Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
CMT/1	Timeline p.4, A.3.1		ge	Schedule requires "Participant" status prior to access to Validation Dataset. This means a vendor must commit to participating prior to seeing any validation images.	Allow access to Validation Dataset upon submission of "Intention to Participate" so vendors can make final decision about participation after preliminary testing with Validation Dataset	For procedural consistency with other NIST tests, will keep schedule as is. NIST hopes to make or facilitate making some iris imagery public for research purposes.
L1/1	1.	bullet list	ge	We assumed that NIST plans to compile or freshly collect test image databases that can be given to the participants.	If this is the case add corresponding task to the itemized list.	Noted Fresh data collection by NIST has never been part of the plan. NIST has issued call for iris imagery and hopes iris community will share their iris images with NIST.
Iritech/1	1	Table 1	te	*Iris boundary shape* quality metric might be split into iris-pupil boundary shape and iris-sclera boundary shape. However, visible iris-sclera boundary shape is closely related to *sight direction* quality and may not play own role.	*Iris boundary shape* quality metric might be split into iris-pupil boundary shape and iris-sclera boundary shape.	Accept in principle See L1/6 This has been added to Table 4 and not Table 1, since Table 1 just lists quality metrics mentioned in SC 37 N3331. One of the planned outcome of IQCE is to refine the list of quality metrics in N3331. Note that evaluating these will

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
						be difficult at least because it requires ground-truth boundary shape. NIST will report the interaction of iris shape and gaze (sight) direction quality metrics. (see CAM/4).
Iritech/2	1	Table 1	te	It seems there are no detection qualities among quality metrics. Of course, detection qualities are algorithm-dependent and also are product of other "primary" image qualities like sharpness or signal-to-noise ratio, but we are sure some of them will be useful for estimating matching error rates. Thus we propose to include such measures to quality metrics.	Add "Pupil detection quality", "Iris detection quality" and "occlusion detection quality" to the third column of the table	Reject 1. Agree that segmentation accuracy greatly impacts matching performance. Several image properties such as iris size (e.g. very large irises), margin (e.g. off-centre or cropped irises) could cause segmentation failure. Some algorithms might be more sensitive to such image impairments than others. NIST will relate failure to create (proprietary) template to image quality features such as iris size, margin, and sharpness and signal-to-noise ratio, as

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
						suggested by the comment. 2. Vendors can choose to compute segmentation-accuracy as a proprietary quality metric in position 33-64 of their IQAA.
CAM/1	1	P. 7.26, Table 1	te	The disjunction "Noise (or camera sensitivity)" does not make sense, as these are two quite different and independent concepts. Why the ("or") disjunction?		Accept in principle. Table 1 lists quality metrics as appeared in N3331. Will make a comment to N3331 to separate them. Q: Should a new entry be added to Table 4?
L1/2	1.	Table 1, column "Iris Acquisition Covariates"	te	A distinction between motion blur due to camera shake and motion blur due to eye/eyelid movement may be useful. The two types of motion blur give rise to potentially different methods of compensation.	Introduce a comment on this fact. or Replace the cell "Motion Blur" by two cells "camera shake" and "eye and eyelid motion blur".	Accept in principle. Add the following NOTE after Table 4. NOTE Motion blur occurs because either the iris is moving (e.g., subject or subject's eye moving), or the device is moving (e.g., active tracking devices). These two causes of motion blur, give rise

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
						to potentially different methods of compensation. Participants can choose to submit two distinct metrics for motion blur, one at position 10 and another one in vendor-defined portion of IQAA output (i.e. positions 33-64).
L1/3	1.	Table 1, column "Iris Acquisition Covariates"	te	Magnification does not directly depend on resolution and should be included in the list of Iris Acquisition Covariates. It correlates with the quality metric "iris size in pixels"	Add another cell "Magnification".	Accept in principle. Added magnification to Table 4. (Table 1 is a list of covariates in N3331.)
Iritech/4	1	Table 1	te	*Interlace* may be added to quality metrics. Interlacing artifacts, even if detected, cannot be fully compensated.	Add "Interlace" to the third column	Accept in principle. Added interlace to Table 4. Interlace is bad and shall be avoided as most cameras do nowadays. While 19794-6 shall ban interlace, 29794-6 shall include it as a q-metric because of legacy data.
Iritech/5	1	Table 1	ed	Iris size item is in smaller font	Enlarge font for "Iris size" item in the third column of the table	Accept

