

# Apply Fast, Lean Start-Up Principles to Space Business & STEM Education in Australia



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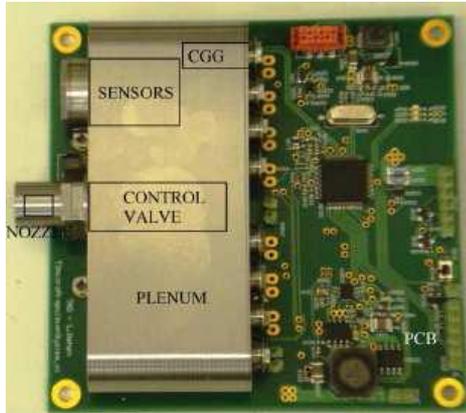
# Outline

- ▶ Space and Flavia
  - ▶ Some experience in Europe
  - ▶ Australia & new thinking process
  - ▶ LaunchBox
  - ▶ The lean start-up approach
  - ▶ Lean features of LaunchBox
  - ▶ Lean approach in Project Management
  - ▶ Conclusion and ideas
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# Passion for Space



# Projects in Europe



10 years, 5M Euro



7 years, 20M Euro

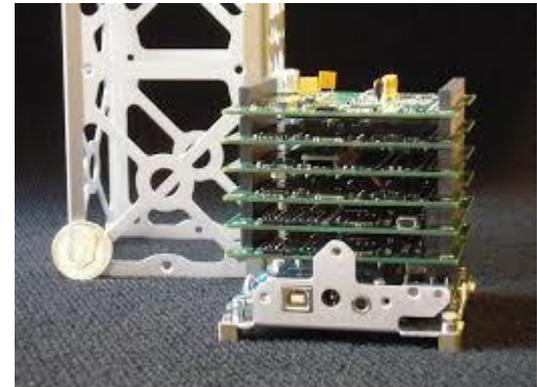
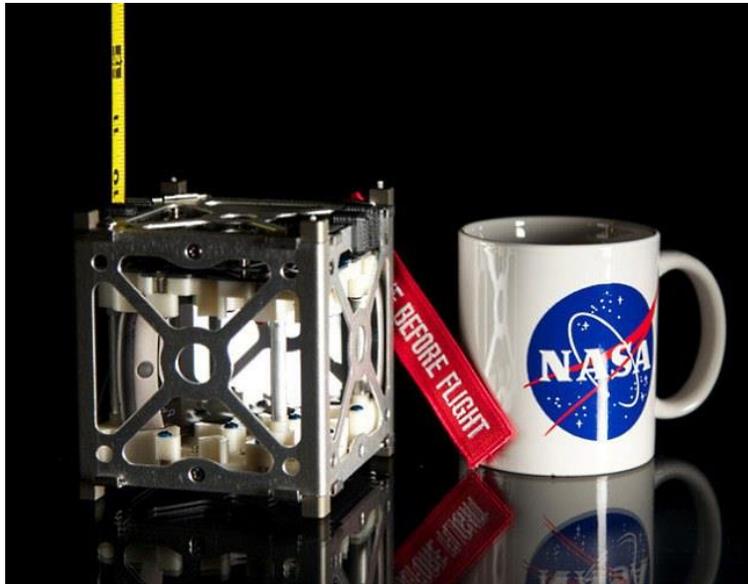


If we have data, let's look at data.  
If all we have are opinions  
let's for mine.

(Jim Barksdale, former CEO of Netscape)

# What is a CubeSat?

A CubeSat is a type of miniaturized satellite for space research that usually has a volume of exactly one liter, has a mass of no more than 1 kilograms!



# What is Commercialization of Space?



# A new vision: Australia Space 2.0

- ▶ **Space 2.0 is shorthand for a new global market in lower-cost commercial space services in Australia**
- ▶ **Space 2.0: lightweight, 3-D-printed NanoSats. Low-cost, reusable launch systems. Start-ups using smart sensors, machine learning, big data, autonomous robots**
- ▶ **Up to 2,750 CubeSats are forecast to be built and launched over the next 5 years, taking advantage of component miniturisation to dramatically lower build, launch, and operating costs**
- ▶ **“By 2019, Microsatellites will be a \$1.9bn market...Asia Pacific is expected to become the largest market surpassing North America...”**

