Farley's Three Laws

"The World makes a lot more sense as soon as you realise that we don't know what we are doing"

Dave Farley
http://www.davefarley.net
@davefarley77

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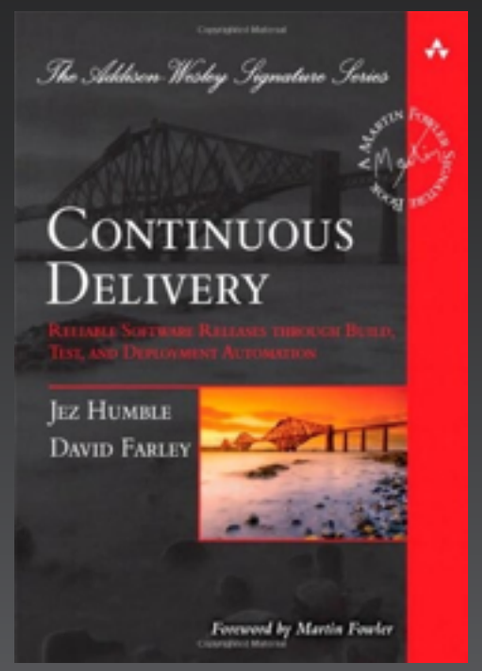
http://www.continuous-delivery.co.uk



A Long Time Ago, in A Canteen Far Away…

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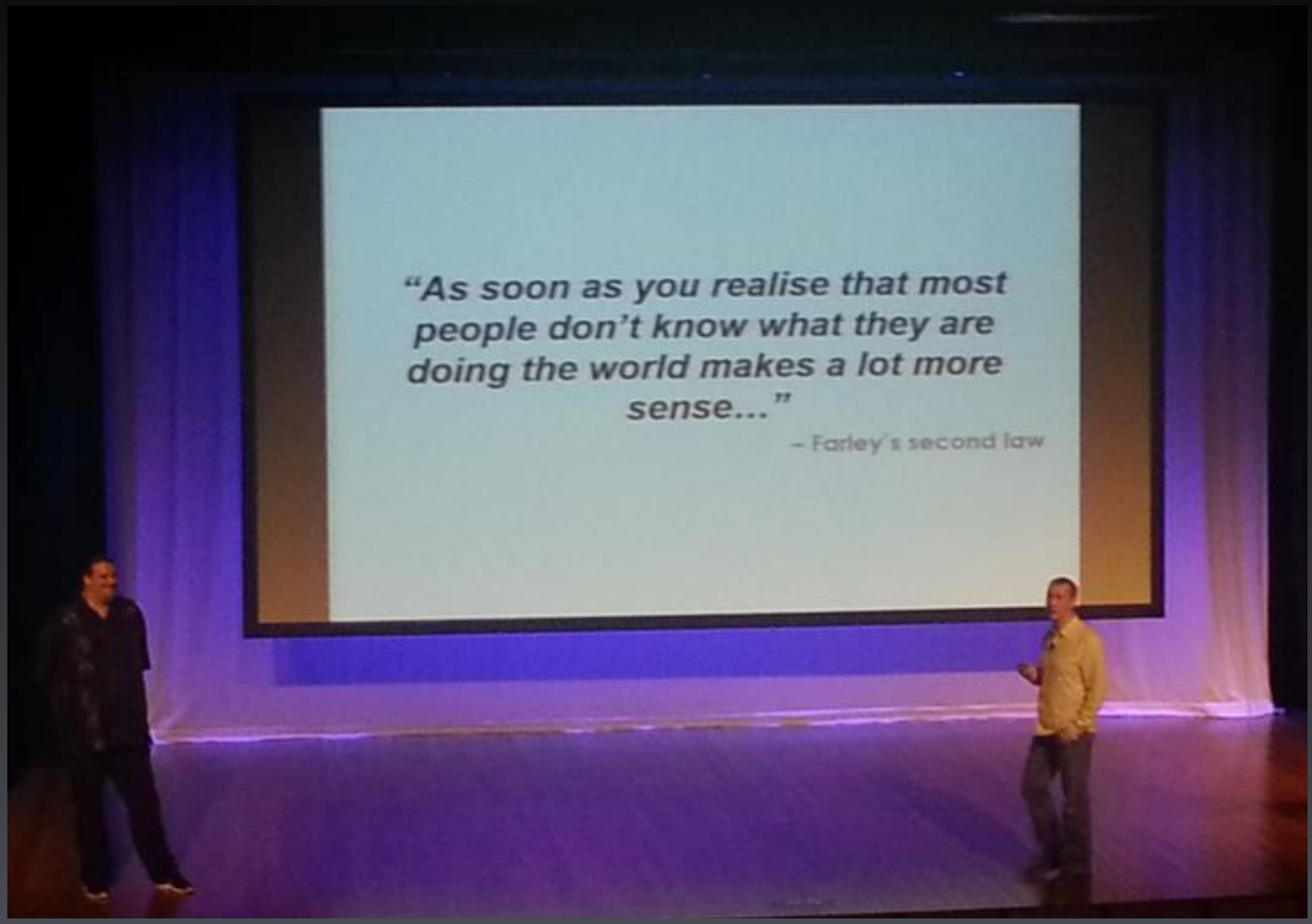
More Recently At a Conference Even Further Away…



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Farley's Three Laws

LAW 1: People are Crap!

LAW 2: Stuff is more complicated than you think

LAW 3: All stuff is interesting

(If you look at it in the right way)

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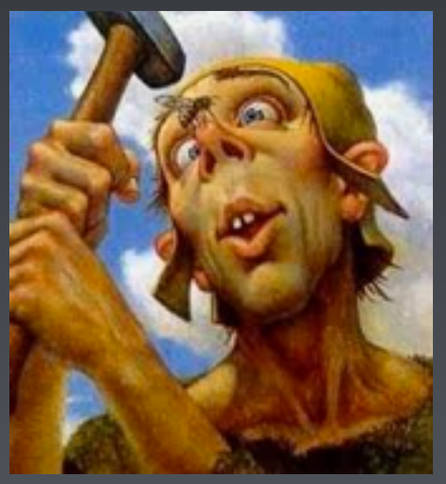
1st Law - People are Crap



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1st Law - People are Crap

1st Law - People are Crap!

- Not meant to be nasty, I mean we are rubbish, not as smart as we think
- We think of ourselves as sophisticated, Rational beings - We are not!

1st Law - People are Crap!

What should you do if you want people to agree with you in a meeting?

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Seeing is Believing...

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1st Law - People ar Crap! (Poor Observers)

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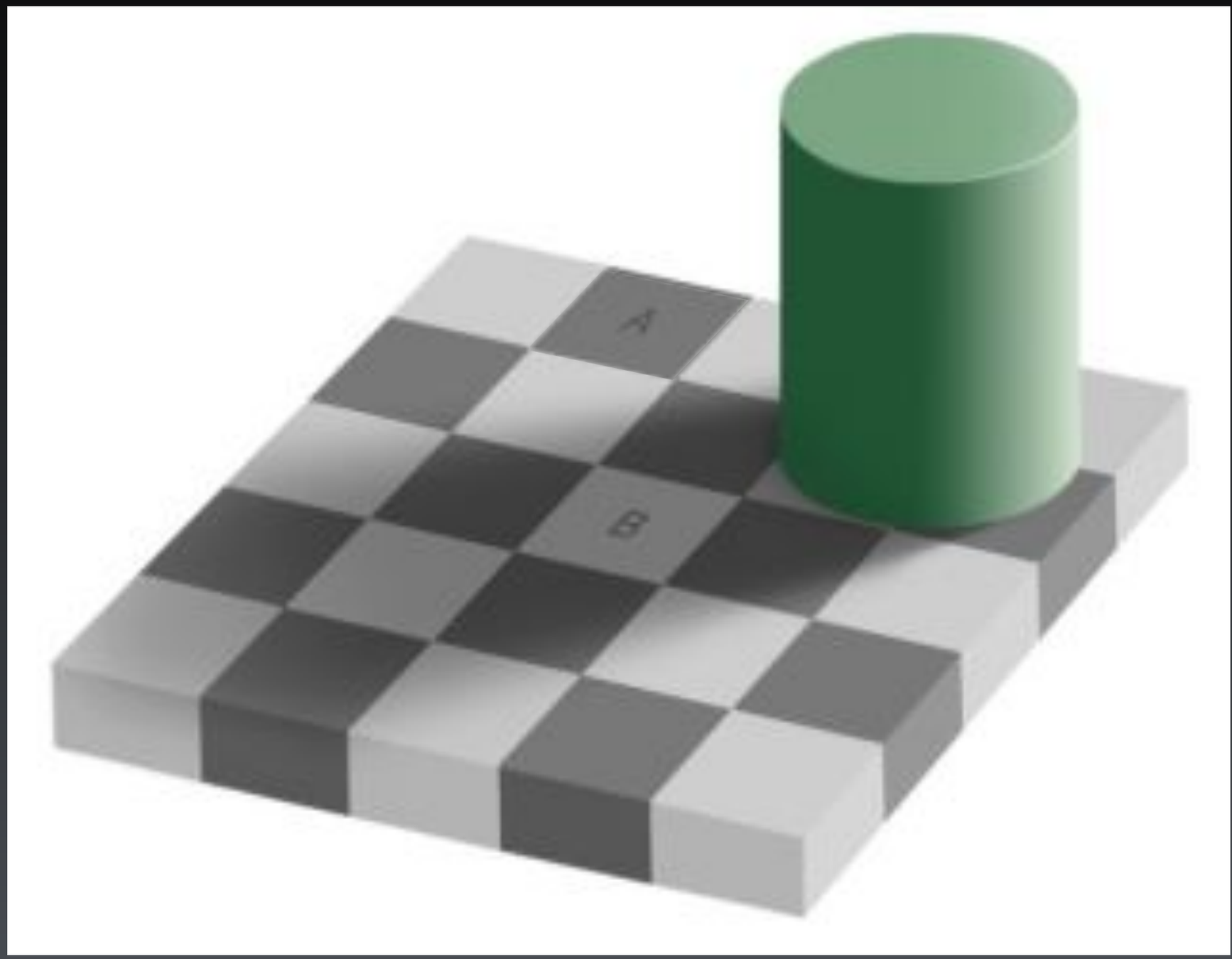
2nd Law - Stuff is More Complicated Than You Think

