# Innovation for the most vulnerable: from ideation to deployment

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SurgiBox

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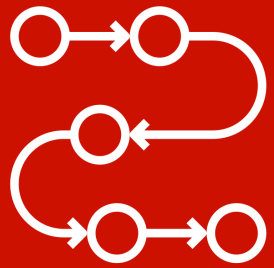
# Overview

## A bit about...



… me

… SurgiBox: The beginning, needs assessment

… SurgiBox: The prototype iteration process

… The SurgiField Kit:  Regulatory and Deployment

A full Conclusion

# A bit about me

**Born in India, Raised in India, Nigeria and Switzerland and still in CH. EE (EPFL) by training with specialization in smart grid technology, love traveling the world, discovering new food.**

## Co-Founder and VP SurgiBox

Fundraising | DFM | Partnerships | QA | RA

## Researcher and Instructor at EPFL

Cold Chain| Energy| Emergency Transport | Development Engineering

## Other Experience

Solidarmed | ICRC | WHO | Google for Startups | Co-Founder IndiaSource

# The beginning: needs assessment

Source: Pullitzer

# 18 million

Deaths due to lack of safe surgery (Lancet Global Surgery)

# 85’000

Providers getting infected by blood splashes during surgery

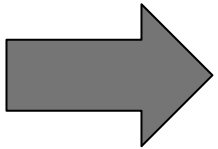
# 72 hours

Time for the best teams to get to the field after a disaster

# Why is there an issue ?

Root cause analysis

- Unmet need
  - Lack of trained personnel
    - SurgiBox cannot do anything here except for awareness activities
  - Lack of infrastructure
    - Bulky
    - Expensive
      - Old Paradigm of doing surgery



Solution:

Change the paradigm !

# Status Quo

Development settings

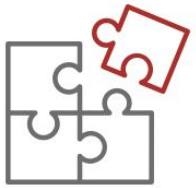
- Trailers (See Cinterandes)
- Operating in an OT
- Non-sterile operations

# The SurgiField™: A rapidly deployed, cost-effective and ultra-portable surgical environment incubated at MIT and Harvard :

- protects the patient's surgical site from the outside environment and medical personnel;
- the medical provider from the patient's bodily fluids;
- transforms any space into a surgical environment, therefore significantly increasing surgical capacity
- simplifies supply-chain burden

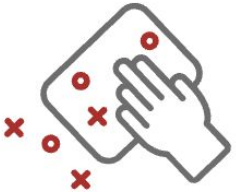
**<90 second time-to-incision**

**<8 lb. kit, ready-to-use**

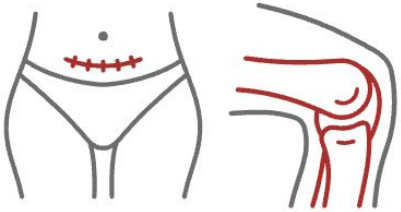


**Seamless fit into surgical workflows**

**Automated pressure control**



**OR-level cleanliness**



**Abdominal & orthopedic applications**

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# “ Today, it is crazy that petri dishes are better protected than some surgical patients” Dr. Debbie Teodorescu, Founder SurgiBox

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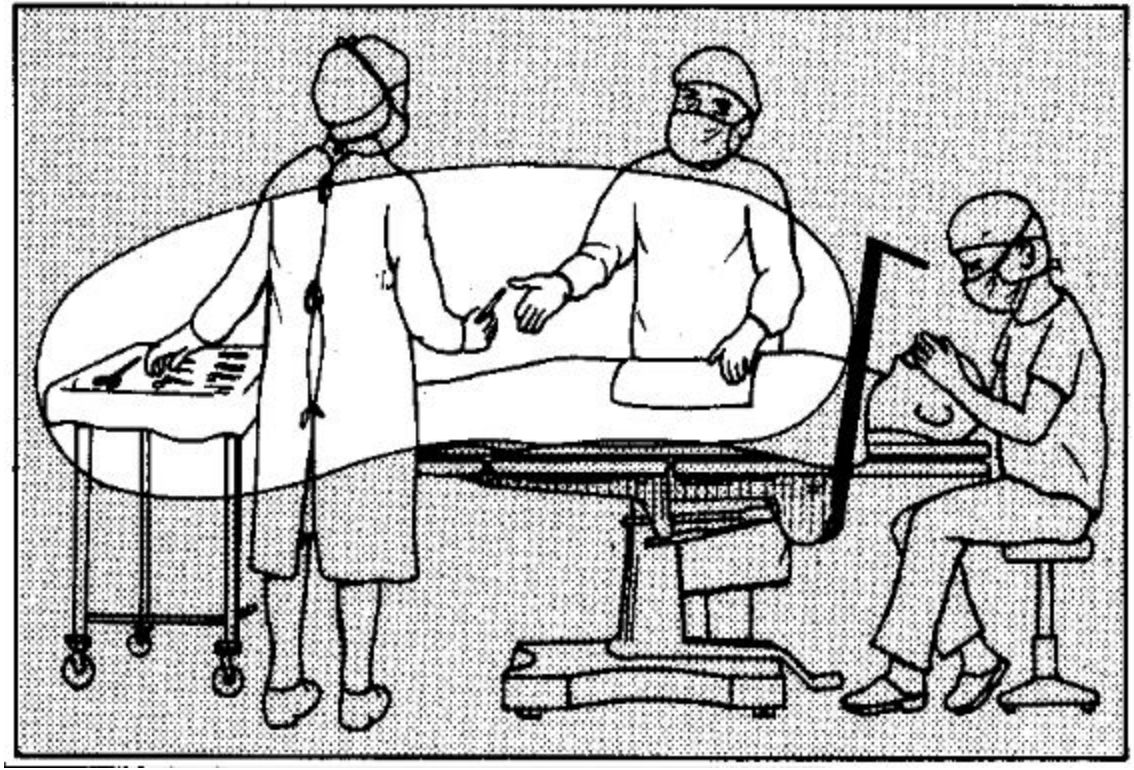


