

DICOS PANEL

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Global Systems Technologies Inc.

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DICOS PANEL GENERAL QUESTIONS

DICOS panel general questions:

- **Is networking of TSE to exchange images, ATR results, etc. necessary for TSA?**
 - Yes, for:
 - Remote Screening
 - Risk Based Screening (RBS)
 - Connecting to Common GUI PVS
 - Third-Party ATR development
- **What will it take to get DICOS into the field?**
 - Procurement requirement
 - OEM acceptance
 - All Stakeholders working together to resolve issues and make DICOS stronger (more reliable and address the needs)



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SPECIFIC QUESTIONS

What are the problems that have to be overcome before DICOS works perfectly in the field? Is working perfectly possible?

- DICOS, like DICOM, is a work in progress. There will always be refinements and new modalities and functionalities as technologies and TSA needs evolve, just as there have been within the medical community for DICOM.
- There is no such thing as a “perfect” version. The stakeholders have done all they could using pencil and paper. Now we need to see the real world problems which would take many decades to model, but will arise more quickly in the field.



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SPECIFIC QUESTIONS

What will happen when DICOS is deployed? For example: Will problems be expected?

- Yes. There will be questions of interpretation, resolution of ambiguities, modifications of useful reports, and evolution of data streams, just as with DICOM. Also, new functionalities/modalities will require adjustments.
- Yes, in this universe; however in a parallel universe maybe no.



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SPECIFIC QUESTIONS

How will the problems be resolved?

- Consensual approach as undertaken for earlier DICOS versions under NEMA
- In the same manner that the problems between Analogic and L-3 were resolved when they connected their respective devices, in a professional manner using good engineering practices.



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SPECIFIC QUESTIONS

How long will it take to resolve problems after they are discovered in the field?

- Depends upon the problems encountered. Some ambiguities can be corrected quickly (as in v02a versus v02); others will require more discussion and revision of the incumbent DICOS version.
- The DICOS Technical Committee is putting some of the responsibility for the issue resolution back onto the OEM or vendor reporting the problem. That is the reporting of a problem should also come with a proposed solution(s). The resolution process is made up of many stakeholders and all must be willing to take part in the solution. Simply reporting a problem without a solution is not good engineering practice.



SPECIFIC QUESTIONS

How can these problems be eliminated/reduced before DICOS is deployed?

- Participating OEMs might anticipate some issues likely to arise when a version of DICOS is deployed; others will arise from experience gained in the field.
- The TSA has taken the approach to have developed, and to offer, to the DICOS v02A developer, at no cost the following:
 - Software Development Kit (SDK) so that the OEM or third-party vendor does not have to develop the software and understand the DICOS Standard in great detail.
 - Development of a TSA certified DICOS Viewer that will allow developers to test their implementation by seeing if the DICOS Viewer can display the image along with the meta data. If the DICOS file cannot be displayed in the DICOS Viewer then there is a fundamental problem which must be addressed in the software.
 - Development of a DICOS Compliance Checker. Ensures that the DICOS file is following the DICOS v02A syntax.
 - Development of a TSA Certifier, where the implementor can validate their implementation of DICOS vo2A against what the TSA is requesting in their procurements.



SPECIFIC QUESTIONS

What are the roles of the various stakeholders (TSA, vendors, NEMA) when resolving the problems?

- OEMs: architects of DICOS; need not only to report the issue, but propose a solution that resolves the issue. They are the implementors and have the first hand knowledge of the working of their systems.
- NEMA: facilitator, publisher and standards-setting organization under Standards Committee. Score keeper, collector of issues and resolutions. Get more OEMs and vendors to participate in the development of the DICOS standard.
- TSA: observer and policy authority - Provide guidance to the Technical Committee about what the TSA needs to see in the standard. For example: no loss or compression of images.



SPECIFIC QUESTIONS

How to reduce pointing fingers (Who will assume responsibility?) when systems from different vendors are connected in the field?

- DICOS is presently designed for the B-B' image interface to avoid intractable intellectual property (IP) disputes likely to emerge were the interface standard designed at the raw data sonogram stage (A-A').
- TSA sets the standard and OEMs must qualify their equipment under T&E protocols of TSA.
- By use of the validation set of tools listed above. When an issue arises it will be presented to the NEMA DICOS Technical Committee for final resolution. If there are tag attributes the Technical Committee will rectify them and post on the web site the solution to the issue. If the standard needs to be corrected or enhanced to address this issue it will be in the next revision of DICOS.



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SPECIFIC QUESTIONS

What does the experience with other networking standards (e.g., DICOM) say about what will happen with DICOS when it is deployed?