2nd Law - Stuff is More Complicated Than You Think



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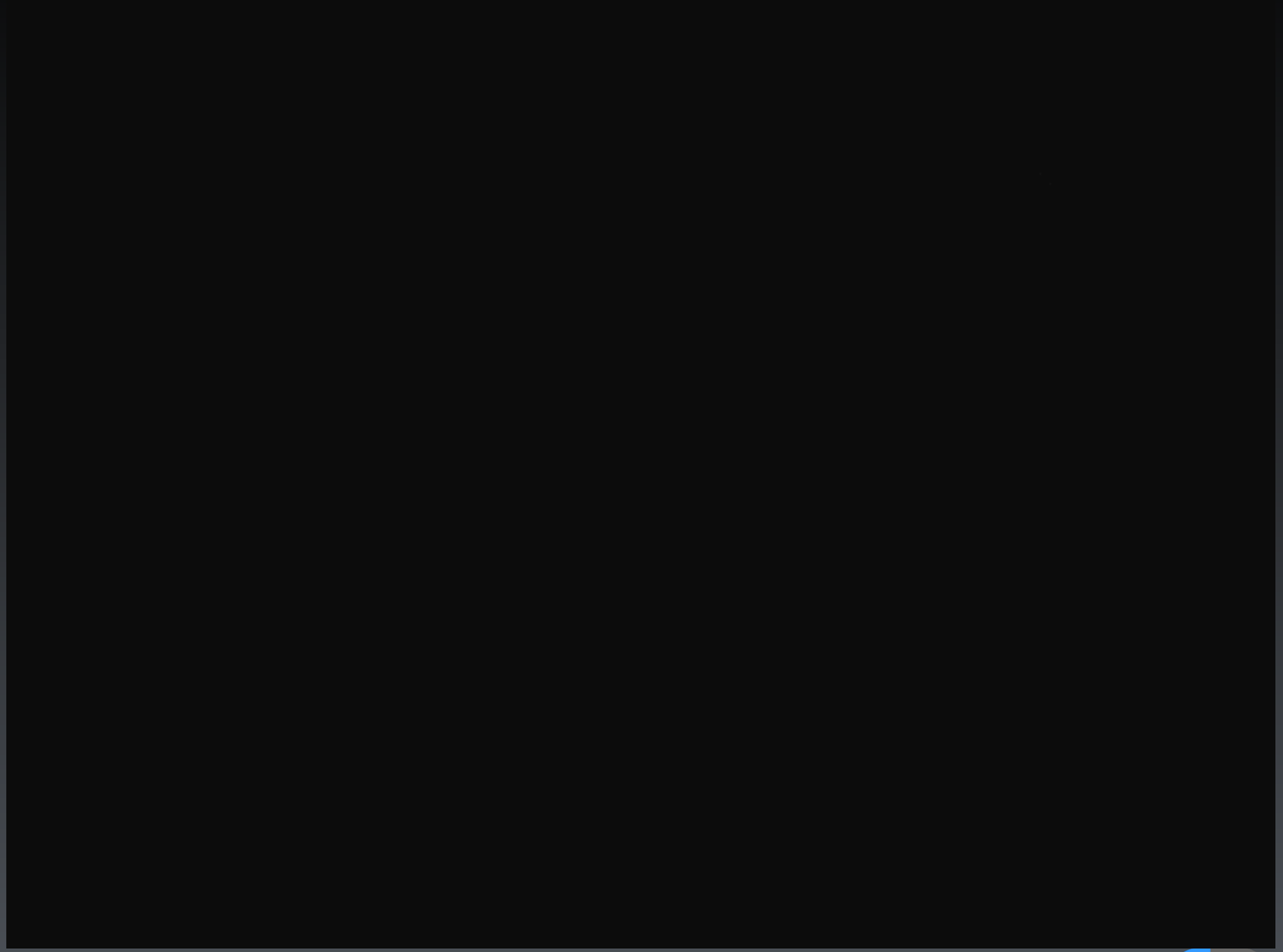
2nd Law - Stuff is More Complicated Than You Think

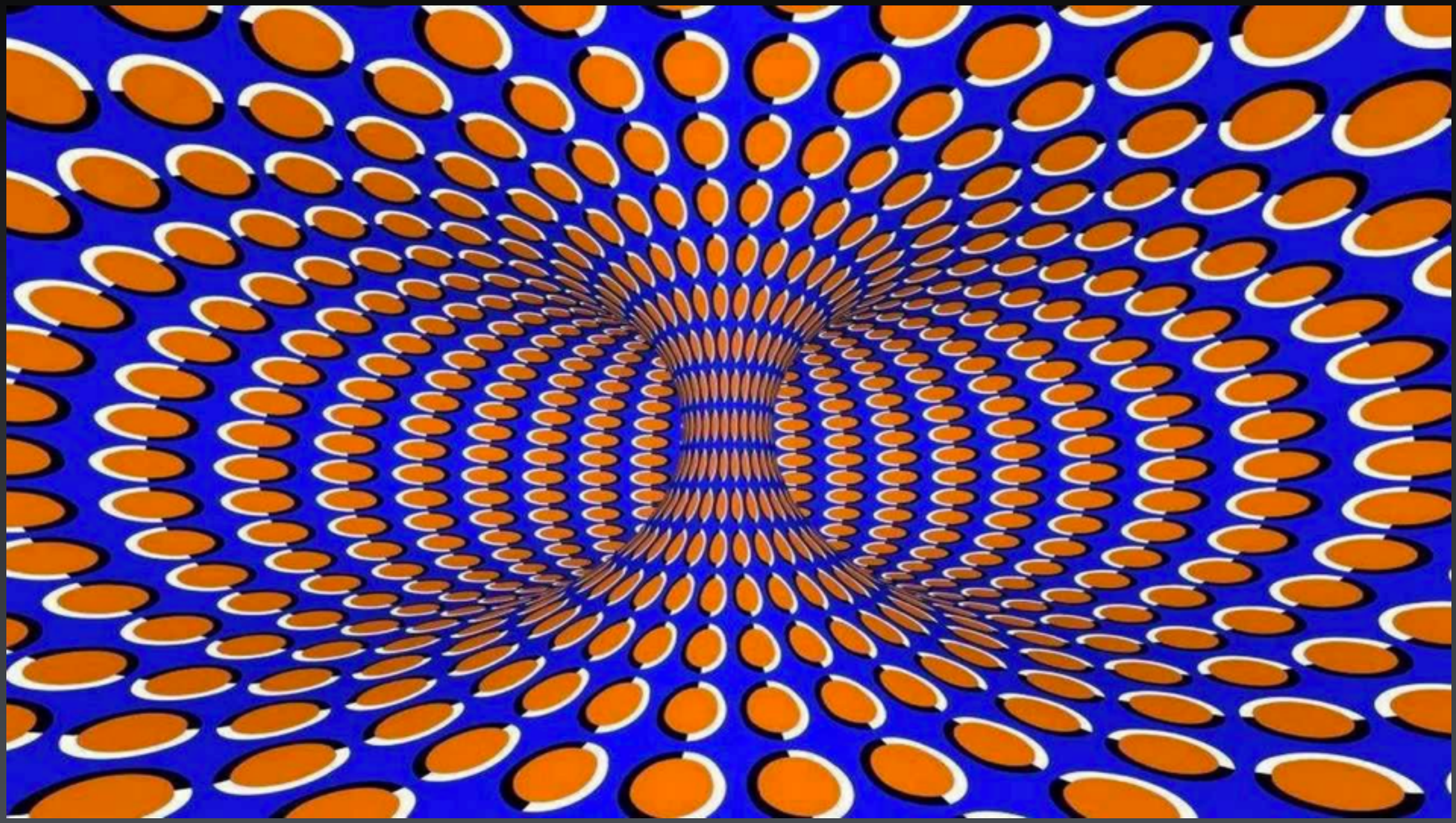
Stare at the dot

for 12 seconds!

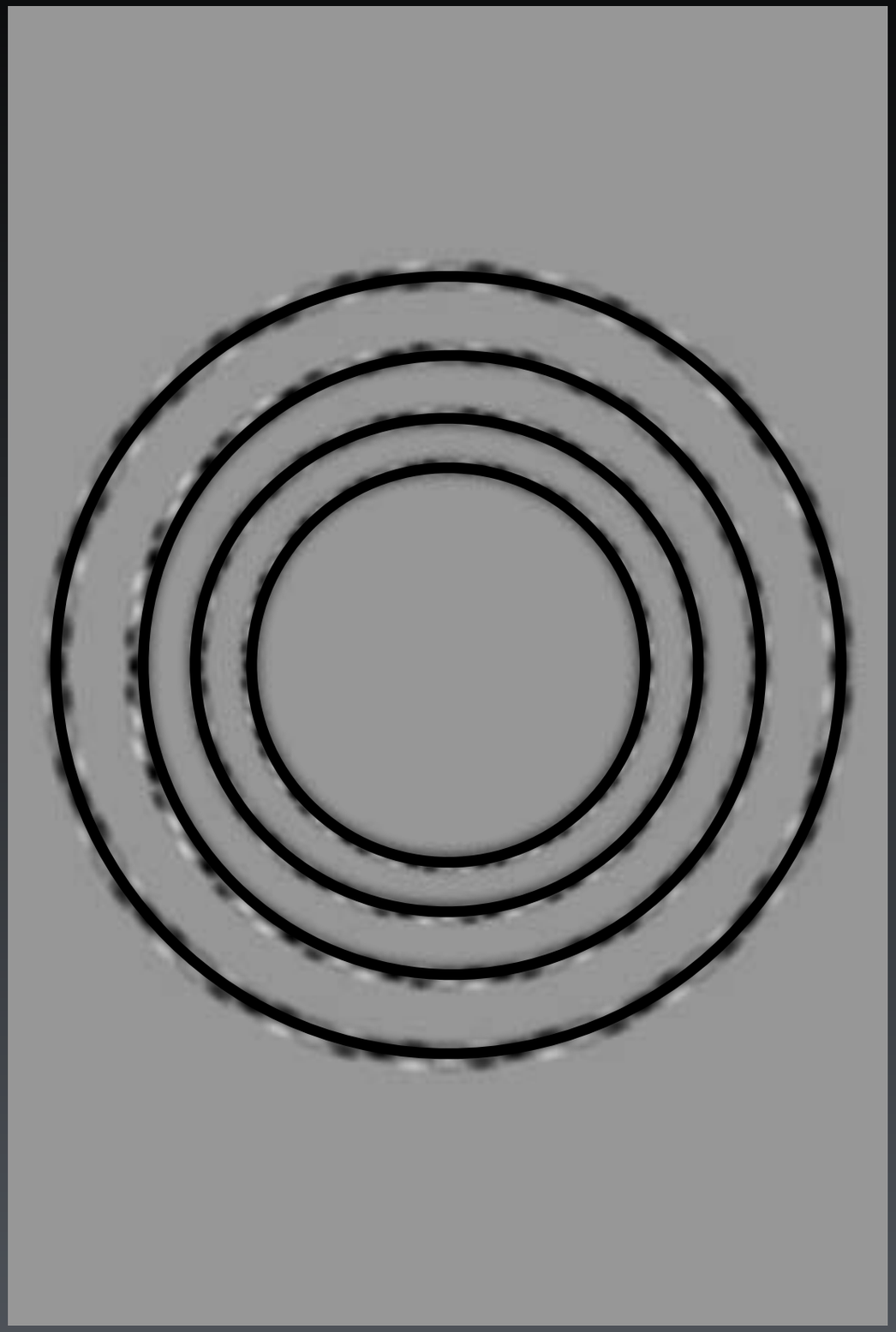
2nd Law - Stuff is More Complicated Than You Think



2nd Law - Stuff is More Complicated Than You Think



2nd Law - Stuff is More Complicated Than You Think



- Only Four Circles Here
- They Don’t Touch!