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
CMT/2	2		te	A primary output is listed as measurements of effectiveness of IQAAs in predicting false nonmatch rate. Some degradations may impact imposter distributions in addition to genuine distributions, so such measurements should predict the impact on both FMR and FNMR.	A primary output should be listed as "Measurements of effectiveness of IQAAs in predicting false-non-match-rate and/or false-match-rate..."	Accept
L1/4	2		te	To which FRR range and algorithm do tolerance values refer? Do they make sense at all?		Noted Clause 2 cautiously mentions "tolerance bounds when possible". For some of the metrics, tolerance bounds may not make sense or may not be possible. For some other metrics (e.g. pupil-iris-ratio, or margin, or maybe iris size) it might make sense.
CMT/3	5		te	Motivation and background does not explicitly mention the use of quality information for quality-based biometric fusion, an important use of quality.	Modify first sentence to read "...and in invocation of quality-directed processing of samples, including quality-based biometric fusion."	Accept
Iritech/6	9.2	page11 line 39	ed	Typographic error	"Element 14-16 are reserved" should be "Element 15-16 are reserved"	Accept in principle. The size of q-vector has changed. Elements 16-32 are reserved.

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
CMT/4	9.2		te	Use of compressed images is not considered, yet in some cases compression may introduce additional degradation.	Compression effects are probably beyond the scope of IQCE but it should at least be acknowledged that compression may further reduce the quality of the image. Add an additional sentence to the first paragraph: "Compression, if applied to image samples, may reduce their quality but in properly designed systems such reduction should not be great enough to significantly affect performance"	Accept
CAM/2	9.2 IQAA output	Table 4 P. 11.27-29	te	There may be a use case for quality assessment on compressed images, if only to establish that canonical quality metrics cannot_detect_compression, per se; yet obviously (as shown in IREX I), compression does affect performance. Moreover, in some scenarios, only a compressed image is available (e.g. an IREX Kind=3 or Kind=7 compressed iris image record); so the quality of compressed images clearly has a use case.	In summary, for the above reasons, it would be interesting to see how quality metrics predict (or fail to predict) performance on compressed images.	Noted Input format is only VGA and Kind3. Kind7 is not considered as an input format here. Will examine how overall quality score (i.e. not quality metrics in positions 2-64) predict or fail to predict performance on compressed images. IREX I showed that compression affects performance.
CAM/3	9.2	Table 4 P. 11.41	te	What is "gray scale density"? Is it just pixel value (0 - 255)?		Change to gray level spread. N3331 clause 6.4.2.2 heading is gray scale density but talks about gray scale resolution.

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
						6.4.2.2 has a note that suggests use of some measure of spread (std or kurtosis to measure gray scale distribution. See L1/5, and CMT/5.
L1/5	9.2	Table 4	ge	The metrics "Gray scale density", "Sight direction", "Iris boundary shape" could be named more descriptively using "Gray level range", "Gaze direction", and "Iris circularity".	Consider switching to these new terms (submit corresponding comments towards the quality standard).	Partial Accept Changed gray level density to gray level spread. See CAM/3. Kept iris-sclera-boundary shape. Avoided Iris circularity because it assumes irises should be circle.
CMT/5	9.2	Table 4	te	Some of the descriptions in this table, taken from SC37-N-3331, are not accurate.	Change "Gray scale density" to "Gray scale range". Change "Head orientation" to "Head roll angle." (This is consistent with face image definitions).	Partial accept N3331 uses gray level density. Have changed it to "gray level spread". See CAM/3 and L1/5. Use "Head rotation" per clause 6.3.8 of N3331. See Iritech/3.
Iritech/3	9.2	Table 4	te	Does *head orientation* mean head rotation? The term head orientation seems ambiguous to us .In ISO29794-6, head rotation is defined rather than head orientation.	Change "Head orientation" into "Head rotation"	Accept See CMT/5.