# Space Industry Accelerator



- ▶ Delta V and the NSW Trade & Investment.
- ▶ Bring talent, opportunity and product innovation together with mentors, investors and customers to bootstrap an export-focused hi-tech space services & manufacturing industry

Four local space teams are stepping forwards to make this vision a reality:

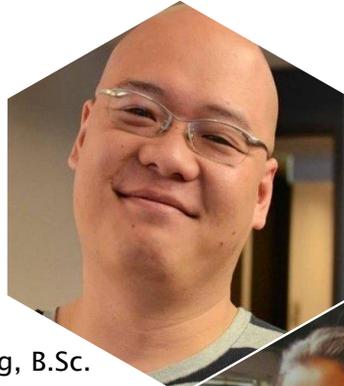
- ▶ Saber Astronautics Pty Ltd
- ▶ LaunchBox Pty Ltd
- ▶ The Australian Centre for Space Engineering Research (ACSER) at UNSW
- ▶ The SpaceNet group at Sydney University



# New Generation of Space Teams

## Brian Lim

- Lecturer UTS
- Curator TEDxUltimo
- Masters of Internetworking, B.Sc.
- International Space University Graduate



## Matthew Pearson

- Entrepreneur & Investor
- Director at Business Switch Pty Ltd

## Flavia Tata Nardini

- Space Propulsion Engineer
- Project Manager, University of Adelaide
- Previously at TNO, TUDelft, European Space Agency



## Dr. Matthew Tetlow

- Research engagements with DSTO, RAF, Boeing and US Navy.
- Chair, American Institute of Aeronautics and Astronautics Adelaide Section.
- International Space University Graduate

# Australia Territorial Challenges

- ▶ Space isn't on top of the list of Government priorities
- ▶ Sea monitoring, border control, weather and catastrophic events observation, prevention and control are the priorities



*Australian land is 13% of the total surface of the Earth!!*

# Are Space Systems Critical?

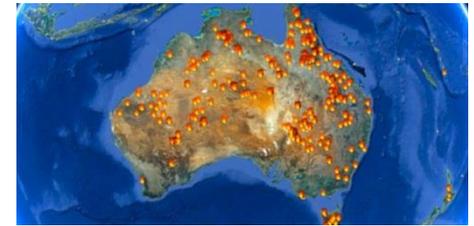
Shutdown or loss of services from space systems would seriously affect:

- air and sea travel
  - maritime navigation
  - telecommunications
  - information technology and networks
  - broadcasting
  - stock exchange
  - credit card transactions
  - etc.....
- 

# Could CubeSats Contribute?

*The focus in Australia: space capabilities that enable telecommunications, emergency management, weather forecasting, environmental management and national security applications*

(Australia's satellite utilisation policy 2013)



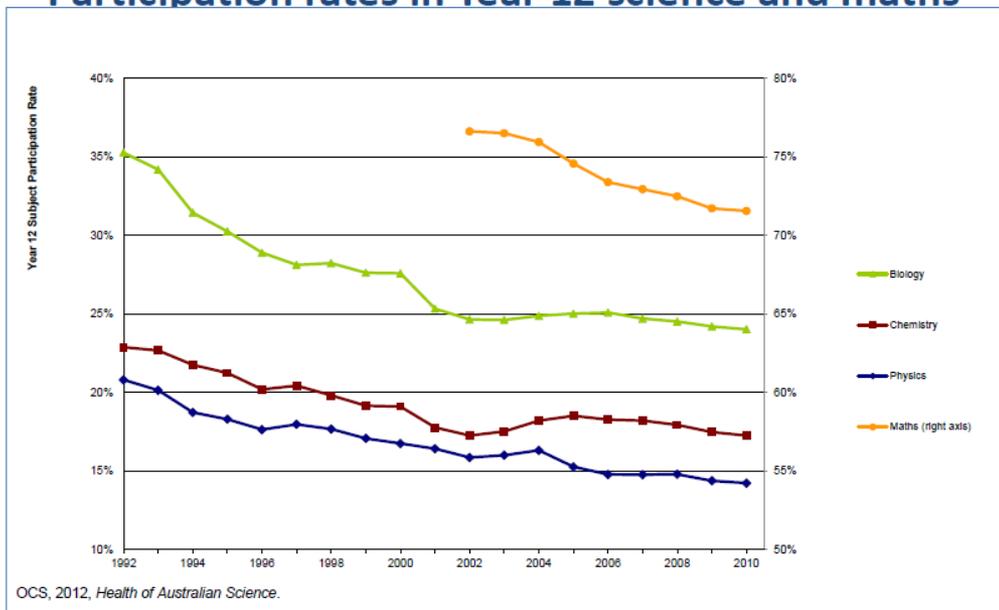
**Why should we use CubeSats?** Quicker and cheaper access to space, in-house technologies development, IOD of technologies, self-reliant systems

