**LAMPIRAN 7**

**C22**

**LEMBAR**
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW***
**KARYA ILMIAH : JURNAL ILMIAH**

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| Judul Karya Ilmiah (Artikel) | : | Using Computer Aided System to Determine the Maximum Depth of Visualization of B-Mode Diagnostic Ultrasound Image | | |
| Jumlah Penulis | : | 3 Orang (G Maslebu, K Adi, and **Suryono**) | | |
| Status Pengusul | : | ~~Penulis pertama~~/penulis ke **3** /~~penulis korespondensi~~ ** | | |
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| | | b. Nomor ISSN | : | 1742-6596 |
| | | c. Volume, Nomor, Bulan, Tahun | : | Vol. 694, 2016 |
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Semarang, 15 Januari 2020

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Prof. Dr. Wahyu Setia Budi, M.S.
NIP. 195806151985031002
Bidang ilmu/Unit kerja : Fisika FSM UNDIP

Reviewer 2

Prof. Dr. Heri Sutanto, S.Si., M.Si.
NIP. 197502151998021001
Bidang ilmu/Unit kerja : Fisika FSM UNDIP

**LAMPIRAN 7**

**C22.A**

# LEMBAR
# HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
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| Judul Karya Ilmiah (Artikel) | : | Using Computer Aided System to Determine the Maximum Depth of Visualization of B-Mode Diagnostic Ultrasound Image | | |
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Semarang, 14 Oktober 2019

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Prof. Dr. Wahyu Setia Budi, MS
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| Jumlah Penulis | : | 3 Orang (G Maslebu, K Adi, and **Suryono**) | |
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| | | d. Penerbit | : IOP Publishing |
| | | e. DOI artikel (jika ada) | : 10.1088/1742-6596/694/1/012052 |
| | | f. Alamat web jurnal | : https://iopscience.iop.org/article/10.1088/1742-6596/1025/1/012020 |
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| c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%) | 9 | | | 8,5 |
| d. Kelengkapan unsur dan kualitas penerbit (30%) | 9 | | | 9 |
| **Total = (100%)** | 30 | | | 29 |
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c. Data hasil penelitian baik dan sesuai dengan metodologi penelitian yang dilakukan, dukungan referensi cukup bagus, ada 15 referensi. Similaritas baik.
d. Kualitas penerbitan baik dan konsisten, JPCC ini termasuk dalam jurnal (conference series) yang terindek Scopus dan memiliki SJR.

Semarang, 24 Agustus 2019

Reviewer 2

Prof. Dr. Heri Sutanto, S.Si., M.Si.
NIP. 197502151998021001
Bidang ilmu/Unit kerja : Fisika FSM UNDIP

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Journal of Physics: Conference Series
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13th South-East Asian Congress of Medical Physics, SEACOMP 2015; UIN Sunan Kalijaga Convention HallYogyakarta; Indonesia; 10 December 2015 through 12 December 2015;
Code 121007

## Using computer aided system to determine the maximum depth of visualization of B-Mode diagnostic ultrasound image (Conference Paper) (Open Access)

Maslebu, G.[a] ✉, Adi, K.[b], Suryono[b]

[a]Physics Department, Satya Wacana Christian University, 52-60 Diponegoro Street, Salatiga, 50711, Indonesia
[b]Instrumentation and Electronics Laboratory, Faculty of Science and Mathematics, Diponegoro University, Professor Haji Soedharto Street, Semarang, 50275, Indonesia

