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# Vendor Provided Data, Tools & Test Procedures

*The Linac Vendor Perspective*

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## Disclosure

Presenter is an employee of Varian Medical Systems  
Palo Alto, CA, USA

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## Learning Aim

- What: Understand vendor considerations when providing test tools, data and procedures for a linac.
- Why: Enable vendors and physicists collaboration in developing independent verification tests of closed/black box systems.
- How: Pedagogical approach → case studies.

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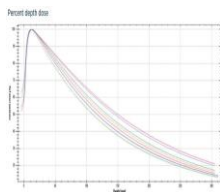
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### Case 5: Linac Beam Data

- Assist in commissioning by providing beam *data*
- Key information to provide with the data
  - Measurement setup
  - Detector type(s)
  - Scanning protocol
  - Example TPS beam model calculations



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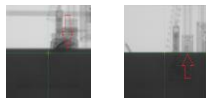
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### Case 6: Sometimes Vendor Has to Provide Procedure

- How to set up water phantom SSD (*procedure*) in the absence of a front pointer
  - Use the EPID?
  - A first guess: put a radiopaque object at depth of 100 cm - SSD?
  - Vendor recommended procedure
    - Trigonometry reveals that for a particular SSD value,
      - ... there exists a gantry angle such that,
      - ... one of the divergent rays from MV x-ray source
      - ... will exactly graze the water surface,
      - ... resulting in a sharp edge in the image of the air-water interface



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### Case 7: IEC 60976

- Vendor-provided *data* per regulatory compliance requirement
  - Regional differences in medical device regulations
    - For some linac characteristics, IEC allows for provision of data that differs from recommended standard value: "should"
    - The Chinese GB standard does not allow for deviations from recommended value



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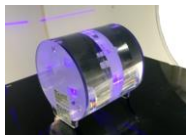
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### Case 8: Hounsfield Phantom

- Vendor-provided **tool** per regulatory compliance requirement in India and USA



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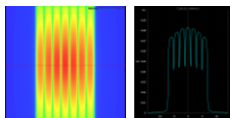
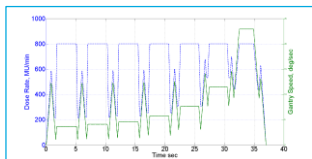
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### Case 9: VMAT test trajectory

- Vendor-provided **data** per precedent & publication\*



\* C. Ling *et al* IJROBP 72 (2) 2008 PP 573-581

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### Case 10: Physics QA Requirements

- How to apply TG-142 for a treatment delivery system that doesn't look like a conventional linac?
  - Vendor can get user up to speed quickly by enumerating the relevant aspects of TG-142

RELEVANT TG142 QA TASKS

- Daily 6 of 17
- Weekly 1 of 1
- Monthly 21 of 39
- Annual 28 of 52
- Total 56 of 108 (52%) applicable

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### Summary

- Precedent
  - Vendors are sensitive to established patterns of practice
  - But also seek opportunities to innovate
- Publications
  - Vendors rely on published standards, codes of practice, guidelines and research articles
- Prescience
  - Need to anticipate what the future will look like
  - Technology, clinical practice, hospital operations & human resources
- Collaboration
  - Keep the lines of communication open between vendors & clinical community
  - Appreciate and recognize the symbiotic relationship between vendors and clinical users

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