- Come on Brain, You can do this?!???!

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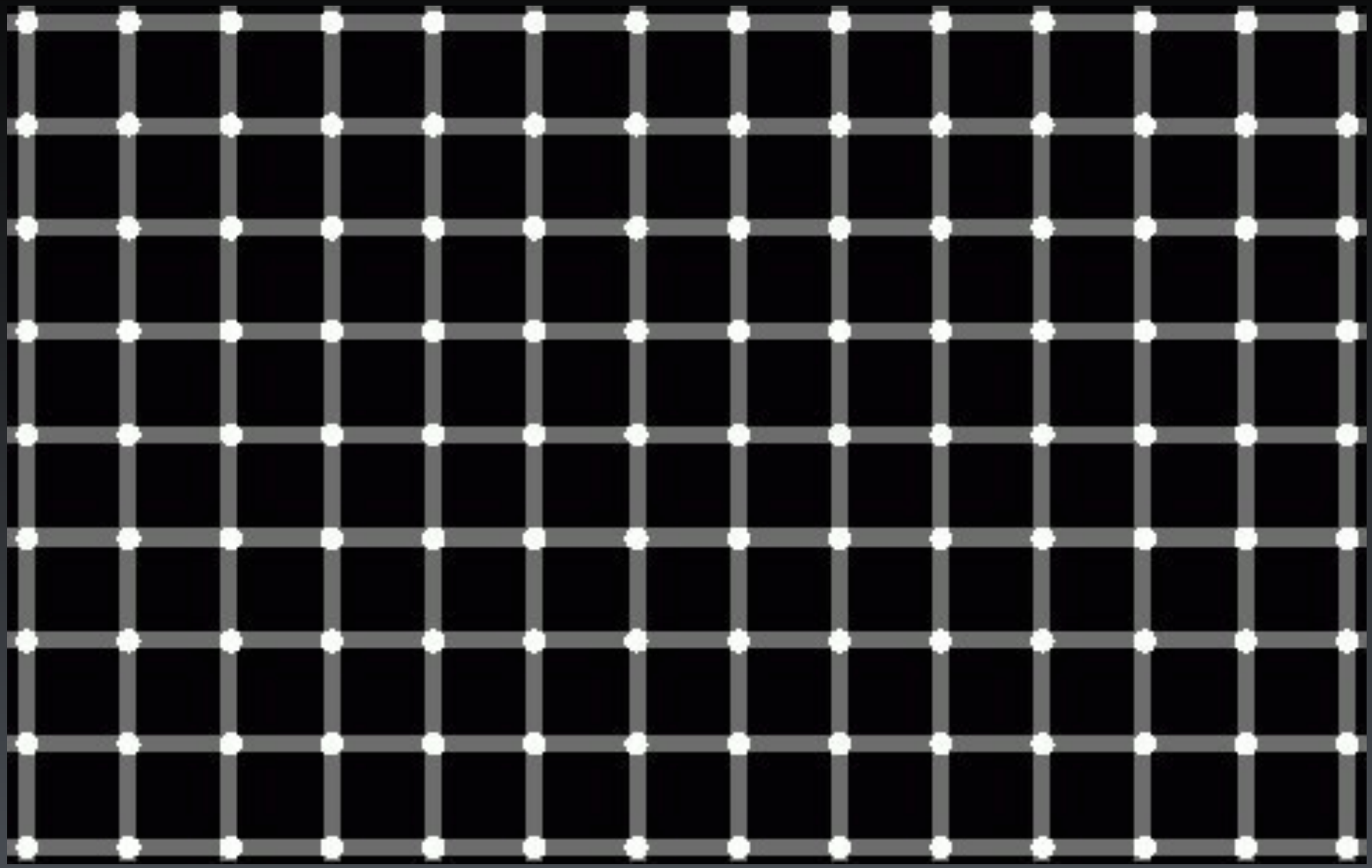
2nd Law - Stuff is More Complicated Than You Think



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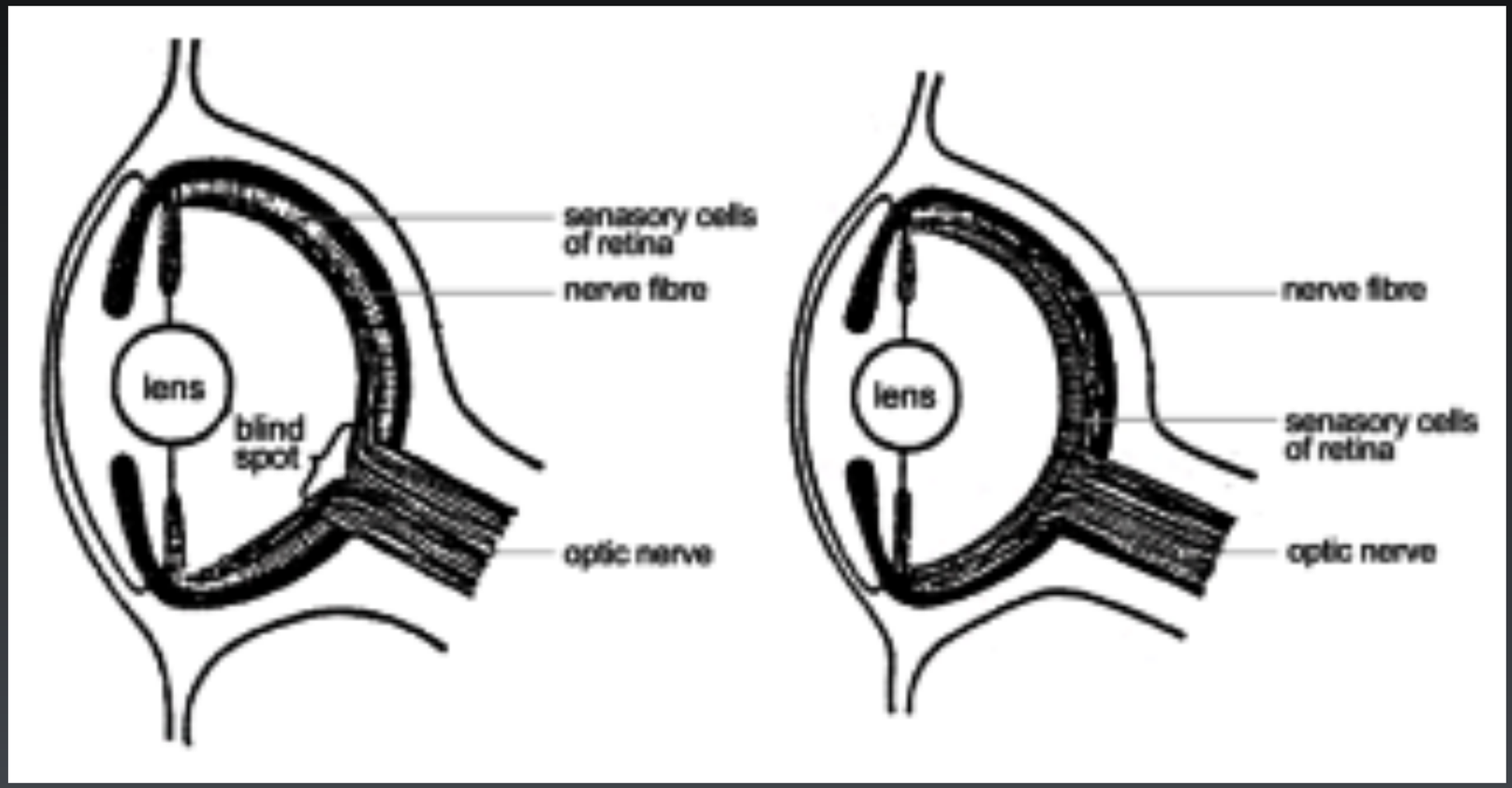
Less?