### Abstract

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In the service unit of radiology, ultrasound modality is widely used because it has advantages over other modalities, such as relatively inexpensive, non-invasive, does not use ionizing radiation, and portable. Until now, the method for determining the depth visualization on quality control program is through the visual observation of ultrasound image on the monitor. The purpose of this study is to develop a computer-aided system to determine maximum depth of visualization. Data acquisition was done by using B-Mode Diagnostic Ultrasound machine and Multi-purpose Multi-tissue Ultrasound Phantom model 040GSE. Phantom was scanned at fixed frequency of 1,8 MHz, 2,2 MHz, 3,6 MHz and 5,0 MHz with a gain variation of 30 dB, 45 dB, and 60 dB. Global thresholding and Euclidean distance method were used to determine maximum visualization depth. From this study, it is proved that the visualization depth using computer aided provide deeper visualization than visual interpretation. The differences between expert verification and the result of image processing are <6%. Thus, computer aided system can be used for the purpose of quality control in determining maximum visualization depth of B-Mode diagnostic ultrasound image. © Published under licence by IOP Publishing Ltd.

### SciVal Topic Prominence

Topic: Ultrasonics | Acoustic properties | Acoustic wave velocity

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Lee, S. , Choi, J.-I. , Park, M.Y.
*(2014) Ultrasonography*

Reproducibility of phantom-based quality assurance parameters in real-time ultrasound imaging

Sipilä, O. , Blomqvist, P. ,

ISSN: 17426588
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DOI: 10.1088/1742-6596/694/1/012052
Document Type: Conference Paper
Volume Editors: Haryanto F.,Ng K.-H.,Peralta A.P.,Arimura H.,Viridi S.
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**2016**

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**10–12 December 2015, Yogyakarta, Indonesia**

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**Accepted papers received: 23 February 2016**
**Published online: 24 March 2016**

### Preface



### Papers

#### Therapeutics

# Verification of Oncentra brachytherapy planning using independent calculation

**N A M Safian[1], N H Abdullah[1], R Abdullah[1] and C S Chiang[1]**

[1] Medical Radiation Programme, School of Health Sciences, Health Campus, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

Email: aininasafian@gmail.com

**Abstract**. This study was done to investigate the verification technique of treatment plan quality assurance for brachytherapy. It is aimed to verify the point doses in $^{192}$Ir high dose rate (HDR) brachytherapy between Oncentra Masterplan brachytherapy treatment planning system and independent calculation software at a region of rectum, bladder and prescription points for both pair ovoids and full catheter set ups. The Oncentra TPS output text files were automatically loaded into the verification programme that has been developed based on spreadsheets. The output consists of source coordinates, desired calculation point coordinates and the dwell time of a patient plan. The source strength and reference dates were entered into the programme and then dose point calculations were independently performed. The programme shows its results in a comparison of its calculated point doses with the corresponding Oncentra TPS outcome. From the total of 40 clinical cases that consisted of two fractions for 20 patients, the results that were given in term of percentage difference, it shows an agreement between TPS and independent calculation are in the range of 2%. This programme only takes a few minutes to be used is preferably recommended to be implemented as the verification technique in clinical brachytherapy dosimetry.

## 1. Introduction

Brachytherapy is a treatment method which requires the delivery of radiation directly into or onto the surface of the area to be treated. In order to ensure the optimal treatment of patients, an institution must develop a suitable quality control (QC) programme for brachytherapy sources, equipment and the physical and clinical procedures [1]. A quick calculation check to evaluate the output of a treatment plan allows detection of any possible errors. Seeking a compromise for efficiency both in the time required for the extra calculation and in the level of reliability. The purpose of this study was to verify the point doses in 192Ir HDR brachytherapy between Oncentra brachytherapy treatment planning and independent calculation software. To the specific review, this study compared the values of planned and independent calculated point doses of 192Ir of rectum and bladder in HDR brachytherapy. These studies also compared the values of planned and independent calculated point doses based on prescription points. Lastly, it was the comparison of the values of planned and independent calculated point doses between pair ovoid applicator and full catheter set ups at rectum, bladder and prescription points.