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
L1/6	9.2	Table 4	te	Add pupil boundary circularity".		Partial Accept Added pupil shape to Table 4 Prefer to avoid the term "circularity". See Iritech/1
CAM/4	9.2	Table 4 – rows 6,7 P. 11.41	te	6 and 7 interact: a change in gaze direction will affine-deform the iris shape.		Noted NIST will examine and report on this interaction. (Iritech/1)
CAM/5	9.2	Table 4, row 10 P. 11.41	te	(please refer back to 11.33): In order for quality vector elements to be normalised onto a unit interval like [0, 100], it is vastly better to refer to "pupil-iris ratio" (which guarantees this), than to "iris-pupil ratio". Also, it should be clarified whether this refers to diameter, or to area (quadratically related). (I presume diameter ratio is intended.)		Noted. Table 4 is using pupil-iris-ratio. Diameter ratio is intended. (N3331 defines Pupil-iris ratio as ratio of diameters.)
CAM/6	9.2	Table 4, row 11 P. 11.41	Q	Is "sharpness" the same thing as a focus score (as in the literature)?		Sharpness is not just focus. Incorrect focal length will cause lack of sharpness, so will other things.
CMT/6	9.2	Table 4	te	N3331 describes "image scale" in terms of the margins on each side of the iris – this is not included in Table 4 as a quality metric but perhaps it should be, since some algorithms may require more area around the iris to accurately locate the	Define an additional table entry called "Field of View" that measures the extent to which the recommended cropping margins (0.2R vertical, 0.6R horizontal) are	Accept in principle. Used "margin" instead of "field of view"

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
				limbus and eyelids.	achieved.	
CMT/7	9.2	Table 4	te	The use of "Visible iris area" and "Occlusions" as two separate metrics is confusing and (probably) redundant. What is most important is how much of the iris is visible and available for matching, i.e. not occluded by eyelids, eyelashes, reflections, etc. As written "Visible iris area" is the iris area not occluded by eyelids and "Occlusions" is how much of this area not occluded by eyelids is occluded by something else.	Either (a) define one "visible iris" metric that measures how much of the iris is not occluded by anything or (b) define two metrics, "visible iris" as above plus a second called "eyelid occlusion" that measures what fraction of the total iris area is occluded by eyelids, or (c) "visible iris" and "eyelid occlusion" as above plus "other occlusion" for what fraction of the total iris area is occluded by eyelids, reflections, etc. Option (a) is preferred.	N3331 only defines usable iris area, and does not make any distinctions among occlusion caused by eyelid/eyelash/specular reflection/etc. Per Iritech comment, the 2nd draft of IQCE introduced distinction between eyelid occlusion and other occlusions (e.g. specular reflection, eyelash, eye water, etc.) Visible iris was meant to be the ratio (percentage) of iris that is not occluded by eyelids, and occlusion the percentage of visible iris occluded by eyelash, specular reflection, etc. CrossMatch and CSC have commented that this distinction is not useful (because ultimately it is non-occluded iris area that matters) and might even be confusing.

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
						Therefore, the third draft of IQCE will only include usable iris area as a quality metric in Table 4 and delete visible iris and occlusion. Participants are welcome to measure and report visible area and occlusion separately in the vendor defined portion of IQAA output (e.g. positions 33-64).
Iritech/7	9.2.2	page 13 line 4	ed	Typographic error	"positions 2-13" should be "positions 2-14"	Partial Accept. Change to 2-17.
L1/7	9.2.2		Te	A quality metric predictive of the false non-match rate may be better represented in the logarithmic space to avoid rescaling when the accuracy of the matching algorithm improves.	Explore this concept in IREX II. Possibly mention it in the test spec.	Will explore the logarithmic space concept, not sure how about relation with rescaling. More detailed what-to-do is much appreciated.
L1/8	9.3		ed	plural required	strategy → strategies	Accept
CMT/8	9.4	Para 2	ed	Lacks clarity.	"Furthermore, NIST will examine how the quality metrics for both enrolment and recognition images can be evaluated jointly to better predict performance. For example, the disparity between pupil-iris diameter ratio of enrolment and recognition images may be a	Accept

