Innovating to Meet the Demand for RT

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  • Tony Manfredi – Elekta Oncology Systems
  • Johan Lof – Raysearch Laboratories
RT Global Demand and Benefit

2012

7 million indications
119 million fractions
1.5 million local controls
580 000 lives

2035

12 million indications
204 million fractions
2.5 million local controls
950 000 lives

Atun et al., Lancet Oncology 2015
Current Radiotherapy Coverage

Atun et al., Lancet Oncology 2015
Innovation: Safety and Simplification

Integrated energy fluence field monitoring system.
>**Dosimetric checksum of dose and field shaping systems.**


NanoX radiotherapy system design including fixed linac and patient rotation system.
>**Significant construction cost savings.**

Keall et al. http://dx.doi.org/10.1594/ranzcr2014/R-0142
Innovation: Compute and Power

Software systems that automate the treatment planning process AND improve plan quality.

>Automated planning from 4 hours to 4 min.

Purdie et al. - Int J Radiat Oncol Biol Phys. 2011

Leverage rapid advances in renewable, sustainable power sources and management technologies.
Innovation: Education and Competency

- New methods to assess skills and measure individual progress, competency-based learning, and ultimately ROI.

The design of a RT treatment machine affects the entire system.

- Embark on the design of the machine as a global optimization problem.
- The operating costs, the capital costs, the financial benefit (and their limiting derivatives with respect to time).

“The Devil is in the details, but so is salvation.”

— Admiral H.G. Rickover, USN
Innovation: Bury the Complexity
Bury the Complexity: ‘BOXCare’

• Containerized Factory Manufactured Solutions
  – Imaging, Treatment (surgery, RT), Shielding, Compute, Power Supply and Management
• Cloud-based Support; Automated TPS; Educating;
• Embedded Financing; Ruggedized;

Engineered to Ship and Operate Cancer Care Solutions at Scale
ISO CONTAINER TYPES

Photos of 50 types of specialty ISO Shipping Containers used globally.
# Shipping Containers: Dimensions

<table>
<thead>
<tr>
<th></th>
<th>20' container (TEU)</th>
<th>40' container (FEU)</th>
<th>40' high-cube container</th>
<th>45' high-cube container</th>
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<tbody>
<tr>
<td><strong>external dimensions</strong></td>
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<tr>
<td>length</td>
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<td>6.058 m</td>
<td>40' 0&quot;</td>
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<td>8' 0&quot;</td>
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<tr>
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<tr>
<td><strong>interior dimensions</strong></td>
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<td>39' 5 45/64&quot;</td>
<td>12.032 m</td>
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<tr>
<td>width</td>
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<td>2.352 m</td>
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<tr>
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<td>2.385 m</td>
<td>7' 9 57/64&quot;</td>
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<td><strong>door aperture</strong></td>
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<td></td>
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<tr>
<td>width</td>
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<tr>
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<td>2.280 m</td>
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<td></td>
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<tr>
<td><strong>internal volume</strong></td>
<td>1,169 ft³</td>
<td>33.1 m³</td>
<td>2,385 ft³</td>
<td>67.5 m³</td>
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<td>2,660 ft³</td>
<td>75.3 m³</td>
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<td>3,040 ft³</td>
<td>86.1 m³</td>
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<td><strong>maximum gross weight</strong></td>
<td>66,139 lb</td>
<td>30,400 kg</td>
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<td>68,008 lb</td>
<td>30,848 kg</td>
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<td>3,900 kg</td>
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<td></td>
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<td>10,580 lb</td>
<td>4,800 kg</td>
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<td><strong>net load</strong></td>
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<td></td>
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<td>55,559 lb</td>
<td>25,600 kg</td>
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</table>
**BOXCare: Shielding Feasibility**

**Linear Accelerators:**

Summary: Shielding mass fits within 30t constraint; Current systems “fit”.

**Brachytherapy:**

Summary: Dedicated HDR suite fits within 20’ and 4.1t shielding.
BOXCare: Power Supply

Peak Power Demand:
Linear Accelerators: 25kW*
CT Simulator: 54kW

EcoSphere technologies Inc
Embedded in 10’, 20’, 40’ containers.
Prototype 1.8 kW. Customizable up to 20kW.
BOXCare: Shipping Feasibility

6/7/2017

02108 - BOSTON (UNITED STATES)
KEMBA - Port of Mombasa (KENYA)

CARGO
FCL
3xDV40, 3xHC40

INCLUDED SERVICES: CFR

- PICK UP
  Cargo pick up from the postal code indicated.

- PORT OF ORIGIN
  Services associated with the port of origin: loading of container onto the ship, customs clearance, etc...

- OCEAN FREIGHT
  Cargo transport from one port to another.

7 results found

A PRICE INCREASE HAS BEEN ANNOUNCED BY THE SHIPPING LINES.

1.
USBOS - Port of Boston
UNITED STATES
Transshipment
AEBJA - Port of Jebel Ali
KEMBA - Port of Mombasa
KENYA

$21,340.84
VIEW DETAILS

ONLY DIRECT ROUTES: Yes

USD ($) LOWEST P

BOOK NOW
MASA Studio’s Competition-Winning Hostels Combine Modularity and Tradition for Cancer Patients

16:00 - 3 June, 2017 | by Osman Bari

With a modular composition inspired by traditional sub-Saharan African building typologies, MASA Studio’s safe lodging proposal for Tanzanian cancer victims has been selected as the winner of the Hostels for Hope competition, which called for solutions to issues of health and safety in regards to the rehabilitation of cancer victims away from home in rural Africa. Organized by Pink Ribbon Red Ribbon, an international foundation combatting women’s cancers, the competition responds to the unfortunate decision that thousands of Tanzanian women have to make every year – to travel great lengths for unaffordable treatment and lodging, or to remain at home unable to fight the disease.

Summary

• Evidence based benefit of radiation therapy demonstrates the opportunity to save 950,000 lives per year by 2035.

• While significant investment is required, a net financial benefit has also be projected.

• We need to develop innovative approaches to enable RT to be applied at scale and at speed.
Robust Essential Components of Effective Cancer Control