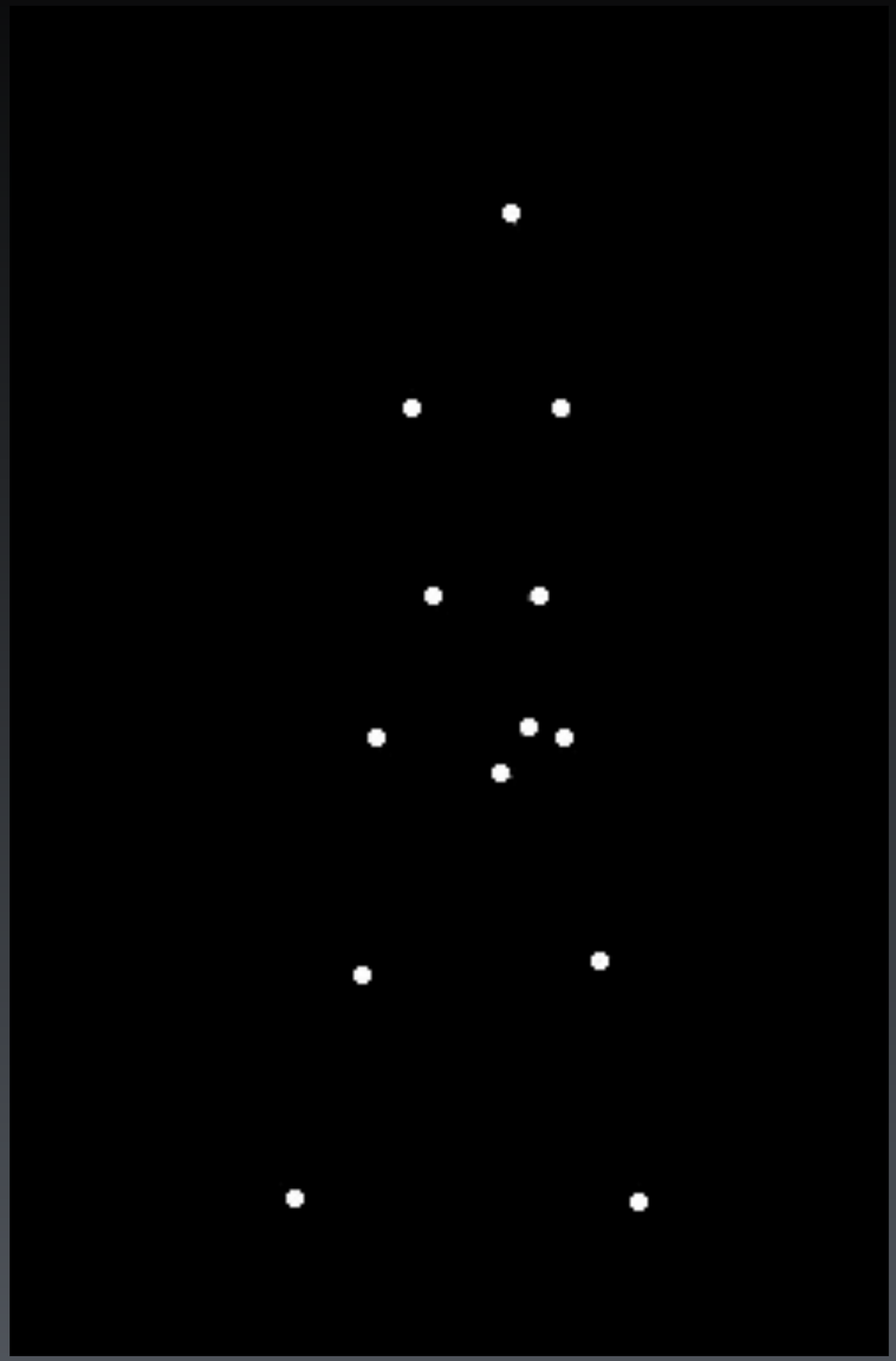
2nd Law - Stuff is ~~More~~ Complicated Than You Think

2nd Law - Stuff is More Complicated Than You Think

Sight



2nd Law - Stuff is More Complicated Than You Think



2nd Law - Stuff is More Complicated Than You Think

Sound

1st Law - People are Crap

Cognition

2nd Law - Stuff is More Complicated Than You Think

Comprehension

Speed of Light

299,792,458 ms^{-1}

(≈1’ per ns)

100 mph ≈ 45ms^{-1}

Length of a Tennis Court

78’ (≈24m)

Speed of Serve

100 mph

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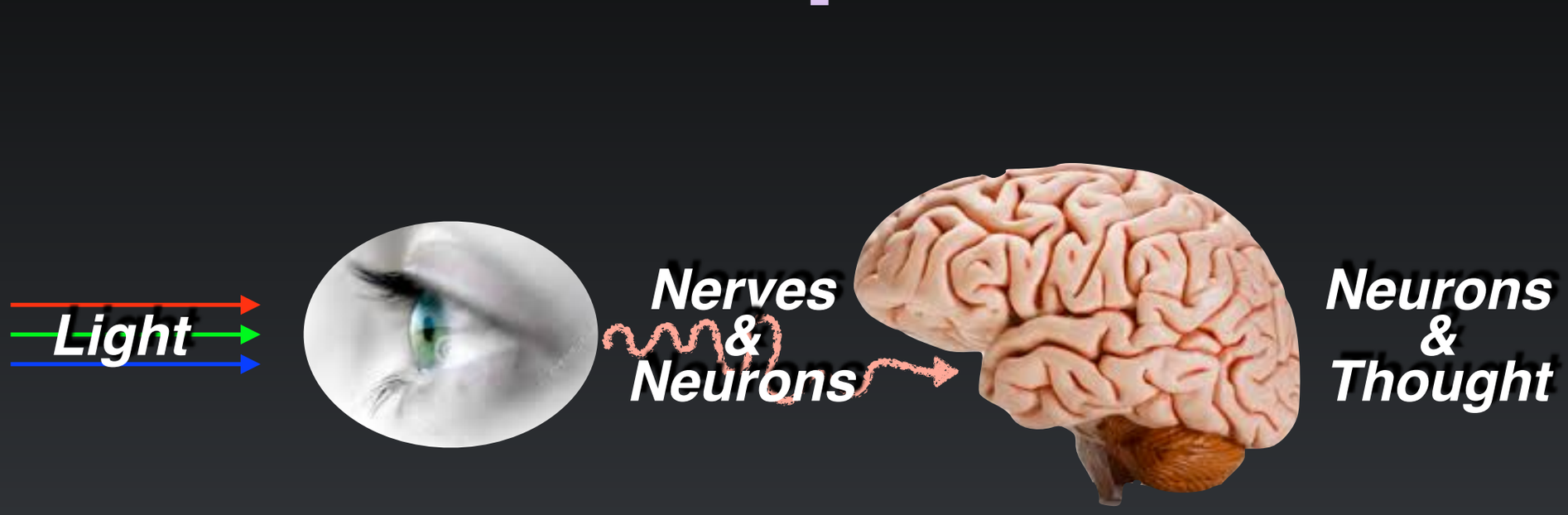
2nd Law - Stuff is More Complicated Than You Think

Comprehension



≈ **78 ns** ≈ **15 ms** ≈ **300 ms**

Time to React

≈315.000078 ms

Distance to React

45 x 0.315 ≈14m (46 ft)

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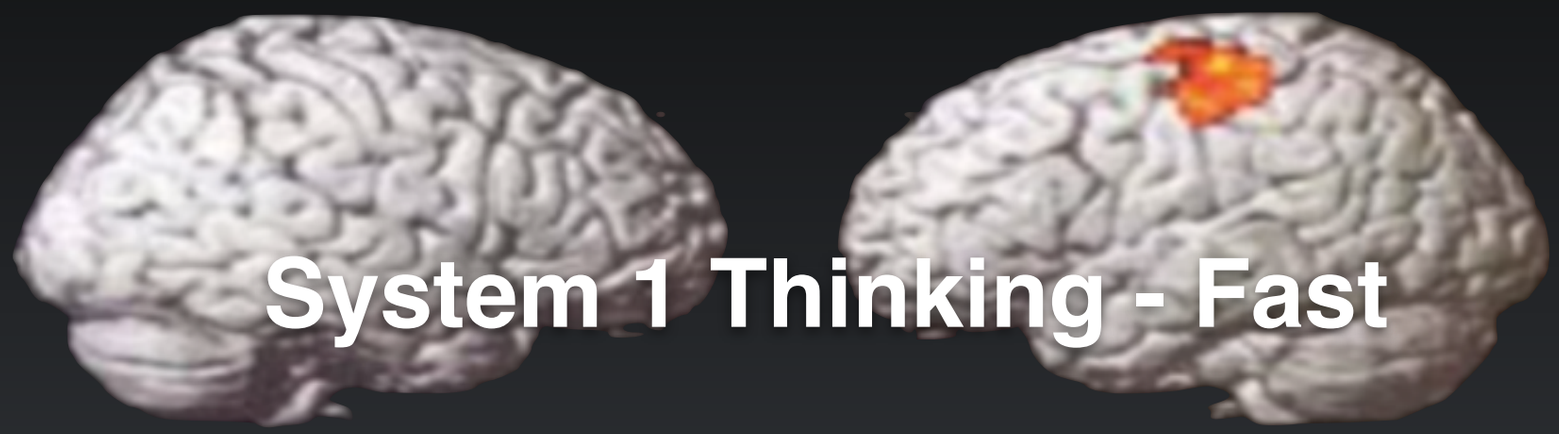
Fast & Slow Thinking

2 + 2

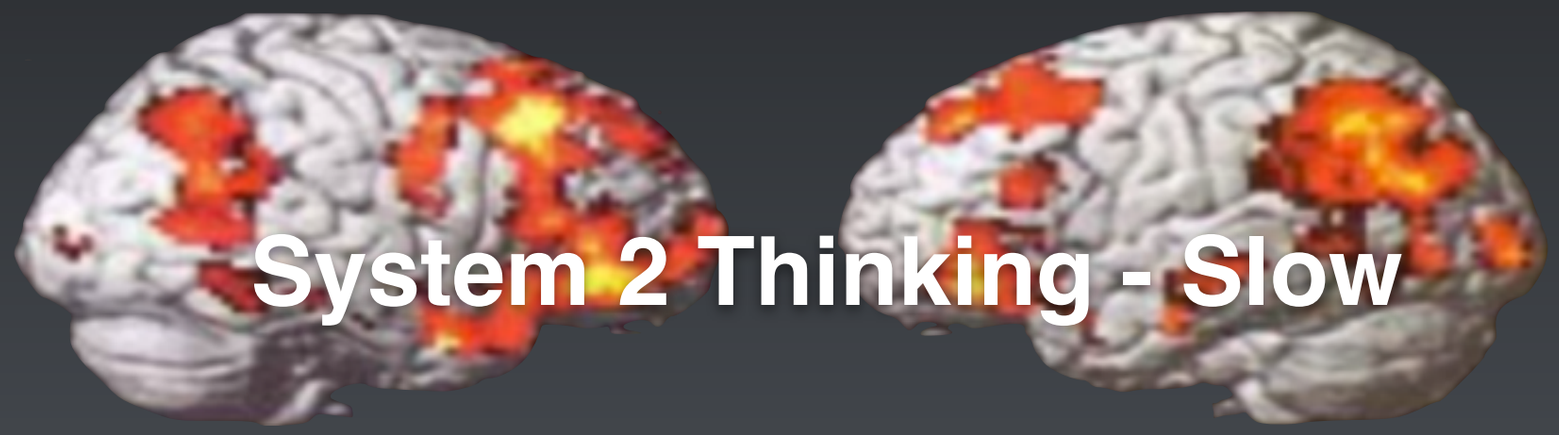
17 x 24

Fast & Slow Thinking

Fast & Slow Thinking



System 1 Thinking - Fast



System 2 Thinking - Slow

Source: fMRI Brain-scans by Dr. Gerald Huther, Presented at ‘Production Systems 2009 Conference’ via Mike Rother

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Being Rational

- Is Hard Work - Literally!
- We are Programmed to avoid it
- We Will Jump to Conclusions
- “Belief comes easily; doubt takes effort.”[1]
- We Can Only Combat this Through a Deliberate Act of Will and Practice

[1]Graham Lawton, New Scientist 2015

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Being Human - The Problem

- Poor Observers
- Confirmation Bias
  - Biased Search for Information
  - Biased Interpretation
  - Biased Memory
- Polarisation of Opinion
- Persistence of Discredited Beliefs
- Preference for Early Information
- Illusory Association Between Events
- Group Conformity
- …

1st Law - People are Crap

SCIENCE

“So What's your point?”