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
					better indicator of match performance than the pupil-iris ratio of either sample alone. Similarly, in the case of iris occlusion, it may be more accurate to consider the total occlusion produced by the union of the sets of occluded pixels in the enrolment and recognition images, rather than the occlusion (or visible iris) of just one of the images."	
CAM/7	9.4 Measure performance	P. 13.42-44	te	These lines are difficult to parse. Would this example be consistent with the intention of 9.4: "For example, determine whether iris images with similar pupil-iris diameter ratios give more consistent matching performance than images with dissimilar pupil-iris diameter ratios, and, if they do, quantify the difference in matching performance over varying pupil-iris diameter ratios." If not, perhaps this point could use further clarification. Comment: it is better, throughout, to refer to "pupil-iris-ratio" (which always maps to the unit interval) rather than "iris-pupil-ratio" (which does not).		The intent is as the comment stated. The paragraph is reworded per CMT/8. Sorry for poor wording. Instances of iris-pupil-ratio were mistakes. They are corrected to pupil-iris-ratio.
CAM/8	9.6. Measure robustnes	P. 14.5	Q	Will the fraction of images failing to produce output for each IQAA be broken down by return value (e.g., elective refusal vs. involuntary failure)?		YES
CAM/9	13. IQAA execution time	P. 14.34	ed	Typographic error	100 milliseconds should be 50	Accept See Iritech/8

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
Iritech/8	13	page 14 line 34	ed	Typographic error	"The 100 milliseconds" should be "The 50 milliseconds"	Accept See CAM/9
Iritech/9	14.2.1	page 15 line 3	ed	Typographic error	"IREX participants" should be "IQCE participants"	Partial Accept. Change to IREX II IQCE participants
CAM/10	14.2.2. Sensor identifiers	P. 15.5-11	Q	If IQCE uses atypical images from some of these sensors (e.g. mystery Dalsa camera), can participants be made aware of the likely range of variation of important image variables like iris radius in pixels, and image dimensions? Could the range of such critical image variables be made available more generally?		NIST will aim to post CDF of image variables like iris diameters in pixel, and image dimension for iris image datasets being used for IREXII IQCE on its FAQ page.
CMT/9	14.2.3		te	Effects of image alteration or manipulation should not be included in quality scores. They are more properly reflected in the ability of specific matchers to compensate for certain degradations, making them more robust to quality impairment.	Effects of image alteration or manipulation should not be included in quality scores.	Quality should be computed on unaltered images. Add to the test plan: SDKs can choose to alter images. Their success in compensating for certain image impairments will be reflected in matching accuracy. NOTE Effect of alteration/enhancement on other quality metrics is another

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
						interesting topic. To keep this study manageable (and complete it in a reasonable time), we will include this in our future plan.
Iritech/16	14.2.3	Request for comment	ge	Image enhancement might give a problem in quality interoperability. Image enhancement by one vendor might actually degrade the matching performance of other vendor.	We suggest no enhancement should be done.	See disposition to CMT/9
CAM/11	14.2.3 Geometric, photometric or other alterations to images	P. 15.20-21	ge	Quality scores for altered/enhanced images could usefully be made available, perhaps as optional fields in the quality vector. If matching is done on a template/"record" generated from an altered image, then the quality of the altered image should be known. For example, if a correction for deviated gaze is carried out, it would be interesting to know how successfully that alteration corrects the defect and what the effects on other measures of quality are. Effects of alterations/enhancements on quality and performance would be interesting in themselves.	Effects of alterations/enhancements on quality and performance would be interesting in themselves.	See disposition to CMT/9
CAM/12	14.2.4. Proprietary record creation	P. 15.22 and throughout	te	In IREX I, what are being called "records" in this document were called "templates." I would prefer consistency with IREX I, which would mean that these data would be called "templates" here as well.	I would prefer consistency with IREX I, which would mean that these data would be called "templates" here as well.	Accept. Replaced all instances of proprietary record to proprietary template.
CAM/13	14.2.4, 14.2.7	P. 15.29, "Table 8" and	te	Are input flags K1 and K3 passed to the functions described in Tables 8 and 10? If so, how? They are not included in the	Pass input flags K1 and K3 to the functions described in Tables 8 and 10	Accept

