Open Source Imaging Initiative (OSI²)

Bringing affordable magnetic resonance imaging (MRI) to the world

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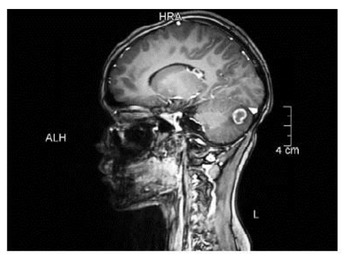
Problem

Why is MRI important?

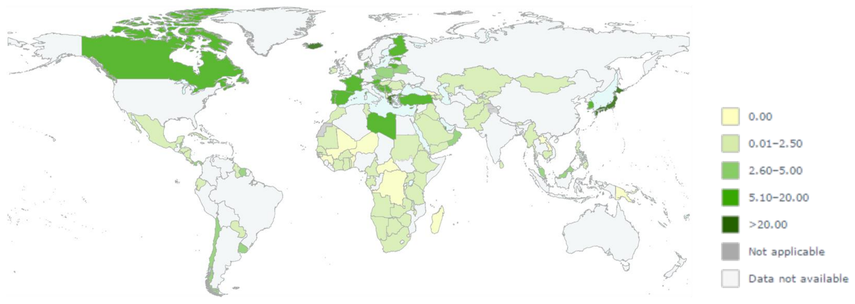
Most **powerful** clinical imaging modality today

Key to the **early diagnosis** and successful treatment of infectious diseases (tuberculosis), musculoskeletal injuries and diseases (osteitis), trauma (brain/spinal cord injuries), cancer (breast cancer), lung diseases (pneumonia), etc.



Global MRI scarcity[1]

(density per million population)



Complex & Costly

1-2.5 mio € for a scanner

Plus annual costs of
120.000€ maintenance
300.000€ operations

Total cost:
5.2 – 6.7 mio € over 10 years (!)

Developing countries: Very limited or **no access** to MRI

Industrialized countries: **Long waiting times** for an exam (>30 days in France[2])

Black-box design causes

- **slow progress** in research, education, collaboration and innovation
- **costly products** and maintenance[3]
- **profit-oriented** rather than global need-oriented product development

Solution

A Roadmap

for Open Source research and development

Knowledge sharing
and collaboration

Ensuring
patient safety

Community Building

- Connecting the research, industry and maker communities for **open source value creation**
- Connecting medical doctors and developers (collaboration with OneWorldDoctors.org)

One World Doctors · ISMRM ONE COMMUNITY FOR CLINICIANS AND SCIENTISTS · open source hardware · open source ecology

Open Sourcing Research & Development

- Guidelines for open source **hardware licenses**
- **Legal frameworks** for open source hardware in research institutions
- Documentation and **publication strategies**

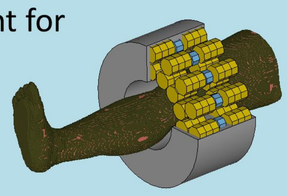
Quality, Reliability, Safety

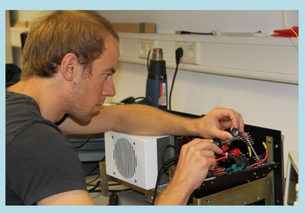
- **Guidelines** for hardware development for a smooth transition from research prototype to medical device
- Collaborations with experts in the **certification** of medical devices and OpenQRS

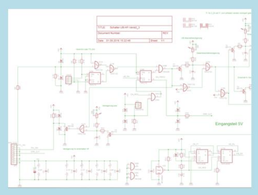
open source imaging .org

Building Open Source MR Hardware

- B_0=0.2T MRI (**<10.000€**)
- „**mobile**“ <100kg
- No liquid helium/nitrogen needed
- No power needed for the magnet
- Simple push-button scans
- **Safer operation** at low field
- Quiet scanning
- **Open source** documentation
- Open source development of lab equipment for building and testing the device







Education

- Clear documentation and manuals
- **Training** developers and staff
- Interdisciplinary collaborations

Business Opportunities

- Customized and **local production**
- Maintenance and service
- Training and workshops
- Certification

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PTB Physikalisch Technische Bundesanstalt

Learning to develop, implement, maintain and understand

Creating regional markets with stable low prices:
global access to MR Hardware

Lower costs of acquisition, maintenance and operation

References: [1]World Health Organization, “Global Health Obervatory (GHO) data: Medical equipment (density per million population)”, 2014 [2]Rylands-Monk F., “French MRI waiting times arouse fresh controversy”, Aunt Minnie Europe, 2015 [3]Sferrella S, “Equipment Service: Total Cost of Ownership, Radiology Business, Dec 28 2012

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B.U.F.F. Berlin Ultrahigh Field Facility