The Importance of Being Experimental

"Science is the belief in the ignorance of experts."

"The first principle is that you must not fool yourself — and you are the easiest person to fool"

"It doesn't matter how intelligent you are, if you guess and that guess cannot be backed up by experimental evidence then it is still a guess."

Richard Feynman

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The Scientific Method

- **Characterisation** Make a guess based on experience and observation.
- **Hypothesis** Propose an explanation.
- **Deduction** Make a prediction from the hypothesis.
- **Experiment** Test the prediction.

Repeat!

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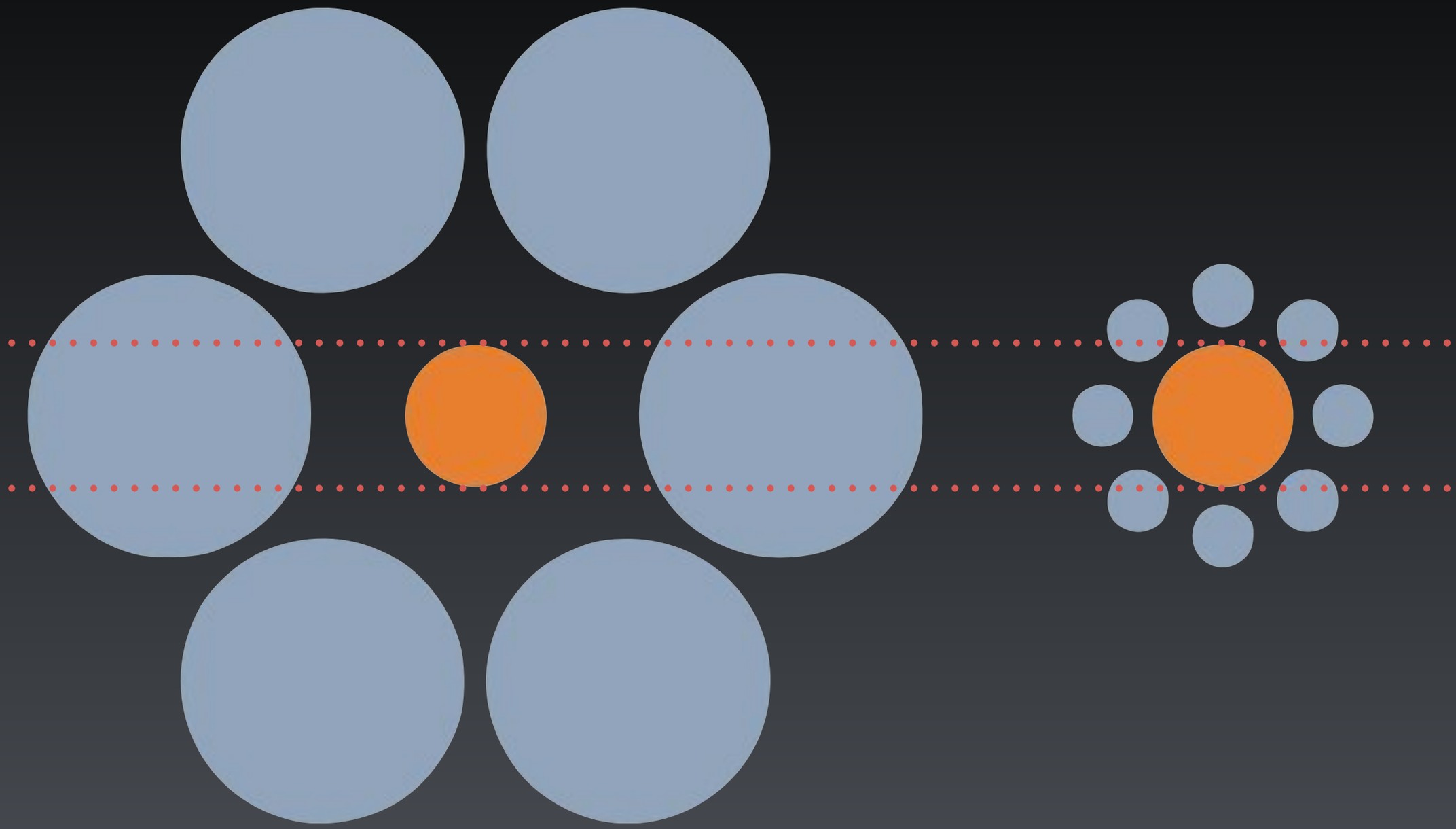
Being Experimental



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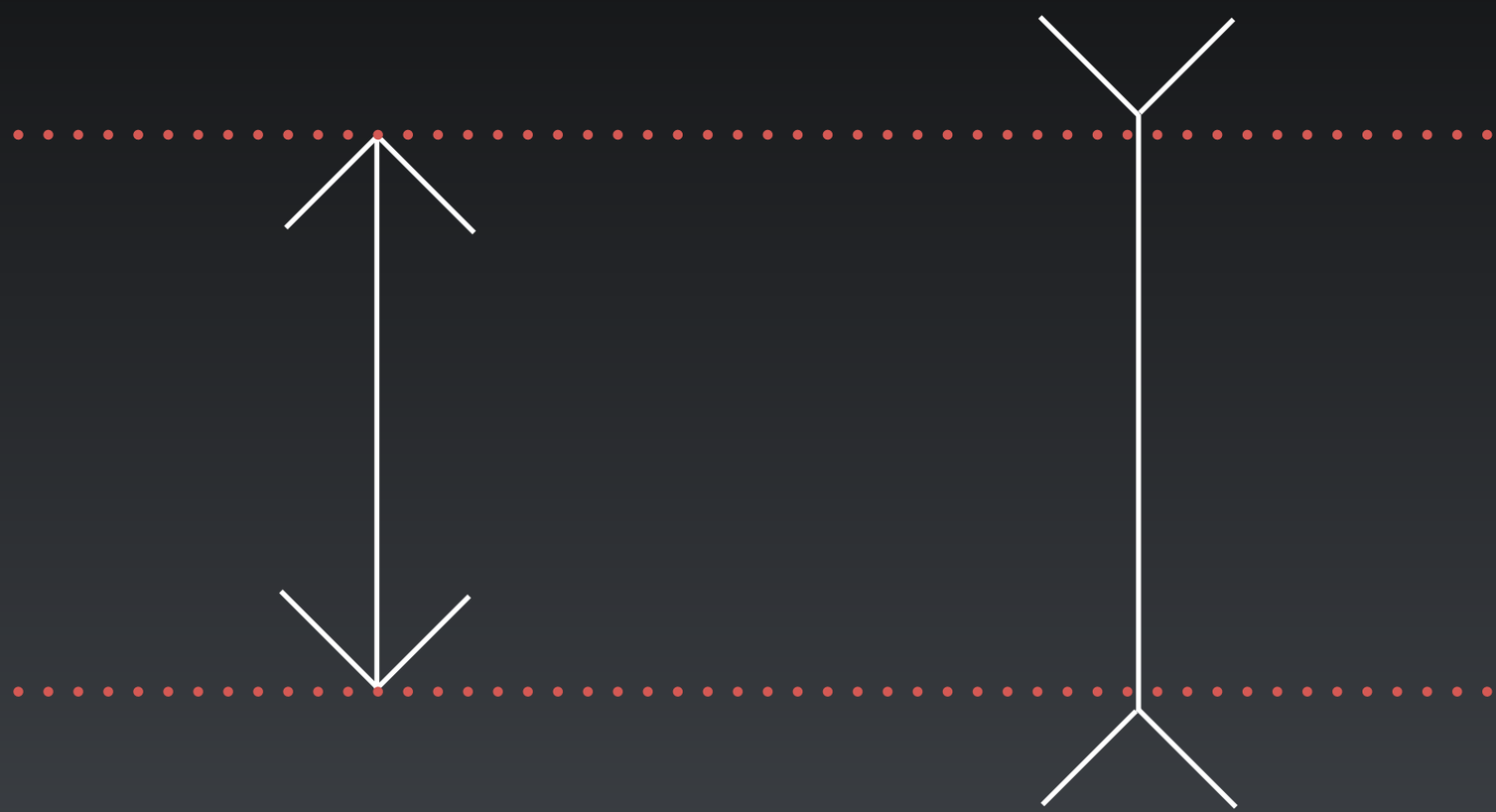
Being Experimental



Being Experimental - The Goal

"I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth"

- John F. Kennedy (1961)

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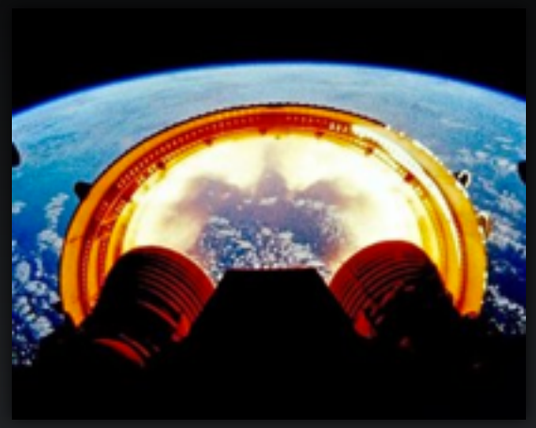
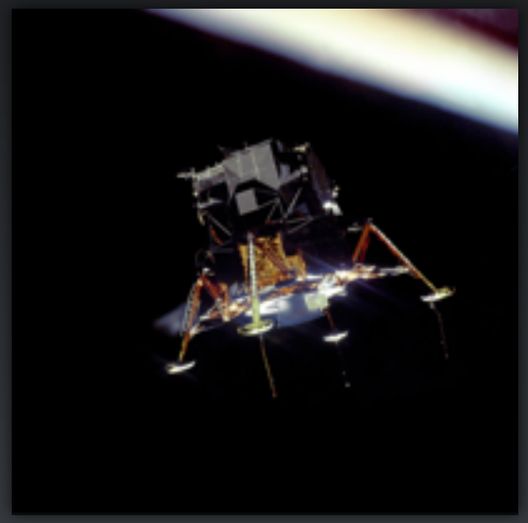
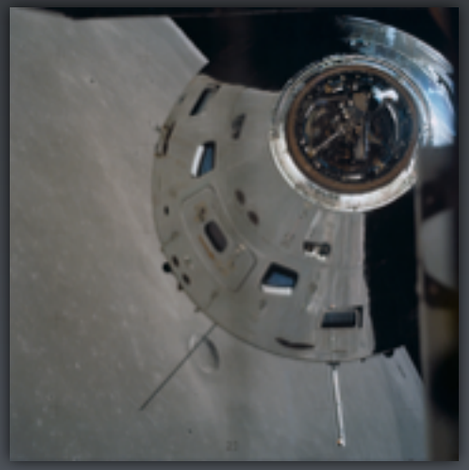
Being Experimental - The Challenge