- DICOM has undergone reviews and revisions over a decade. DICOS would be expected to follow a similar developmental path. However, present versions of DICOS, even if imperfect, are sufficient for deployment. The experiences from such deployments will inform future DICOS changes.



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SPECIFIC QUESTIONS

Does cybersecurity affect the deployment of DICOS?

- Sure. DICOS and any third party connection to the TSA network would have to fulfill DHS MD4300A requirements and appropriate NIST standards from the NIST 800-53 controls as well as any other IRD requirements posted by the appropriate TSA acquisition authorities.
- Not any more than the present deployment.



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SPECIFIC QUESTIONS

What commitments and responsibility does TSA have to provide?

- TSA must (should) require the standard as part of its acquisition requirements.



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SPECIFIC QUESTIONS

What is current status with the standard? For example: With respect to the spec itself:

- DICOS v02A is published and ready to be tested by the OEMs and vendors in the field. A free set of toolkits (Stratovan and TSS) are being developed to ease the pain of implementation, reduce the full understanding of the standard and allow for quicker implementation.

What are the weaknesses and gaps in the standard protocol, syntax and scope needed for field operations?

- After careful development, review, free software development tools by the TSA, and paper examination of the use cases, it is time to turn the on switch and see what happens. We are into the next phase of problem solving, the issues that can only come about through fielding. BTW you can spend the rest of life trying to determine all the issues that may occur and still not over them.

Are bug fixes required?

- This will be more tag attribute clarification. If there are bugs discovered they will be addressed by the DICOS Technical Committee for resolution.



SPECIFIC QUESTIONS

Does additional scope need to be added?

- Yes, as new modalities are discovered and added to the TSE; these upgrades will be added to the standard, for example, CAI, DPC, PCI.

What is the status of sending DICOS objects over a network?

- TSA is still investigating the requirements of the network and the effects on the OEMs and third-party developers.

What is the status of exception handling?

- This needs to be defined further. But upon implementation, these will be examined; hopefully there will be few in the field.

What is the status of supporting TSA's CONOPS?

- DICOS is capable of supporting varied TSA CONOPS. Now there is a standard format for image representation along with a standard method for reporting threats in a TDR.



SPECIFIC QUESTIONS

➤ With respect to vendors:

What are the weaknesses and gaps in OEM's readiness to field and support DICOS enabled technology?

- Need to address this question to the OEMs.

Which vendors are presently DICOS-compliant?

- There is one vendor who is completely compliant, others are working towards DICOS implementation, and one or two vendors are completely against it.

What is the current opinion of DICOS by the vendors?

- Need to ask the vendors in the room.

How do the vendors think that DICOS should be used?

- Need to ask the vendors in the room.

Do the vendors perceive that DICOS will increase/decrease their profits?

- Will increase their profits; will be able to continue to sell to the TSA.



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SPECIFIC QUESTIONS

➤ With respect to TSA:

What are the weaknesses and gaps in TSA's readiness to field and support DICOS enabled technology?

- The TSA has started the implementation; it is time to see the results from fielding.

Does TSA have a spec for DICOS-enabled airports?

- Not at this time, but it will developed as DICOS is implemented.

What is the status of requiring DICOS in purchase specifications?

- The TSA has full rights to the DICOS v02A and can and will distribute the standard to all need to know OEMs and vendors.

Is TSA considering alternative standards?

- No image representation, no. But is considering how to update the DICOS standard to streaming and the other technology advances which have occurred in the past 20 years.

Is TSA considering using connect-a-thons (e.g., at TSIF) before deployment decisions are made?

- Of course, details to come. But first baby steps and development and test tools free of the OEM, vendor and University use.

Answers to these questions from the perspective of different stakeholders should emerge out of the discussions at ADS 18 at the DICOS panel.



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SPECIFIC QUESTIONS

Should you Listen to Me?

- Steve and Carl integrated Analogic's CT scanner to L3's workstation for the L3 3DX Examiner
 - Solved with Analogic's emulator of L3's workstation
- Carl supported the development of the technical requirement specs for DICOS v1 for NEMA.



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SPECIFIC QUESTIONS

How long will it take to resolve problems after they are discovered in the field?

- Finger-pointing could lead to delays.
- Function of the level of the problem.
- The decode/encoding of images will be resolved in the phases approach, leaving problems which arise from fielding.
- Simple problems, quickly (1 or 2 days); larger problems within seven days.
- Inputs from parties will be used to resolve the issues.
- For the SDK, a standard deficiency, a standard interpretation issue or a bug in the DICOS SDK. Assuming a high priority toolkit bug in the toolkit – normally less than 24 hours.



