**ISO/IEC JTC1/SC29/WG1
(ITU-T SG8)**

Coding of Still Pictures

JBIG	**JPEG**
Joint bi-level Image	Joint Photographic
Experts Group	Experts Group

TITLE: Report on Core Experiment CodEff03 (Rochester),
"Even-Length Filter Bank Option"

SOURCE : Chris Brislawn, Brendt Wohlberg
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PROJECT : JPEG 2000

STATUS : Report

**REQUESTED
ACTION :** To be presented at WG1 meeting in Rochester,
August 2000

DISTRIBUTION: WG1 web pages

Core Experiment Description/Results Summary on VM 7.2
Experiment Name: Even-Length Filter Bank Option (Part 2)
Sub-Group: Coding Efficiency   Number: 03 (Rochester)

Description:

Core experiment **partners**	Los Alamos National Lab Ricoh SAIC/Univ. of Arizona
Core experiment **objective**	Demonstrate algorithms for implementing even-length filter banks in a manner that enables resolution-scalability in the reference grid coordinate system.
JPEG 2000 **Requirement** Focus	Expand user options for filter banks.
What will **change** from Verification Model 7.2	Additional filter bank options.
Key **Benefit** of change	Additional filter bank options.
Related Experiments	Generalized subband decomposition trees
Expected Memory Decrease/increase	No anticipated changes (same memory requirements as odd-length filters)
Expected Complexity Decrease/increase	No anticipated changes (same complexity as odd-length filters)
Other expected results	

Core experiment detail description	Implement filter bank algorithms for even-length filters that comply with the established conventions for resolution-scalability in the reference grid coordinate system, specifically, the convention of alternating lowpass and highpass filter outputs across tile boundaries.

Results:

VM Mode Used in Experiment	Convolutional filtering. The VM's low-memory lifted transform implementation is proving difficult (time-consuming) to re-engineer.

What has **changed** from Verification Model 7 (provide level of integration)	Code has been added to the VM to implement the even-length transforms.

Was this experiment **performed** on the VM or in a testbed	VM 7.2

Key **Benefit** of change	We have provided transforms for even-length filter banks that enable resolution-scalability and geometric image transformations via compressed codestream manipulation on the reference grid, just as with odd-length filter banks.
Key **Cost** of change	Additional signaling needs to be defined to distinguish between odd- and even-length optional filter banks.

1   Recommendations

Include even-length algorithms in Part 2 Annex F using the generic lifting framework already defined there.

Add examples of even-length filter banks to Part 2 Annex F.4.

Add LANL convolutional software to the VM.

Continue the core experiment for New Orleans:

> Fine-tune choice of 2-point postprocessing transform, including subjective analysis of distortion and tiling artifacts.

> Develop software lifting implementation of generic transforms for both even- and odd-length optional filter banks.

> Work with Part 2 Annex G and H authors to verify compatibility of generic filter bank specifications and software with the SSOWT methods in Annex G and the generalized subband decompositions in Annex H.