Being Experimental - NASA Planning

FLIGHT PLAN

UV PHOTOS - CISLUNAR

049 HOUR TO EARTH UV PHOTO ATT (153,0
OMNI D

CONFIGURE CAMERA: (UV)
CMS/EL/105/UV-BRKT, CONT (F4.3,1/60,
RINGSLIDE
MAG (N) ____; FR #
REMOVE MTF FLIGHT DATA FILE STOWAGE BO

DAMP RATES
INHIBIT ALL JETS EXCEPT A1 & C2 OR B2 &
VERIFY FDAI SCALE - 5/1
WAIT 5 MIN FOR RATES TO DAMP
VERIFY RATES ON FDAI ARE <0.2°/SEC IN ALL

REMOVE CMS WINDOW COVER, MOUNT UV CARDBOARD SH
2 FRAMES, FILTER 1, CHANGE SHUTTER TO B
8 FRAMES, FILTER 2, EXP TIME 20 SEC
CHANGE SHUTTER TO 1/250
2 FRAMES, FILTER 3, CHANGE SHUTTER TO 1/500
2 FRAMES, FILTER 4
RECORD FR # ____

CONFIGURE CAMERA
CMS/EL/105/CER-CONT (F8,1/250,-) (1 FR) (before 7)
RINGSLIDE
MAG (M) ____; FR # ____
1 FRAME, FILTER 4
RECORD FR # ____

REMOVE CAMERA AND UV CARDBOARD SHADE
COMMENT - CONDITION OF CMS WINDOW
REPLACE CMS WINDOW COVER
ENABLE ALL JETS

FINAL (7/26) 6/21/71 3-57

CONFIDENTIAL 276

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 11
TECHNICAL
CREW DEBRIEFING
(U)

JULY 31, 1969

PREPARED BY:
MISSION OPERATIONS BRANCH
FLIGHT CREW SUPPORT DIVISION
VOL. I

FLIGHTPLAN DOCUMENT - TITLE UNCLASSIFIED

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONFIDENTIAL

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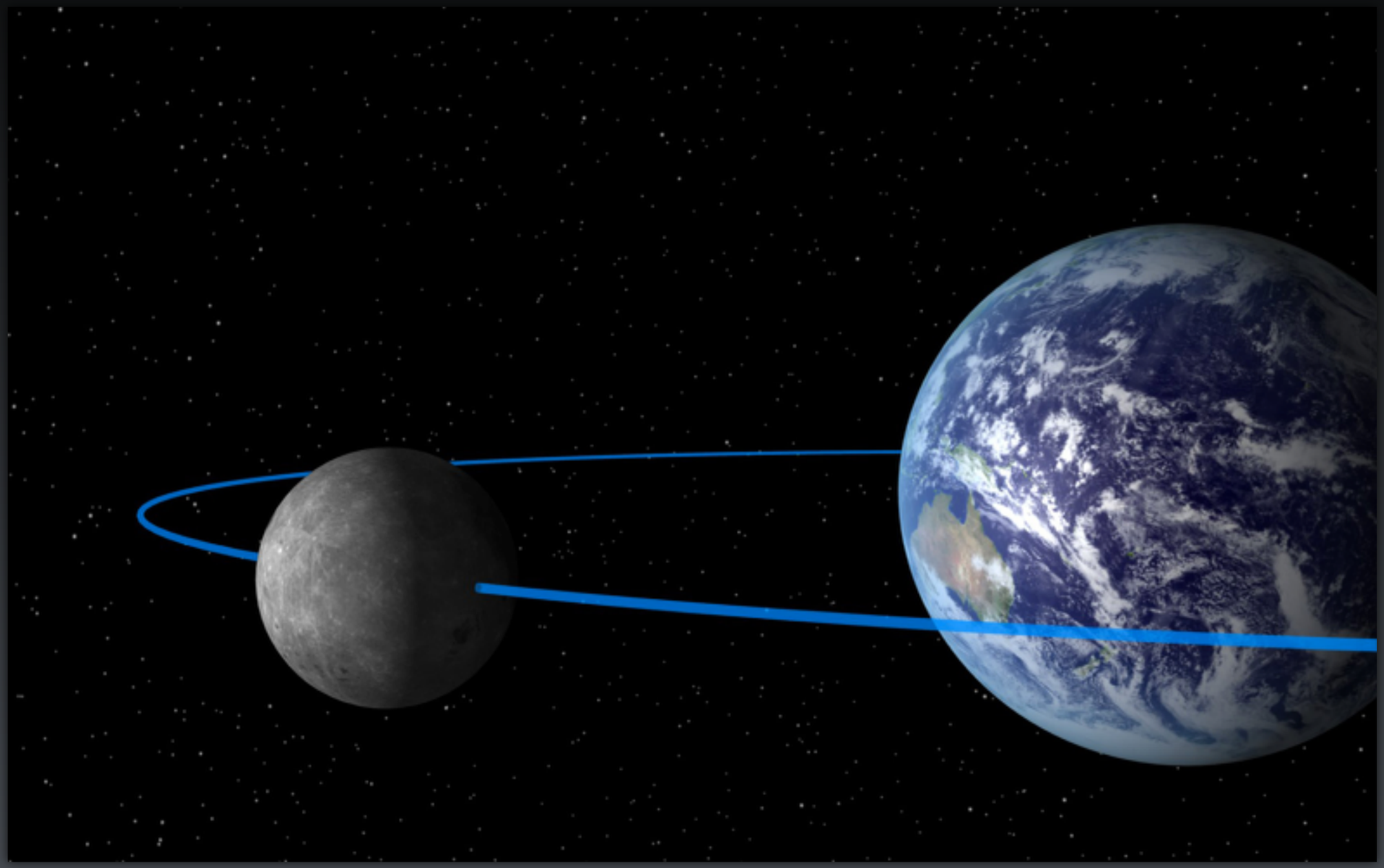
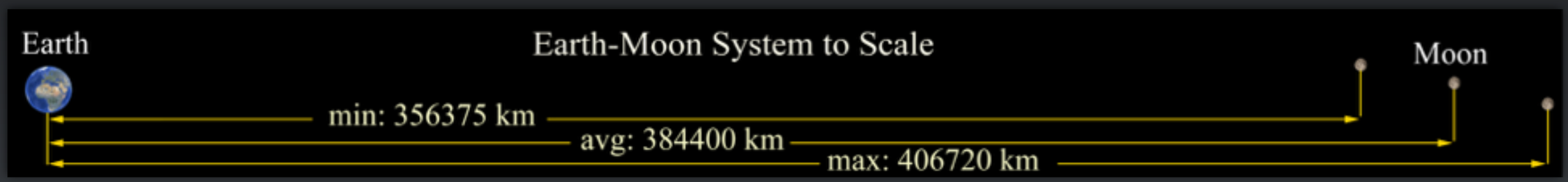
Being Experimental - Small Steps



Being Experimental - Giant Leaps



Being Experimental

The Ranger Programme

- **Ranger 1** - *Launch Failure*
- **Ranger 2** - *Launch Failure*
- **Ranger 3** - *Missed!*
- **Ranger 4** - *Impact, systems failed*
- **Ranger 5** - *Missed!*
- **Ranger 6** - *Impact, cameras failed*
- **Ranger 7** - *Success!*
- **Ranger 8** - *Success!*
- **Ranger 9** - *Success!*

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Being Experimental - Works!

Can you build a free-standing tower with just spaghetti sticks, tape, string and place a marshmallow on top of it?