SPECIFIC QUESTIONS

What are the roles of the various stakeholders (TSA, vendors, NEMA) when resolving these problems?

- Vendors to identify the problems and recommend solutions to TSA and NEMA. Their solutions to the problems will be taken as the final guideline.
- TSA will assist in the solution of the problems and keep a running log of the problems and solutions.
- The stakeholders will vary depending on the nature of the issue or request.
 - If an update to the standard is needed, NEMA will be involved.
 - If it is an interpretation, then the TSA, the vendors and the SDK provider.
- All changes to the SDK will be approved by the TSA for bugs that do not involve an update to the Standard.
- Vendors will propose changes in addition to the identification of needed bug fixes.



SPECIFIC QUESTIONS

How to reduce finger-pointing when systems from different vendors are connected in the field?

- A common issue with paper standards. Having the “Golden Standard” provided by the DICOS Toolkit will address this issue to a large degree; however, the need for a stakeholder DICOS committee made up of the TSA and vendor representatives and a issue clearinghouse is key.
- Good leadership (See Bernie Gordon at ADSA16).



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SPECIFIC QUESTIONS

What does the experience with other networking standards say about what will happen with DICOS?

- History in the networking, cellular and medical industry show that standards are written with flexibility in interpretation.
- Unfortunately, this leads to incompatibilities in interfaces. Past standards did not provide SDKs as DICOS has done through the sponsorship of the TSA.
- The TSA's approach in providing a DICOS Toolkit showed significant foresight and should reduce past historical issues with standards.
- Using a software industry best practice of having implementations platforms / SDKs available has been proven to be a significant advantage in reducing issues. Successful examples include Apple's iOS SDK, Microsoft Windows provided SDKs, Android, Java Dev Kit, .NET Framework SDK, etc.



QUESTIONS



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DICOS v3.0

NEMA will perform the following Tasks described in this SOW, to revise and enhance DICOS Standard v02A into DICOS Standard v03:

Task 1: Add Complex DICOS v02A Updates to DICOS v03:

- The technical committee will examine the issues and changes that were too complex and time consuming to be addressed for v02A.
 - a) Those items that were identified, but deemed too complex for inclusion in DICOS v02A; and
 - b) TSA prospects for long-term use of a technology.



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DICOS v3.0

Task 2: Address field issues of DICOS v02A

As the new software is being implemented by the OEMs and third parties, issues will arise. These issues will be brought to the attention of the Technical Committee and will be address in a timely manner. The Technical Committee will make the necessary changes to the standard to avoid makeshift, undocumented solutions to the standard implementation.

- a) As the Software Development Kit (SDK) is used by the OEMs and vendors, address and resolve the issues identified by the end users.
- b) DICOS Compliance/Certification/Testing for a DICOS Viewer. The Technical Committee will review/propose appropriate revisions to the Stratovan compliance test tools to ensure that they meet the DICOS standard.
- c) Code Reviews for TSA DICOS converters by various third-parties. NEMA will support, when directed by the TSA to support a maximum of two code reviews of TSA contracted third-party implementations of the DICOS Standard.



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DICOS v3.0

Task 3: Modalities

a) Enhancements

After the release of v02A, there have been additions to the DX and CT modalities which must be captured to ensure that the fielding and image formats are in place before the technology changes have been made to the DX and CT modalities.

a. Digital X-ray (DX) and Computed Tomography (CT)

i. Coded Aperture Imaging (CAI)

ii. Phase Contrast Imaging (PCI)

iii. X-ray Diffraction (XRD)

iv. Differential Phase Contrast (DPC)

v. Air Cargo - modalities are composed of either DX or CT technology. The TSA wants to capture the changes to these modalities and incorporate these changes before the technology becomes widely fielded. To accommodate air cargo:

a. An expansion of existing DICOS v02A modalities.

b. Will be necessary to expand AT systems to allow up to 8 or more views (high and low energy), as well as a sub-addressing approach, to more efficiently identify the exact location of a Potential Threat Object (PTO).

c. For CT, it is appropriate to accommodate tomographic (incomplete) reconstruction, when matched to an air bill entry

d. Commodity classifications (so that “known” or identified commodities can be cleared expeditiously, devoting resources to other PTOs.



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DICOS v3.0

Task 3 New Modalities (CONT.):

The following modalities will be added to the DICOS formatting standard to ensure that moving forward, these modalities will have the format and data representation in place.