# The Education Aspect

*“Australia needs to improve its approach to STEM education to underpin its prosperity, its capacity to meet national challenges and its global competitiveness”*

STEM in the National Interest Position Paper 2013

## Participation rates in Year 12 science and maths



# The Market Key Players



The Space Education Institutes



The Space Industries



The Schools



The Government



The Investors



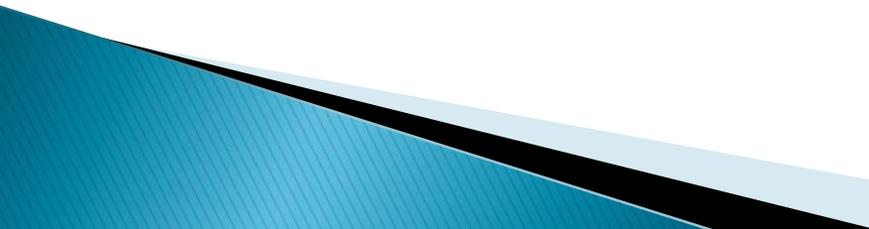
International Collaborators



Australian Government  
Department of Defence  
Defence Materiel Organisation

ADVANCED TECHNOLOGY PROJECT

# Achievements in 3 Months..How??

- ▶ Involved in the ATP program of the Government
  - ▶ 60 schools involved in SA
  - ▶ 10 participants to the first balloon launch
  - ▶ Support of the NSW Trade&Investment
  - ▶ Present a CeBIT 2014
  - ▶ Present at STEM conferences
  - ▶ Part of the first space start-ups accelerator in Australia
  - ▶ Presence at TED USA
  - ▶ 3 Potential Sponsors for the space mission
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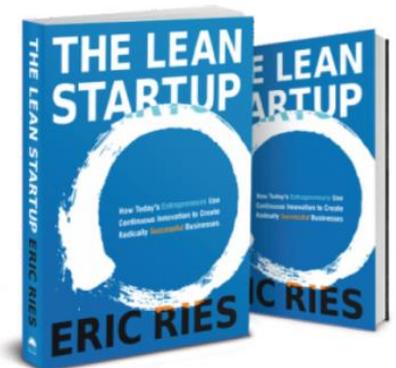
# The lean Start-up Approach