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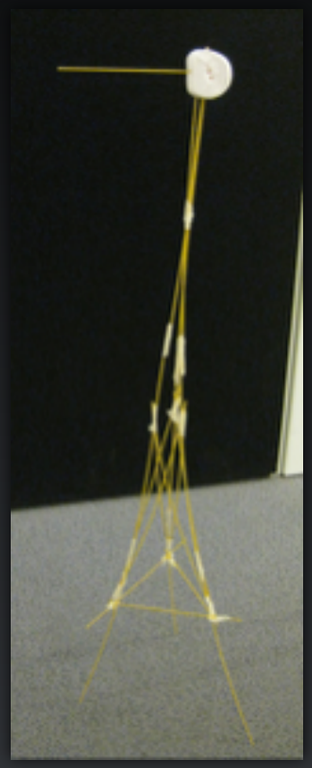
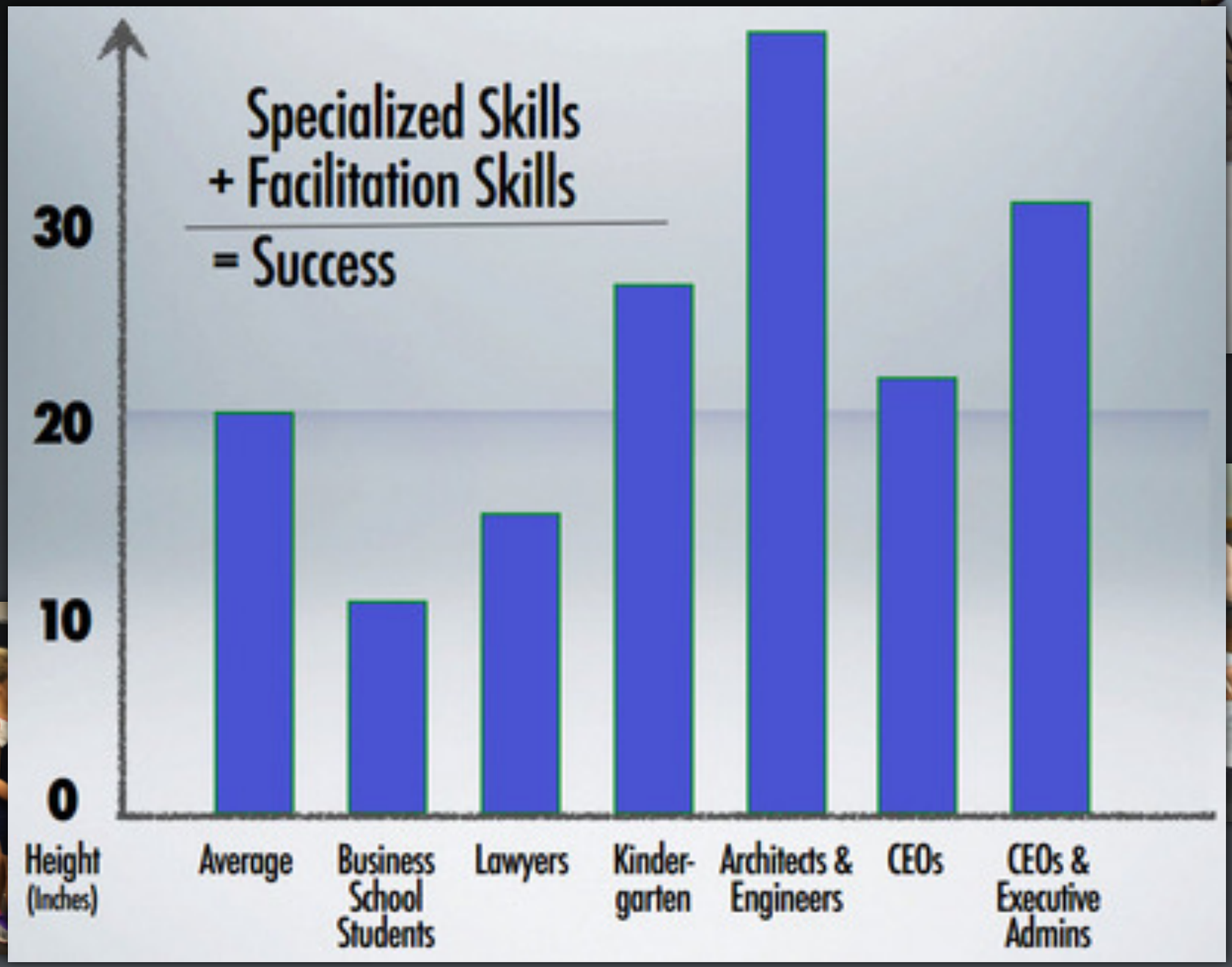
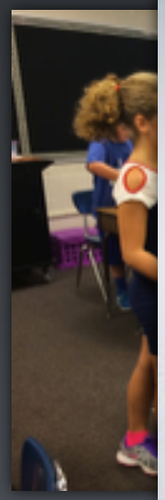
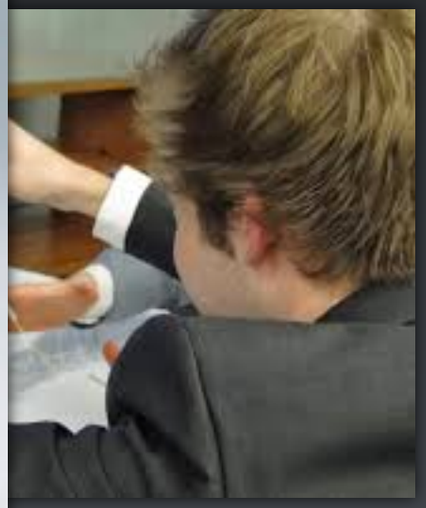
Being Experimental - Works!









Source: Tom Wujec (http://marshmallowchallenge.com)

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Dr. W. Edwards Demming

Plan *a change or test, aimed at improvement*

Do *carry-out the change or test, (preferably on a small scale)*

Study *the results. What did we learn? What went wrong?*

Act *Adopt the change, abandon it, or run through the cycle again*

More Info: http://pkpinc.com/files/NA01MoenNormanFullpaper.pdf

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The Lean Mindset

- Deliver Fast
- Build Quality In
- Optimise The Whole
- Eliminate Waste
- Amplify Learning
- Decide Late
- Empower The Team
- Focus on Skill Development & Results

  “Results are not the point” - Mary & Tom Poppendieck

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Lean Mindset

- Listen to the voice of the customer
- Remove all non-value adding steps and processes
- Address bottlenecks by rebalancing resources
- Establish an organisational structure to support continuous learning

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The Principles of Continuous Delivery

- Create a repeatable, reliable process for releasing software.
- Automate almost everything.
- Keep everything under version control.
- If it hurts, do it more often – bring the pain forward.
- Build quality in.
- Done means released.
- Everybody is responsible for the release process.
- Improve continuously.

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2nd Law - Stuff is More Complicated Than You Think

Cancer Treatment Machine
Overdoses Patients With Gamma Radiation

Ariane 5 Explodes
40 seconds after Launch

Knight Capital's
$440 Million loss

NASA Mars Climate Orbiter
Lost!
(Orbiter talking Metric units, ground talking imperial!)

NorthEast USA
Blackout

22 people wrongly arrested
due to failures in courts computer system

Microsoft Zune's
New Year Crash

Cash machine bug
gives customers extra money

USS Yorktown (Aircraft Carrier)
Lost Control of Propulsion System

Chinook Helicopter Crash
Faulty Engine Mgmt System

Pentium chips
floating-point math error

Russian Colonel Prevents Nuclear War in 1983
by Ignoring Mistaken Early Warning System

2nd Law - Stuff is More Complicated Than You Think

Vancouver Stock Exchange

In January 1982 the index was initialised at 1000

It was then updated and truncated to three decimal places on each trade. (3000 times a day.)

The truncations led to a loss of around 25 points per month.

2 Years later the error was corrected, raising the value of the index from 524.811 to 1098.892

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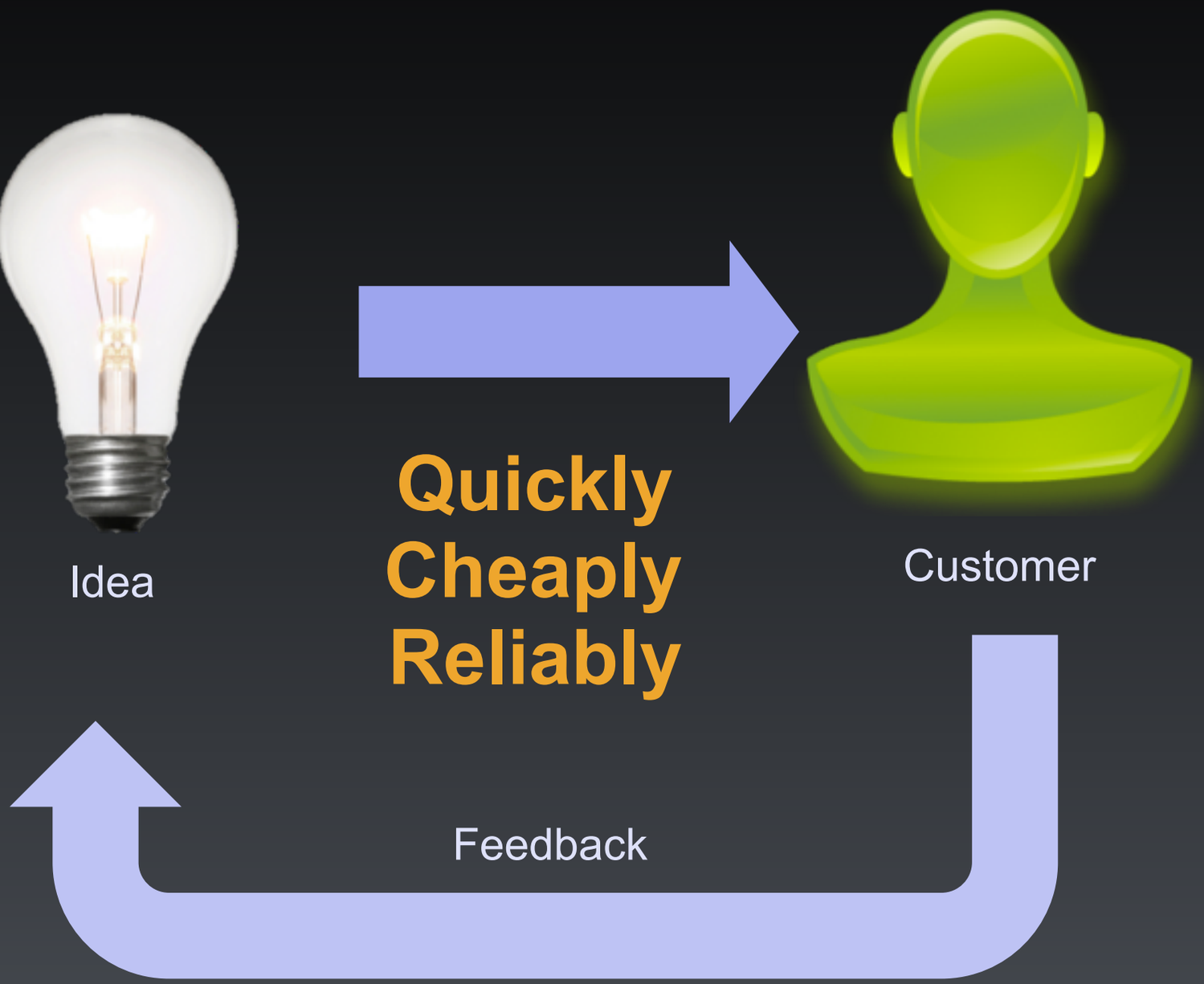
What Do We Really Want?