## 2. Materials and method

### *2.1. Oncentra masterplan treatment planning system (TPS)*

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# Helical tomotherapy optimized planning parameters for nasopharyngeal cancer

**K Yawichai**[1], **I Chitapanarux**[1] **and S Wanwilairat**[1]

[1] Department of Therapeutic Radiology and Oncology, Faculty of Medicine, Chiang Mai University, Thailand

E-mail: somsaksw@gmail.com

**Abstract**. Helical TomoTherapy(HT) planning depends on optimize parameters including field width (FW), pitch factor (PF) and modulation factor (MF). These optimize parameters are effect to quality of plans and treatment time. The aim of this study was to find the optimized parameters which compromise between plan quality and treatment times. Six nasopharyngeal cancer patients were used. For each patient data set, 18 treatment plans consisted of different optimize parameters combination (FW=5.0, 2.5, 1.0 cm; PF=0.43, 0.287, 0.215; MF2.0, 3.0) were created. The identical optimization procedure followed ICRU83 recommendations. The average D50 of both parotid glands and treatment times per fraction were compared for all plans. The study show treatment plan with FW1.0 cm showed the lowest average D50 of both parotid glands. The treatment time increased inversely to FW. The FW1.0 cm the average treatment time was 4 times longer than FW5.0 cm. PF was very little influence on the average D50 of both parotid glands. Finally, MF increased from 2.0 to 3.0 the average D50 of both parotid glands was slightly decreased. However, the average treatment time was increased 22.28%. For routine nasopharyngeal cancer patients with HT, we suggest the planning optimization parameters consist of FW=5.0 cm, PF=0.43 and MF=2.0.

## 1. Introduction

The nasopharynx, a cuboidal chamber, is located below the base of skull and behind of the nasal cavity [1]. Radiation therapy oncology group (RTOG 0225) suggested that the intensity modulated radiotherapy (IMRT) combine with chemotherapy is suitable treatment for staging I-IVB squamous cell carcinoma of nasopharynx [2].

The helical tomotheray (HT) is a specialized technique of delivering IMRT by using a 6 MV linear accelerator mount on the ring gantry that rotate around the patient while couch through the gantry. The HT treatment planning parameters including; Field width (FW), pitch factor (PF) and modulation factor (MF).

The FW has three setting values 1.0, 2.5 and 5.0 cm. The chosen FW is compromised between treatment time and dose distribution in superior-inferior direction. Although a smaller FW results in good dose distribution in superior-inferior direction, there are increased treatment times [3].The PF is the couch distance travel for one gantry rotation divided by FW. Kissick *et al.* has recommend the solution to use PF of 0.86/n, where n is an integer. For reduce dose fluctuation due to helical junction of divergent beam in HT as known as "Thread effect" [4].

MF defines as the ratio of maximum leaf open time to the average leaf open time. Increasing MF contributes the larger of beam modulation. However, there are increased treatment times [4].

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# A fully automated calculation of size-specific dose estimates (SSDE) in thoracic and head CT examinations

**C Anam[1,2], F Haryanto[2], R Widita[2], I Arif[2] and G Dougherty[3]**

[1] Department of Physics, Faculty of Mathematics and Sciences, Diponegoro University, Indonesia
[2] Department of Physics, Faculty of Mathematics and Natural Science, Institut Teknologi Bandung, Indonesia
[3] California State University (CSU) Channel Islands, California, USA

E-mail: anam@fisika.undip.ac.id

**Abstract**. The purpose of this study is to automatically calculate and then investigate the size-specific dose estimate (SSDE) in thoracic and head CT examinations undertaken using standard imaging protocols. The effective diameter ($D_{eff}$), the water equivalent diameter ($D_W$), and the SSDE were calculated automatically from patient images. We investigated sixteen adult patients who underwent a CT head examination and thirty adult patients who underwent a CT thorax examination. Our results showed that the $D_W$ value in the thoracic region was 4.5% lower than the value of $D_{eff}$, while the $D_W$ value in the head region was 8.6% higher than the value of $D_{eff}$. The relationships between diameter ($D_{eff}$ and $D_W$) and $CTDI_{vol}$ were distinctive. In the head region, decreasing the patient diameter resulted in a constant $CTDI_{vol}$ due to the tube current modulation (TCM) being off, while in the thoracic region decreasing the patient diameter resulted in a decrease in value of $CTDI_{vol}$ due to TCM being on. In the head region, decreasing the patient diameter resulted in an increase in the value of SSDE, while in the thoracic region decreasing the patient diameter resulted in a decrease in the value of SSDE.