Method proposed in 2011 by Eric Ries

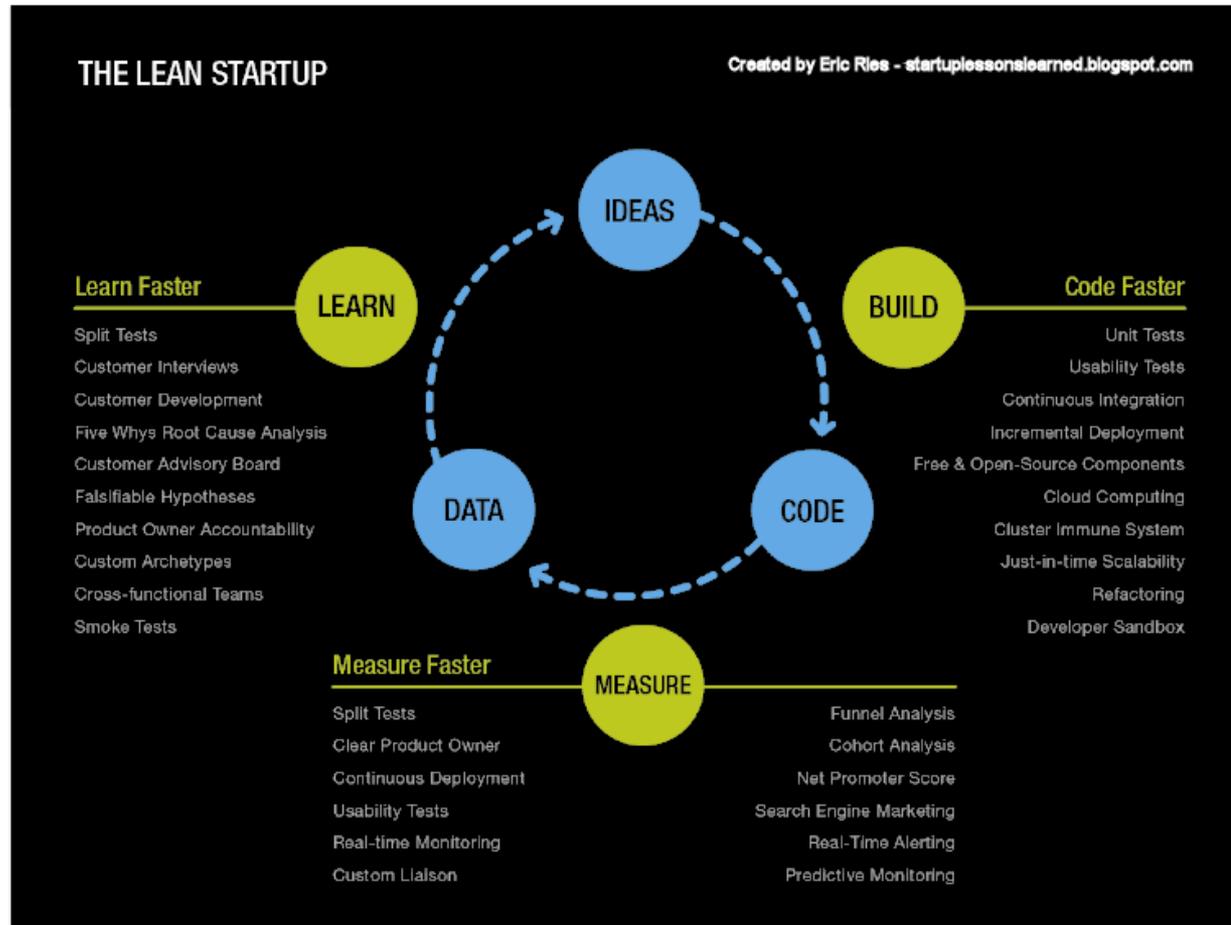
Based on the tried-and-true scientific approach that we all learned for the first time back in elementary school.

The process is simple and can be applied to project management initiatives:

1. Create hypotheses.
2. Deliver minimum viable product.
3. Get feedback.
4. Repeat, pivoting if necessary.



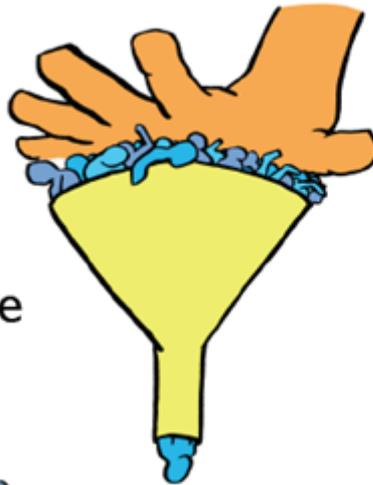
# How does it work?



# Projects vs Lean Start-up

## Projects

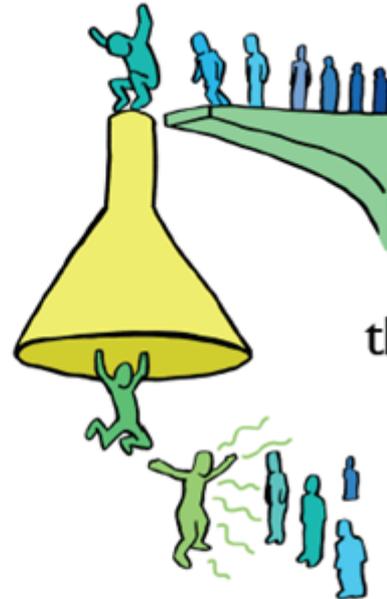
Projects  
through the  
approval  
funnel