- a. Bottle Liquid Scanner (BLS)
- b. Explosive Trace Detection (ETD)



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DICOS v3.0

Task 4: Enhanced Threat Detection Report (TDR)

- a. Accommodate Emerging Threats (‘classes that result in a new/revised defined term, enumerated value, or attribute)
- b. Prohibited Items (PI) as a class along with the subclasses within PI
- c. Data Fusion between legacy and Machine Learning algorithms



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DICOS v3.0

Task 5: Publish DICOS v03 Standard

The DICOS standard will be updated based on the results of Tasks 1-4. The updated standard will be balloted and adopted via the normal NEMA standards development process, and is notionally called DICOS v03 standard.

The following actions will be performed to accomplish the task:

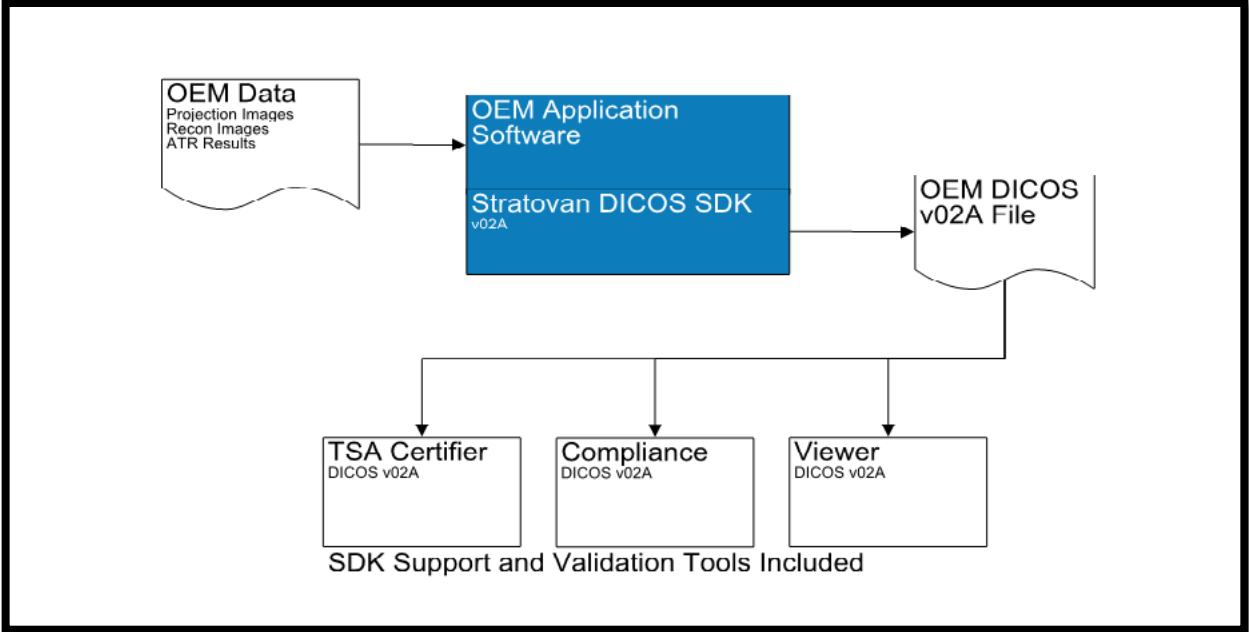
- a. Review and establish consensus regarding the proposed revisions to DICOS, and process the revision(s) according to NEMA's existing policies and procedures for the maintenance of a standard.
- b. Prepare and ballot DICOS Phase v03 standard, using NEMA Standardization Policies and Procedures.
- c. Adopt a final DICOS v03 standard incorporating such revisions.
- d. If consensus is not reached, then a revised standard shall be developed to reach consensus and document required revisions.



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Stratovan DICOS SDK



Location of Stratovan DICOS SDK and Toolkit

Go to: www.Stratovan.com

Click on: Products, Select: Security, DICOS

Complete Form.

The screenshot shows the Stratovan website's 'Our Products' section. The main heading is 'Our Products'. Below it, there is a breadcrumb trail: 'Home / Products'. The product being featured is the 'DICOS Toolkit'. The product image is a green box with the Stratovan logo and 'Stratovan DICOS' text. To the right of the product image is a 'Request access to DICOS Toolkit' button. Below the product image is a 'Description' section. The description reads: 'Our DICOS Toolkit provides a Digital Imaging and Communications in Security (DICOS) software library and conformance testing suite that facilitate the conversion between native security vendor data with the DICOS format. The toolkit enables airport security devices to connect over a local area network, and handles both files on disk and cross-platform connectivity on Linux, OSX and Windows.' Below the description is a screenshot of the 'Movavi Screen Capture Studio' interface, showing a 'Capture' window with a 'REC' button and various settings like 'System Audio' and 'Microphone A'.



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