## 1. Introduction

The radiation dose from CT examinations is greater than other radiological modalities [1, 2]. Therefore, it is very important to accurately estimate the patient dose and to reduce it to as low as possible. In order to estimate and compare CT radiation doses received by patients, the medical community uses volume CT dose index ($CTDI_{vol}$) as an indicator [3]. The $CTDI_{vol}$ is measured using a standard phantom made from polymethylmethaacrylate (PMMA) with a diameter of 32 cm to represent the patient's body and 16 cm to represent the patient's head and a 100 mm pencil ionization chamber [3]. The $CTDI_{vol}$ depends on exposure parameters, e.g., tube voltage, tube current, pitch, and so on. However, $CTDI_{vol}$ is considered to be an output dose indicator only and not a patient dose indicator, because the dose to the patient not only depends on output dose but also depends on the patient's characteristics [4, 5]. The patient dose indicator which takes into account both output dose and patient characteristics is the size-specific dose estimate (SSDE) [6].

The most obvious patient characteristic is the effective diameter ($D_{eff}$) [6]. But this alone is not sufficient to determine the patient characteristic because different parts of the patient are composed of different materials [7-9]. Air (lung) is the biggest contributor in the thoracic region, and soft tissue is

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# Establishing daily quality control (QC) in screen-film mammography using leeds tor (max) phantom at the breast imaging unit of USTH-Benavides Cancer Institute

**K J C Acaba[1,2], L D Cinco[2] and J N Melchor[3]**

[1] The Graduate School, University of Santo Tomas, España Blvd., Manila, Philippines
[2] Breast Imaging Unit – Benavides Cancer Institute, University of Santo Tomas Hospital, Manila, Philippines
[3] Center for Device Regulation, Radiation Health, and Research – Food and Drug Administration, Department of Health, Manila, Philippines

E-mail: akb.karl@gmail.com

**Abstract**. Daily QC tests performed on screen film mammography (SFM) equipment are essential to ensure that both SFM unit and film processor are working in a consistent manner. The Breast Imaging Unit of USTH-Benavides Cancer Institute has been conducting QC following the test protocols in the IAEA Human Health Series No.2 manual. However, the availability of Leeds breast phantom (CRP E13039) in the facility made the task easier. Instead of carrying out separate tests on AEC constancy and light sensitometry, only one exposure of the phantom is done to accomplish the two tests. It was observed that measurements made on mAs output and optical densities (ODs) using the Leeds TOR (MAX) phantom are comparable with that obtained from the usual conduct of tests, taking into account the attenuation characteristic of the phantom. Image quality parameters such as low contrast and high contrast details were also evaluated from the phantom image. The authors recognize the usefulness of the phantom in determining technical factors that will help improve detection of smallest pathological details on breast images. The phantom is also convenient for daily QC monitoring and economical since less number of films is expended.

## 1. Introduction

The Breast Imaging Unit of USTH- Benavides Cancer Institute has been conducting QC program to constantly evaluate the mammography system performance with the goal of improving the detection of punctate calcifications, tumour masses, fibrous extensions and other pathological details to even smaller dimensions.

Daily QC on the SFM equipment in the facility is performed by the assigned QC radiologic technologist following the test protocols in the IAEA Human Health Series No.2 manual. Two films, at least, are used for light sensitometry and for AEC constancy. Though presently, the facility has acquired the Leeds TOR (MAX) breast phantom through the IAEA Coordinated Research Project (CRP) E13039. Only one exposure of the phantom is done to accomplish the two tests, hence, the economy of films used.

The objective of this paper is to verify that measurements made using Leeds phantom are comparable with that obtained from the usual conduct of tests and can be assessed with the

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