated	James C. King
	ALWAN COLOR Expertise	Elie Khoury
	Apple Computer, Inc.	John Zimmerer
	Creo	Joris Verbouwe
	Eastman Kodak Company	David Q. McDowell
	The Fuji Photo Group	Lawrence C. Warter
	Heidelbergerer Druckmaschinen AG	Detlef Freyer
	Imaging Business Machines, LLC	Leonard J. Jowers
	London College of Printing	Professor Tony Johnson
	NPES	William K. Kip Smythe
	Quark	Brett Mueller
	Quebecor World	Klaus Fischer



Leonard Jowers,
Imaging Business Machines, LLC

Chairman's Report

The *Communication Working Group* will play a vital role in ICC future activities because of the heightened importance that must be attached to education, promotion and other efforts to improve understanding of ICC and the profile specification.

The level of misperception of ICC among target publics was strongly illustrated during 2001 by working group members' monitoring of chat rooms and discussion groups such as those hosted by PrintPlanet.com and yahoo.com. The group agreed that members should make an effort to respond to technical questions posted in these venues, to direct inquiries to the ICC website and to reply to particularly striking instances of incorrect information or misunderstanding.

The working group is also acting more positively to foster a favorable identification of ICC, its specifications and related activities. One step in this direction is the development, now underway, of a special logo CM marketers can apply to their products to designate conformance with Version 4.0.

In light of the growing role of the ICC website in public communications, the WG is also obtaining new software that will provide detailed tracking of activity at the site.



Graphic Arts Special Interest Working Group



Craig Revie,
Fuji Film Electronic Imaging

Charter: The primary focus of this working group is to address issues raised when using ICC Profiles for printing presses or related printing systems, for example digital proofers by:

1. Promoting the use of ICC Profiles in “high end” graphic arts applications.
2. Identifying areas where the existing ICC Profile format is unable to provide the functionality required by these printing systems.
3. Proposing changes in working practice and if necessary in the ICC Profile format to address current limitations.

Chairman: Fuji Film Electronic Imaging

Craig Revie

Members: Adobe Systems Incorporated

Dr. James King

Adobe Systems Incorporated

Lars Borg

Agfa-Gevaert N.V.

Dirk De Baer

Agfa-Gevaert N.V.

Marc Mahy

Apple Computer, Inc.

Steve Swen

Apple Computer, Inc.

Luke Wallis

Barco NV - BarcoView

Geert Carrein

Canon Development Americas, Inc.

John Haikin

Creo

Joris Verbouwe

Corbis Corporation

William T. Radcliffe

Dainippon Screen

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Bob Strum

Eastman Kodak Company

George Pawle

Eastman Kodak Company

David Q. McDowell

The Fuji Photo Group

Lawrence Warter

Global Graphics Inc.

Kenneth Elsmann

GretagMacbeth

Dr. Stefan Brües

Heidelbergerer Druckmaschinen AG

Detlef Freyer

Heidelbergerer Druckmaschinen AG

Uwe-Jens Krabbenhoef

Hewlett Packard Company

Mark Gorzynski

Hewlett Packard Company

Jack Holm

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R.R. Donnelley & Sons

Dr. Michael Rodriguez

WaveMark Technologies, Inc.

Tom Schuneman

Xerox Corporation

Ann McCarthy

X-Rite, Incorporated

David Buell

Chairman's Report

The *Graphic Arts Special Interest Group* addresses the specific problems faced by companies trying to implement ICC based workflows for high-end graphic arts, particularly in cases when final output is done on a printing press. This is an area in which there are many high quality traditional tools, and the skill level of press operators is also high.

However, these traditional methods may also be limited in their flexibility, and GASIG members believe ICC based workflows can help increase this flexibility. The WG has been identifying specific areas in which ICC implementations have been limited in the past, and is working to identify these shortcomings and provide solutions.

Chairman's Report

The *PCS Lab Working Group* was formed in February, 2001 and completed its task in April, 2001. The group submitted a ballot 200103 which was approved and is now included in the v4 spec:

PCS Lab value and encoding ranges are currently undefined for mBA tags, mAB tags, and gray profiles with kTRC. They required definition before the ICC 4 specification could be released. Also, the use of two different value ranges for PCS Lab has caused confusions in the past, resulting in malformed profiles.