Source :
https://storage.googleapis.com/global-help-publications/books/help_primarysurgery02chaptertwo.pdf

# Then, Debbie goes to MIT D-LAB with this idea in mind

Source: WSJ

# Initial Success

**Harvard President's Challenge**
75k USD

**Best Paper Award AAAS**

**Paper accepted as UNESCO Conference in Lausanne**
This is where I have joined (2017)

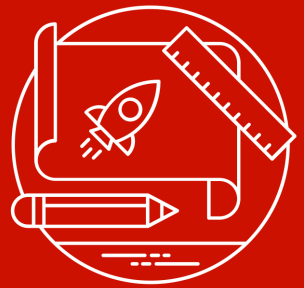
**Tip**

Right place at the right time :D

# Let us start a company ! A bit about our first pitch.

# The world has changed a lot since!

# A bit about prototyping



**Define key users AND customers**
If possible, onboard users with some influence/authority.

**Define User Requirements Review**
Shall and Should, Know the Industry Standards

**Few Rounds of Iteration until lab POC**
With the small team, until you say: The core concept works.

## Tips

In the beginning, no need to involve too many users

Invite first users to be part of the advisory board and also team

Involve more customers after lab POC

Users != Customers
Define both very early

# Create Partnerships





**Importance of creating local and international partnerships !!!!**

# The case of conflicting advice

Each user will have their **own opinion**.

The user does not know the **technical limitation** of the product, you do.

Clearly define the **minimum viable product** and FOCUS on it.

Each new feature addition will take much more time than expected

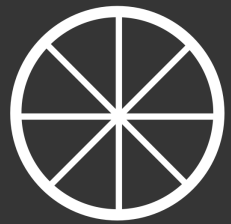
**Tip**

You can always say: well this is what we have now. Use it, and while you use it we will work on the next features.

Ensure that the user gives written feedback. Share the meeting notes with the user and get them signed! Keep a written record of everything!

# Don’t reinvent the wheel!

Try to get as many components as possible off-the-shelf.



**Tip**

SurgiBox is battery powered: we will not invent a new battery technology for it, we will buy what is available.

# Raise Funds


wellcome


CREATING
HOPE
IN CONFLICT:
A HUMANITARIAN
GRAND CHALLENGE


SBIR · STTR
America's Seed Fund


USAID
FROM THE AMERICAN PEOPLE


UKaid
from the British people


Ministry of Foreign Affairs of the
Netherlands


WITH SUPPORT FROM
Grand Challenges Canada
Grands Défis Canada

# Get that darn thing OUT THERE !

Don't get stuck is constant R&D.

- The Product Development Team will only see the mistakes and failures in the product.
- The customer is often satisfied before the R&D team.

→ Take the next step from prototype to product.

# A bit about medical devices

**ISO 13485 / FDA QSR**
Quality Management System

**CE**
Conformité Européenne (Barrier to the European Market, and virtually the whole world)

**FDA**
Food and Drug Administrations (Barrier to USA)

**Tip**

KNOW THE INDUSTRY STANDARDS BEFOREHAND

# How to get the CE Mark ?

**Manufacture** the product

**Test** the Product Formally (Validation Plan)

**Apply** for conformity assessment (CE)

# Now the adventure really starts

Going from prototype to product

is even more challenging !

**Elon Musk**
@elonmusk

The extreme difficulty of scaling production of new technology is not well understood. It's 1000% to 10,000% harder than making a few prototypes. The machine that makes the machine is vastly harder than the machine itself.

# Design for Manufacturing

- Spend time to scout for contract manufacturers, ensure that they have the write tooling capabilities
- Simplify the design of your device, the faster you make it, the lower the total price
  - Manufacturability > Bill of Materials
- Supply Chain Issues
  - Critical Component Analysis
- There will be delays

# Media Coverage and Awards

Award-winning technology for making surgery safer for both patients and healthcare providers

## Select Media Coverage

THE WALL STREET JOURNAL.
*"The Challenge of Health-Care Innovation"*

Forbes
Cofounder SJ was 30 Under 30 in Healthcare

The Telegraph
*"UK funded inflatable operating theatre set to revolutionise emergency surgery"*

medgadget
*"SurgiBox: a Portable Operating Room for Surgery Anywhere"*

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## Select Awards

MC MASSCHALLENGE
Platinum Award

TEDMED
HIVE Innovation

VE RI TAS HARVARD
President's Challenge & New Venture Challenge

CREATING HOPE IN CONFLICT: A HUMANITARIAN GRAND CHALLENGE
Inaugural Winner

MEDICAL INNOVATION CHALLENGE
TECHCONNECT ACCELERATOR & PRIZE
National Winner

W wellcome
Innovator Award

AAAS AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
Science & Human Rights Coalition Sessler Award


AIR FORCE SPECIAL OPERATIONS COMMAND

# Now the adventure, really, really starts

"We are victims of advanced technology everyday, drones parachutes, etc. This is when we need most technology innovation (like yours) to help us save our people."

# What's next

- Deployment in Myanmar, Ukraine, Yemen and Gaza (ongoing)
- Selling in LMIC markets: Programmes for Maternal Health, starting with countries which have easier processes for purchasing
- Private Markets: Non invasive surgeries in clinics

## Scale up through partnerships

# Thank You !

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