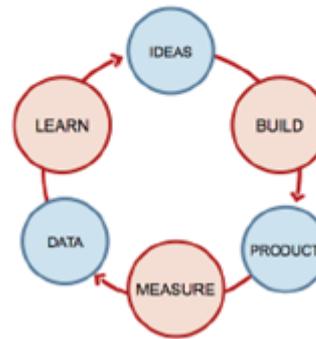
One  
expensive  
experiment  
= the  
project

## Lean Startup

Ideas  
through the  
validation  
funnel



Many cheap  
experiments

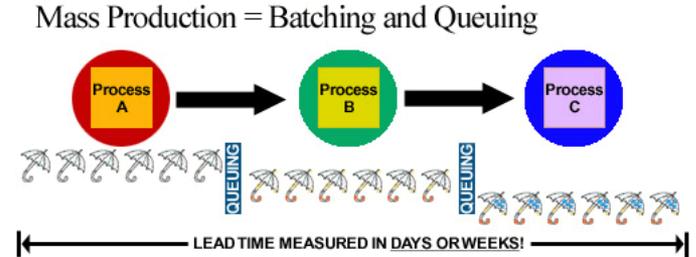


# 1950: Toyota and Lean Approach

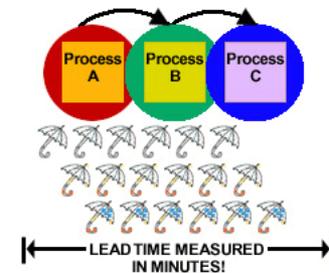
“Lean approach is providing exactly what the customer wants; when the customer needs it; in the correct quantity and in the expected sequence, without defects; at the lowest possible cost”

(Eiji Toyoda, creator of the Toyota Export Giant)

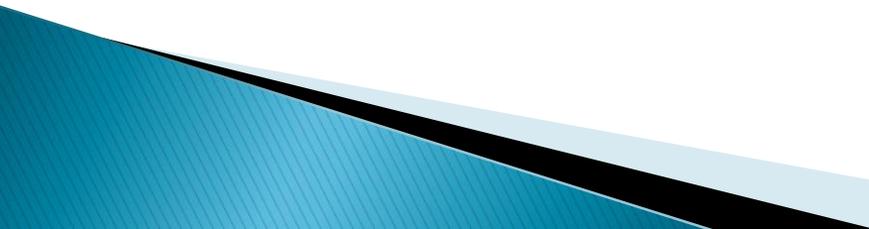
Toyota sold 2.348 million vehicles in the first three months of 2007.



Lean Production = Continuous Flow



# Key Features of Lean Process

- ▶ Waste a small amount **before** the project start
  - ▶ Everything is an assumption that needs to be **tested**
  - ▶ **Identify** and test your riskiest assumptions at first
  - ▶ There are no facts inside your building, **get outside**
  - ▶ **Minimum** amount of features required to learn
  - ▶ Optimise learning
  - ▶ Pivot or preserve: life is too short to build something that **nobody wants**
- 

# #Safetofail

# It is ok to fail, seek out validation

## # Failearly

# Lean approach in LaunchBox

- ▶ Our knowledge of the Australia Education?
- ▶ Our knowledge of the reaction of Australian market?



- ▶ Space projects: two years from start to mission...



# LAUNCHBOX



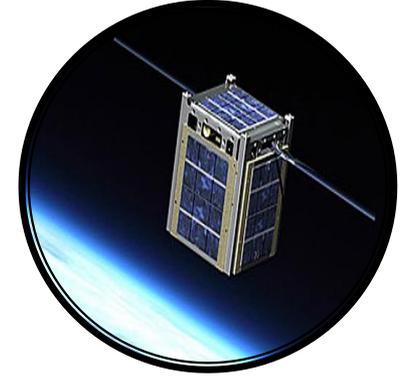
**Engage costumers  
now and learn!!**

Send stratospheric balloons with a CubeSat kit as payload.



**Keep them engaged  
in the loop!!**

Community working at the for the payload of this little satellite in space.



**Deliver a quality  
product!!**

The CubeSat into orbit with Australian technologies.