The working group recommended a single PCS L* a* b* value range of 0 to 100, -128 to 127, -128 to 127 respectively for new tags, while leaving the range for legacy tags unchanged. The working group considered both Lab value ranges that are used in the current spec. I would like to thank the members of the group for their input and support. They are:

Chairman: Eastman Kodak

George Pawle

Members: Adobe Systems
Apple Computer Company
Agfa-Gevaert
Heidelberger Druckmaschinen AG
Hewlett Packard Company
Kodak Polychrome Graphics
Polaroid Corporation

Lars Borg
Luke Wallis
Dirk De Baer
Uwe-Jens Krabbenhoeft
Mary Nielsen
Chris Edge
Michael Vigneau



George Pawle,
Eastman Kodak

Specification Editing Working Group

Charter: The Specification Editing Working Group is tasked with keeping track of the approved changes to the ICC specification and developing draft minor and major revisions to the spec for approval by the ICC.

Chairman: Creo

William Li

Members: Adobe Systems Incorporated
Adobe Systems Incorporated
Creo
DuPont Ink Jet
Eastman Kodak Company
Eastman Kodak Company
The Fuji Photo Group
The Fuji Photo Group
Hewlett Packard Company
London College of Printing
Polaroid Corporation

Manish Kulkarni
Lars Borg
Dana Fokos
Robert Strum
David Q. McDowell
George Pawle
Martin Gouch
Mike Wilsher
Johan Lammens
Professor Tony Johnson
Michael Vigneau

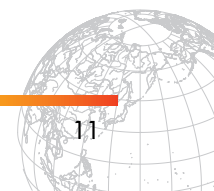


William Li,
Creo

Chairman's Report

The *Specification Editing Working Group* met regularly throughout 2001 and worked intensively to prepare the draft specification Version 4.0 that was published for balloting in the fall. The group has also agreed on a timeline for development of a further enhancement to the spec, entitled Version 4.1, which will incorporate additional comments and user experiences.

In addition, the working group has addressed the question of associating ICC specifications with the International Organization for Standardization (ISO). Recognizing the advantages of this step in terms of consistent formatting and elimination of ambiguity, the group has recommended that ICC Version 4.0 be re-formatted to be consistent with normal ISO level formatting.



Workflow Working Group



Dr. Stefan Brues,
GretagMacbeth

Charter: The Workflow Working Group will:

1. Identify a small number of the most commonly used workflows
2. Recommend effective ways for application to use the ICC specification to satisfy those workflows and recommend improvements to the specification, or implied architecture, in order to make the workflow procedure more efficient
3. Identify where predictability and consistency are required in the workflow and insure that the recommendation enable them to be achieved
4. Recommend what procedures are required to ensure ease of use with the recommendations made
5. Identify any liaison relationships that need to be established

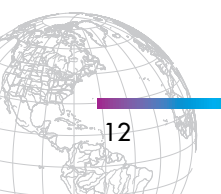
Chairman:	GretagMacbeth	Dr. Stefan Brues
Vice-Chairman:	Xerox Corporation	Ann McCarthy
Members:	ALWAN COLOR Expertise	Elie Khoury
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	London College of Printing	Professor Tony Johnson
	Quark, Inc.	David Allen
	Que-Net Media	Bob Hallam
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Chairman's Report

The *Workflow Working Group* was created to develop ways in which applications can use the ICC Specification to meet the needs for color consistency and predictability in specific workflow environments. The WG's first task was to begin identifying the dominant color management workflows in the industry.

To help understand these workflows, a workflow description template was created, which defines the stages of the imaging process in terms of the input and output data and control content at each stage, and the data and control transformations each stage performs.

This template provides a common frame of reference in which the industry's large number of workflow products can be discussed. It will also support the WG's effort to develop a glossary of terms related to workflows and color management.



The ICC at work...Scottsdale, Arizona, November 2001



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Published Articles

“Standards Update – CIE Report Published,” *IS&T Reporter “The Window on Imaging”* (Society for Imaging Science and Technology), December 2001.

“Color Management – What’s New from the ICC,” *The Prepress Bulletin* (IPA, An Association of Graphic Solutions Providers), November-December 2001.

“Standards Update – International Color Consortium,” *IS&T Reporter “The Window on Imaging,”* April 2001.

“Color Management for the Pragmatic: Where Do We Go From Here,” *The Seybold Report*, April 16, 2001. A response to this article in the form of a letter to the editor by ICC Technical Secretary Professor Tony Johnson was published in the June 18 issue.

“Color Management – What’s Needed for Printing and Publishing,” *The Prepress Bulletin* (IPA, An Association of Graphic Solutions Providers), March-April 2000





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