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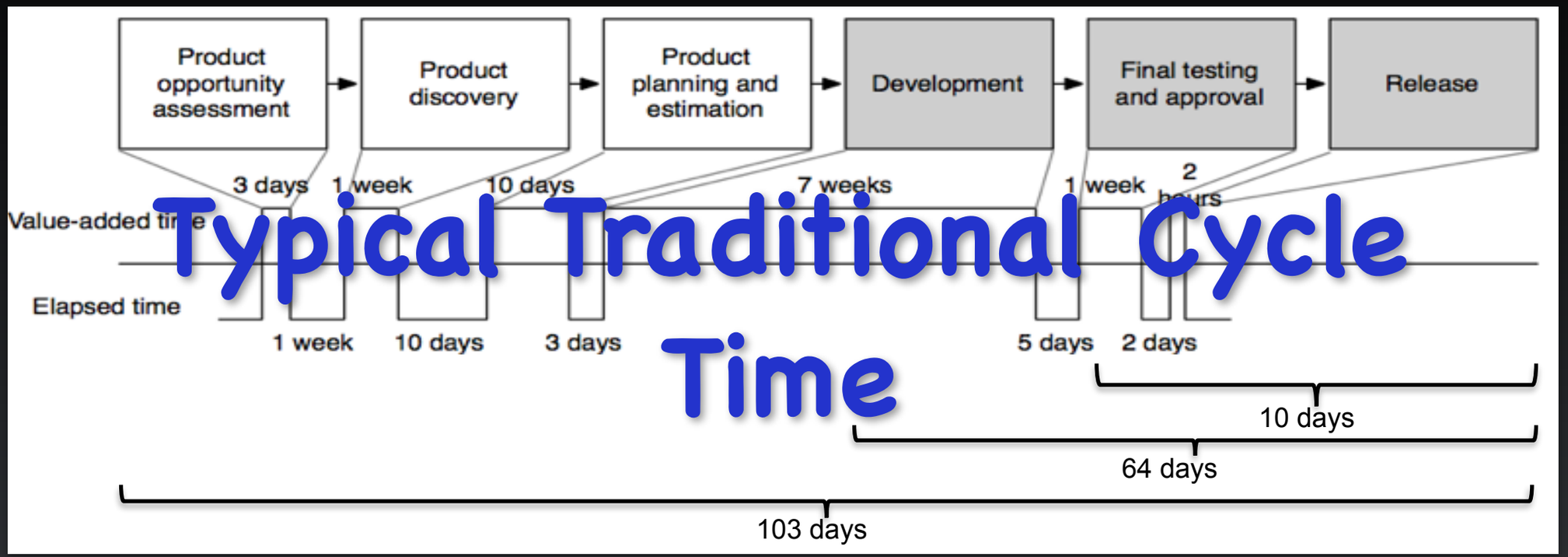
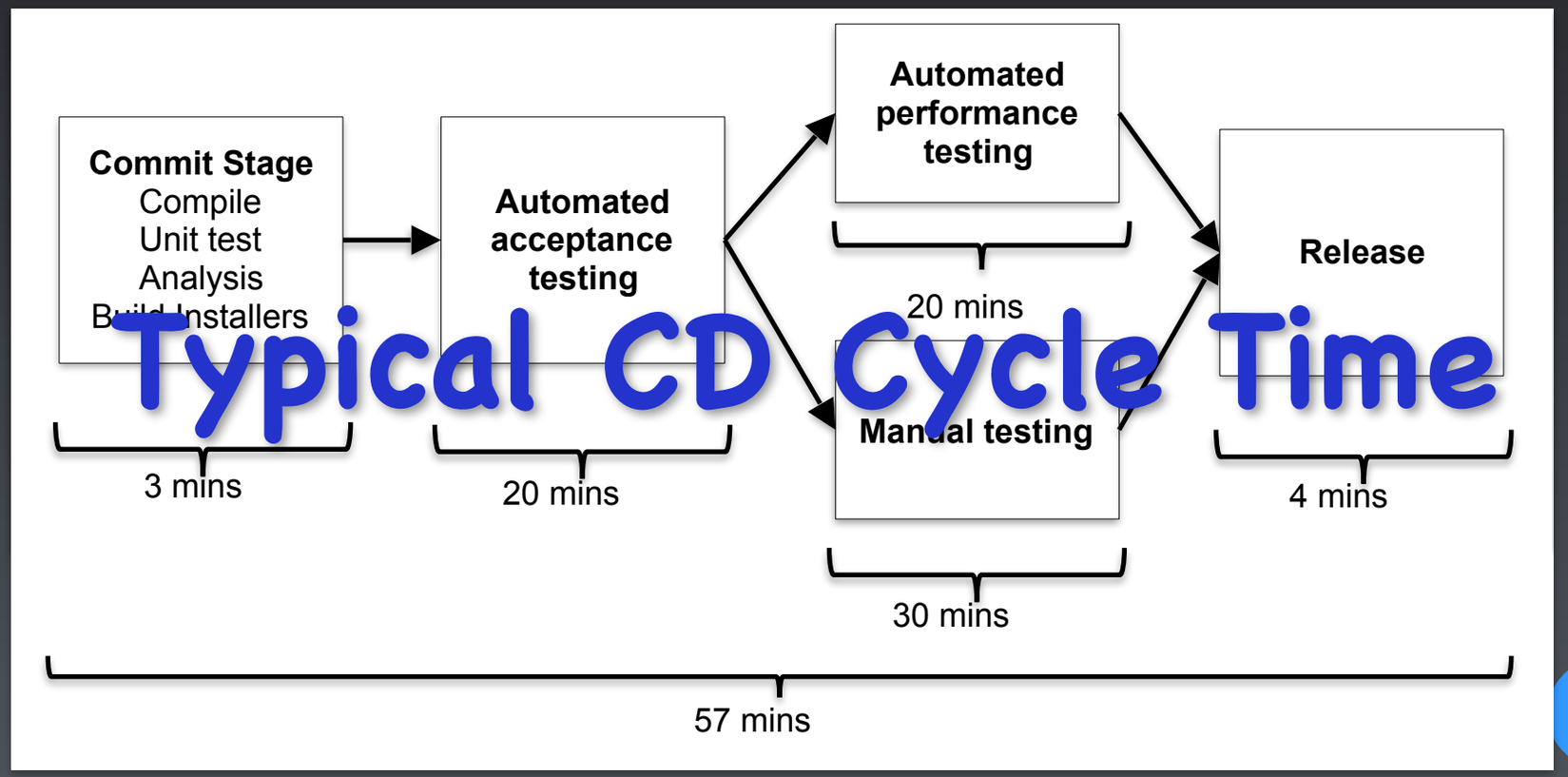
Cycle-Time





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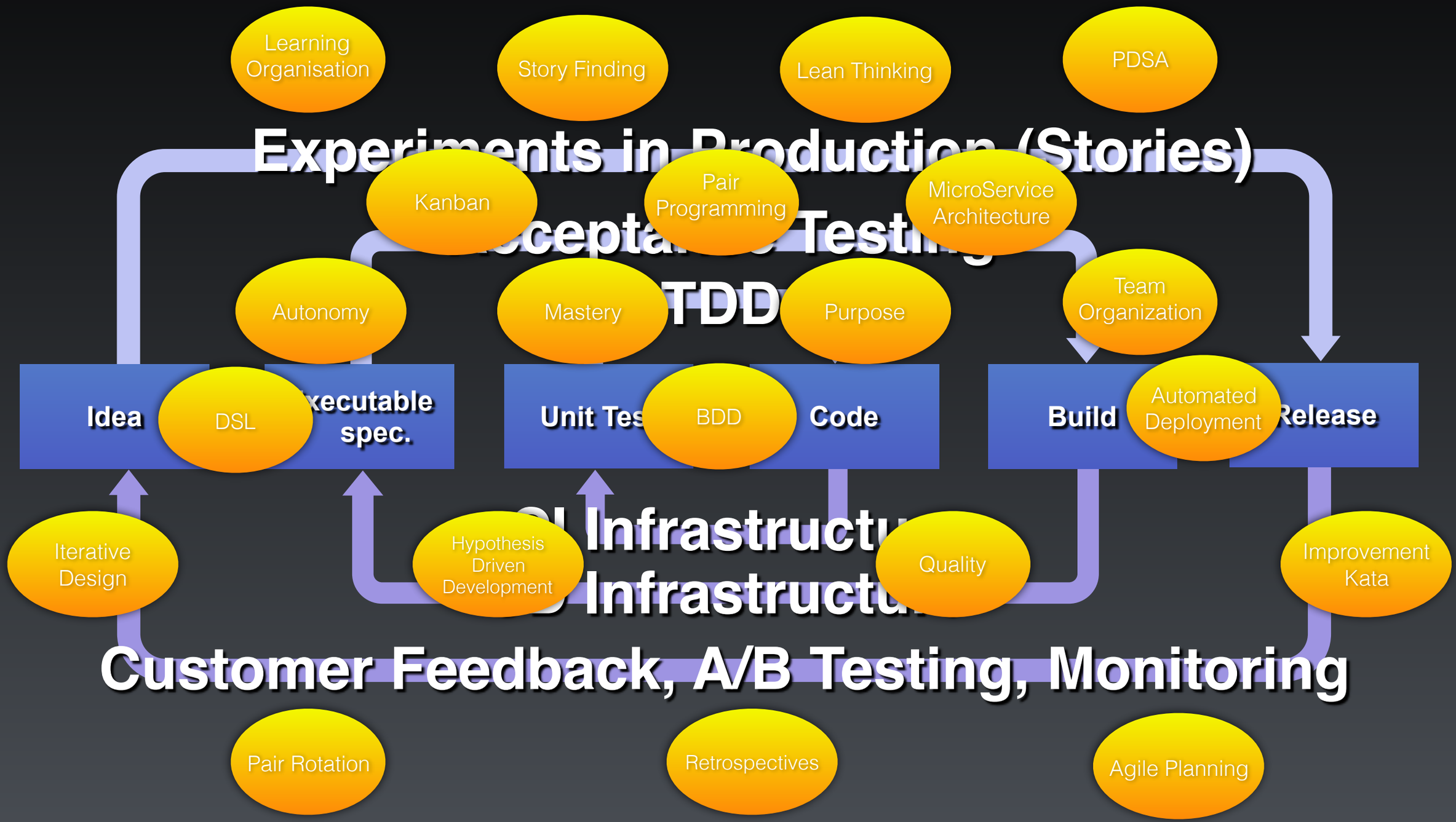
Experiments in Software Development



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Experiments In Team Development

Being Experimental!

- ***Don't*** Jump to conclusions
- ***Don't*** Start work based on a guess
- ***Don't*** Do things because "we have always done it that way"
- ***Don't*** Be afraid of experiments failing,
  that is when you learn most!
- ***Don't*** Assume experts know the answer

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Being Experimental!

- ***Do*** Question everything
- ***Do*** Make your first response to ANY idea “How can I test this?”
- ***Do*** Work iteratively so that you can learn and adapt
- ***Do*** Think about how to apply ideas from science like:
  - “Falsify-ability”, “Skeptical Mind”, “Scientific Method”, “Reproducibility”, “Peer-Review”…

The Importance of Being Experimental

"Science is the belief in the ignorance of experts."

"The first principle is that you must not fool yourself — and you are the easiest person to fool"

"It doesn't matter how intelligent you are, if you guess and that guess cannot be backed up by experimental evidence then it is still a guess."

Richard Feynman

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We are approaching the end, and I know what you are thinking…

“Dave said there were 3 laws, What about the 3rd law?”

I hope this presentation has proven all three ;-)

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Farley's Three Laws

LAW 1: PEOPLE ARE CRAP!

LAW 2: STUFF IS MORE COMPLICATED THAN YOU THINK

LAW 3: ALL STUFF IS INTERESTING

(IF YOU LOOK AT IT IN THE RIGHT WAY)

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Q&A

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http://www.continuous-delivery.co.uk

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http://www.davefarley.net

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