BGU and Rotec – the many reversals in trying to get flow reversal into the market

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The Problem

**Scaling**: Mineral deposits that harm performance of water treatment and industrial process equipment

**Membranes Systems**

**Industrial Systems**

**The outcome:**
1. Increased **energy, chemical** and **equipment** costs
2. Reduced **water** production

**Early detection** of onset of scaling, allows more timely and cost-effective intervention to prevent scaling and reverse its effects.
Flow reversal technology - basic principles

Flow Reversal at induction time or before:

Induction time reached - Flow reversal performed

Permeate (product)

Concentrate / Brine (exit)

Feed (entrance)

Feed (Undersaturated)
Brine (Oversaturated)
Permeate
U/S Scale Sensor technology - basic principles

- Unfouled
- Fouled

Algorithm output

Crossover point – scaling starting
No scaling occur

U/S Scale Sensor technology – R&D phases

- Phase I – Flat sheet scale sensor development
- Phase II – Spiral-Wound membrane scale sensor development
Ultrasound sensor picked up presence of CaCO₃ scaling before any flux decline detected! It detected deposits as small as 20 micron (≈1/5th the thickness of a human hair) covering less than 10% of the membrane area.
How did we get there?

BGU Seminar on New LPRO organized by Prof. O. Kedem
1996

Idea – Flow Reversal

Idea – Zero the induction clock

1996

Optical triggering

U/S Triggering

Aug 2005

UCLA

CU

HOW TO TRIGGER FR?

2003

TAMAS 90/10

Proof of principle

2004

PATENTS!

BGN

PILOT PROJECT CONCEPT

2006

ROTEC 2009

WORKING PILOT PLANT

2010

PRODUCTS OUT THE DOOR!

U/S Triggering

NATO SfP
Call for proposals

TAMASHigh Tech Incubator BGN, Mekorot, Angel

 beta customers

Angels, VC’s
Lessons

• University as site for generating/exchanging ideas/knowledge

• Israel Ministry of Industry and Trade (Tamas) programs for partnering industry and academy played key role

• Israel’s needs and geopolitical situation offer opportunities as well as challenges (NATO SfP)

• Key role played by the right people (collaborators, CEO and engineer of Rotec)
CHALLENGE:
Crossing the “valley of death”

• We have prototypes for some (F/R), proof of principle for other parts (U/S)
• We need to develop salable products
• Most VC’s want to invest where products are already sold but need to expand/develop markets, but we need investment to complete product development – Catch ‘22
• Key issue is developing business model – who are the customers and how does Rotec get remunerated for the benefit they provide customers?
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