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
		P. 17.14, "Table 10		"Prototype."		
Iritech/10	14.2.4	Table 8	Te	The proprietary record creation function in Table 8 may also compute the quality vector during the template generation. Our question is about the relation between the quality vector computed during the template generation and the one computed by the function "compute_quality_from_image_data." A class X SDK may support only the quality computation function without the proprietary record creation functionality. However, a class Y SDK should support both the proprietary record creation and the quality computation. In this case, does NIST give the participants the option to choose where to implement their quality computation algorithm? Or does NIST want the participant to implement their quality computation algorithm at both "convert_image_to_proprietary_record" and "compute_quality_from_image_data"? If the participant should put their quality algorithm to both functions, NIST need to test whether both functions produce the same quality vector. On the other hand, if the participants have the freedom to choose the location to put their quality computation algorithm, NIST need to design two different test procedures: one for the SDKs which compute the quality vector during the template creation, and one for the SDKs which compute the quality vector using a separate function. A more serious problem is that if a SDK computes the quality vector only on "convert_image_toproprietary_record" and	Our suggestion is that it is better to force any SDKs in class X or Y to implement the separate quality computation algorithm. And it should be explicitly stated that the speed of IQAA will be measured for "compute_quality_from_image."	Reject Quality computation as part of template (or standard record) generation is a very relevant operational case. We will measure and report computation time for standalone IQAAs (class X) and quality computation as part of template generation (class Z) separately. To clarify class participations, add the following to clause 8 after Table 3: Class X SDKs will compute quality vector from an image. Input is an image, and output a 64-byte quality vector. The output of Class X SDKs will be evaluated using comparison scores computed by class Z matchers.

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
				does not support a separate quality computation function, NIST will have no way to measure the speed of quality computation excluding the time spent for the template generation.		Class Y is submission of quality algorithm, a proprietary-template-generator and a matcher. A class Y matcher will only be used to evaluate its mated IQAA. Vendors can submit a stand-alone quality measurement algorithm or quality computation could be part of their proprietary template generation. Class Z is submission of a proprietary template generator (with or without quality computation) and a matcher. Class Z template generators and matchers will be used for class X IQAAs evaluation. Class Z participants can choose to compute quality scores as part of their class Z proprietary-template-generator, or submit a stand-alone IQAA as a class X. Quality scores computed by a Class Z proprietary-template-generator will be evaluated by

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
						other Class Z matchers.
Iritech/11	14.2.4	Table 8	te	The input parameter "output_type" in Table 8 shall be used to distinguish the role of proprietary templates. The types will be generic, verification, or enrollment. This parameter has not been used in the previous IREX project. In IREX, NIST used different prototypes for each type of templates as shown in Table 11 of IREX API. We think either approach is fine. However, current version of IQCE API is lack of the clear definition of the values for "output_type." The input parameter "which_eye" is clearly defined to have the values among EYE_UNDEF = 0, EYE_RIGHT = 1, EYE_LEFT =2. Likewise, for the input parameter "output_type", the values for GENERIC, ENROLL, VERIFY should be clearly defined.	Define the numeric values for output_type. For instance, GENERIC = 0, ENROLL = 1, VERIFY = 2	Accept. See CAM/14
CAM/14	14.2.4	Table 8 P. 15.29		What values of input parameter "output_type" denote "generic" and "enrollment and verification"?	Define these values	Accept. See Iritech/11
Iritech/12	14.2.4	Table 8	te	We advice to add some “technical” error codes to the list. It is unlikely to happen, but what should the function do, if NULL pointer or invalid parameter (like unknown image format) is passed from the caller?	Add “-2 – NULL pointer” and “-4 – bad arguments” to the “Return values” category	Accept
Iritech/13	14.2.5	Table 9	te	We advice to add some “technical” error codes to the list. It is unlikely to happen, but what should the function do, if NULL pointer or invalid parameter (like unknown image format) is passed from the caller?	Add “-2 – NULL pointer” and “-4 – bad arguments” to the “Return values” category	Accept

