

fastbrick robotics

Mike Pivac, CEO

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Fastbrick Robotics

- Fastbrick Robotics is a frontier technology company, and is revolutionising the construction industry through robotic technology
- FBR's **Hadrian X** will vastly improve the speed, accuracy and safety of global brick construction
- In a world first, proof of concept for fully automated, course by course 3D printing of a brick structure has been achieved



The opportunity

- There are over 300 billion bricks laid around the world every year
- The global construction industry is one of convention and custom – methods haven't evolved
- There is a massive shortage of bricklayers – moreso than any other trade
- Labour inefficiencies, wasted materials and poor communication account for annual industry losses of a staggering $120 billion globally
- The serious issue of housing affordability continues to test governments and policy makers around the world

The addressable market

- Independent global market assessment completed by BDO Consulting
- Global addressable market of ~$100 - $200bn
  - Most attractive markets: Australia, UK, USA and Canada ~$12bn
- Market inefficiencies create competitive advantages:
  - Time sensitivities due to climate
  - High material and labour costs
  - Labour shortages
  - Human error/inaccuracy
  - Stringent OH&S regulation



The Hadrian X revolution



The Hadrian X Commercial Prototype

Faster, cheaper, safer and more accurate construction

- The Hadrian X will revolutionise the construction industry
- Building with advanced robotic precision streamlines the rest of the construction process
- The Hadrian X will maximise efficiency and affordability of brick construction with minimal wastage
- Multiple trades can work simultaneously by building to plan, not to measure
- The Hadrian X is a complete game changer, and will bring about a new commercial ecosystem for residential construction



The Hadrian X Commercial Prototype

Faster, cheaper, safer and more accurate construction

- Minimal human interaction required
- Ability to work day and night, 7 days a week
- Design capability of up to 1,000 bricks per hour*
- Universal brick compatibility up to 500mm x 250mm x 250mm
- Omni-track laser alignment system corrects dynamic interference and vibration to 0.5mm accuracy of CAD design
- 30m robotic arm allows completion of all brickwork from a single position on site
- Truck mounted and self powered



*Standard Brick Equivalents

The Room Construction Milestone

Functions & Technology Successfully Demonstrated by the Hadrian 105

- ✓ Robotic de-hacking bricks from pallets
- ✓ Fully automated from pallet to slab without human interaction
- ✓ Accurate brick placement and dynamic pressure control
- ✓ Remote brick processing monitoring system
- ✓ Proprietary laser guidance system with automatic positioning and dynamic interference compensation
- ✓ Construction adhesive application system



- 1.6m(w) x 2.4m(l) x 2.4m(h) room built from CAD design
- 330 maxi bricks (equivalent to 2.2 standard bricks)
- Bricklaying rate ~200 bricks* per hour
- Door and window openings, manual lintel placement

*Standard Brick Equivalents

Summary

- Large addressable global market ~$100 - $200bn
- International patents secure FBR's competitive position
- Development of commercial prototype fully funded – Hadrian X
- CAD/CAM design systems can now be utilised to create efficiencies that were previously impossible
- Competitive advantage – time, cost, quality and safety of construction
- Addresses a dire skills shortage as well as the housing affordability crisis
- Supported by government and major industry partners inc. Brickworks Limited (ASX.BKW)

Appendices

Corporate Overview

Key Personnel

Mike Pivac – Executive Director and CEO

- Airborne Electronic Systems specialist
- Extensive experience in Business Operations Management, Workplace Training and OH&S

Mark Pivac – Executive Director and CTO

- Aeronautical/Mechanical Engineer and Founder of Fastbrick Robotics

Shannon Robinson – Non-Executive Director

- Corporate lawyer and corporate advisor
- Director of Spookfish Limited (ASX.SFI), Yojee Limited (ASX:YOJ) and Equator Resources Limted (ASX.EQU)

Gabriel Chiappini – Non-Executive Director

- Chartered accountant and corporate consultant
- Director at Sunbird Energy (ASX.SNY), Global Geoscience Limited (ASX.GSC), Scotgold Resources (ASX:SGZ) and Black Rock Mining (ASX.BKT)

Key Share Data



Ordinary Shares on Issue[1,2]	**663m**
Options on Issue[3]	80m
Cash in Bank[4]	$3.85m

1. Includes 150,000,000 shares subject to 12-24 month escrow from November 2015
2. Excludes 499,999,998 Performance Shares. Performance Shares to vest in 3 even tranches upon achievement of major commercial milestones.
3. Includes 75,000,000 options exercisable at $0.02 on or before 12 November 2019
4. Cash as at 30 June 2016

Working Smarter

Improving the efficiency and safety of brick construction sites

Traditional Site	Fastbrick Site
Overtime – Risk of cost-overruns	Hadrian works to a precise schedule, following CAD design
Fatigue/Injury – High risk	Hadrian lifts majority of heavy items, and removes the burden of manual labour
Resourcing & wastage – labour/materials	Material/labour costs accurately estimated for brick construction and other trades
Other trades build to measure after completion of the brickwork	Multiple trades can work simultaneously by building to plan, not to measure
Human error – Risk to project timeline, delays other trades, safety concerns	Zero errors in brick construction, laser-guided pinpoint accuracy
Hours of operation – work hours typically limited to daylight	Hadrian works 24/7
Weather/Seasonal Factors – Need to consider the health and safety of human workers	Rain, hale or shine. No tools down

Priority Markets – UK and North America

- UK, USA and Canada identified as priority international markets
- Climatic conditions favour quick construction techniques
- Favourable language, government, currency factors
- Total addressable market for FBR ~$8.0 - $9.5bn
- High bricklaying margin in UK presents compelling market opportunity for FBR **~$3.21 per brick with 1.81Bn bricks laid in FY15** (65% residential)
- Southern region of the US has highest propensity to use brick
- 80% of the cost of brick construction in the UK, US and Canada is attributed to manual bricklaying labour*

*Average derived from total industry revenue in Australia and the UK, 2010 – 2014.

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