# Are we wasting resources?

- ▶ For most managers and business people, if you throw away any work that you have already done, then you have wasted resources
- ▶ The first phase generated useful, actionable knowledge
- ▶ We know **exactly** what doesn't work and be think we will avoid future bigger and maybe deadly mistakes



# Are we negating the importance of a business plan?

Wrong. We'll still need a business plan. But the Lean Startup is about what comes *before* that.



# Are we showing lack of focus?

**Do not persevere on directions that are proven to lead to failure, but persevere in exploring new directions**

Prototypes or real Satellites?





# Is it just for small businesses?

- ▶ What Lean Startup really says is that scaling is not the first concern for startups. A startup needs to find the Product–Market Fit first.
- ▶ The fundamental point is that you should use all this money to maximize learning – and not for premature scaling.



# How PMs Can Use Lean to Increase Success

- ▶ Any organization or PM wants to figure out the right thing to build as quickly as possible, not just start-ups
- ▶ Figure out the right thing to build—the thing customers want and will pay for—as quickly as possible
- ▶ A new way of looking at the development of innovative new products that emphasize fast iteration and customer insight



# THE 8 STEPS FOR LEAN STARTUP PROJECT MANAGEMENT (LSPM)

“The 8 Habits of ALL Highly Successful Innovators and Blue Ocean-Lean Startups”

- BUMP Discovery Project    BUMP-Tool Fitness Project    Customer Growth Project    Company Maturity Project

*Collaboratively Document and Solve Big Urgent Market Problems (BUMPs) in Real Time*

## 1. TEAM

- Form a “Co-creation Dream Team” for managing the ecosystem of the lean startup project as well as identifying needs of stakeholders
- Look for synergy in ecosystem

## 2. LEAP

- Complete the **Project Charter** that describes **customer, big problems, vision, resources, and duration** as well as **success criteria (ROI; cust. experience)** for startup project

## 3. DESIGN

- Document and review **trade-offs in ecosystem (business model)** for existing (“as is”) **analogs & antilogs**
- Devise **plan (hypotheses/assumptions)** & design (“to be”) **strategy**

## 8. PERSEVERE OR PIVOT

- Repeat** spiral of steps to achieve product-market fit/value proposition/vision/mission. Then, scale
- Otherwise, **pivot (on the strategy/vision). Abandon the project???**

## THE 8 STEPS FOR LEAN STARTUP PROJECT MANAGEMENT (LSPM):

Roadmap, Workflow, and Deliverables

## 4. BUILD

- Assign **finish date and metrics** to planned project activities or tactics
- State **verifiable targets, criteria, or milestones** for each activity/tactic
- Build **prototype: Min. Viable Prod.**

## 7. LEARN

- Analyze **gaps/failures/successes**
- Anticipate **future adoption and weakest links**. Devise experiments
- Summarize/Share **lessons learned**
- Summarize/Share **insights**

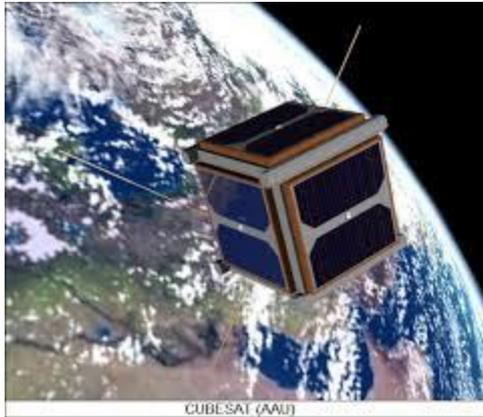
## 6. REVIEW

- Review **progress and gaps** of lean startup project: daily/weekly/monthly/quarterly/annually
- Determine and document what next activities **to do**

## 5. MEASURE

- External Validation:** Get out of the enterprise and test **most critical risks & assumptions** of ecosystem
- Internal Validation:** Test and validate internal assumptions

# What is going to be next?



# Conclusions and ideas



*"Now there goes a good Salesman!..."*



- Take the model with a grain of salt
- Most of the time, it fits in the earliest phase of the lifecycle when money is tight and knowledge of the market is everything
- Keep iterating, but not in a way that subjects your team to the risk of burnout.

A high-angle view of Earth from space, showing the curvature of the planet and a thin blue atmosphere. The Moon is visible in the dark sky above the horizon. The text 'LAUNCHBOX' is centered in a white, monospace font with black outlines.

LAUNCHBOX