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
Iritech/14	14.2.6	Table 10	te	The prototype of the function "compute_quality_from_image_data" has the input parameter "allocated_byte." But it is not mentioned in the input parameter section in the same table. Throughout the document, the quality vector is assumed to be a vector of 32 integers. So it is unnecessary to pass the allocated bytes to this function	Remove the input parameter “allocated_bytes” from Table 10	Accept
Iritech/15	14.2.6	Table 10	te	We advice to add some “technical” error codes to the list. It is unlikely to happen, but what should the function do, if NULL pointer or invalid parameter (like unknown image format) is passed from the caller?	Add “-2 – NULL pointer” and “-4 – bad arguments” to the “Return values” category	Accept

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
Iritech/17	9.2	Table 4	Te	In Table 4, pupil iris ratio is a quality score which tells whether image is good or not. However, in the second paragraph of 9.4, pupil-iris-ratio seems the ratio of the pupil diameter over the iris diameter (multiplied by 100 for percentage representation). What does this pupil-iris-ratio actually mean? If pupil iris ratio is a kind of quality score, then it should be close to 100 when the ratio of the pupil diameter over the iris diameter is around, for example, 0.5. So, Note 3 in 9.2 doesn't make any sense regardless of taking transformation. Also, in this case, we cannot deduce the actual pupil size from this pupil iris ratio. If pupil iris ratio is the actual ratio of pupil diameter over the iris diameter (multiplied by 100), this value doesn't represent image quality as stated in 9.2.2. In other words, neither 100 means best nor 0 does worst. Same argument may apply to iris size. It should be a pixel size rather than a quality score.	Modify Note 3 in 9.2 and line 13-14 in page 13 so that the pupil iris ratio is the actual ratio of pupil ratio over iris diameter.	Accept Why pupil-iris-ratio = 0.5 is the best?
CMT/10	14.2.6		te	Use of a dissimilarity measure to report match results may be confusing and is not consistent with earlier NIST tests.	Match score between 0 and 100 is more appropriate and vendor-neutral.	Reject IREX I used dissimilarity score.
CAM/15	14.2.8	P. 18.6, "Table 11"	te	I don't quite understand how "get_quality_description()" should use the input parameter "nist_assigned_identifier". Is this actually meant to be an input rather than output parameter? I would have thought that the SDK should never be presented with an identifier other than its own. If it can,	Clarify.	Accept in principle. That was a mistake. nist_assigned_identifier is not need.

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**

Title: NIST proposed disposition to Comments on IREX II IQCE test plan + API v2

Comments received: Iritech + CrossMatch(CMT) + Cambridge Univ. (CAM) + L1 + CSC (as annotated pdf, not included here).

Date: 25 Nov 2009	Organization: **NIST**

1	2	(3)	4	5	(6)	(7)
#	**Clause No./ Subclause No./ Annex** (e.g.3, 3.1, Annex A, A.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**	**NIST Proposed Disposition**
				what return value should be given for an identifier other than that belonging to the SDK interrogated?		

1 **Type of comment:** **ge** = minor general **Ge** = major general **te** =minor technical **Te** =major technical **ed** = minor editorial **Ed** = major editorial. (Take care of Word changing **te** to **Te** etc.

NOTE 1 Columns 1, 2, 4, 5 and 6 are compulsory. If column 4 is **ge**, use **ge** in column two also (and leave column 3 blank) if it applies to the whole document.

NOTE 2 NBs should not change the width of columns, in order to make merging easier.

Note 3 **Please submit this document in .doc format and NOT .pdf**