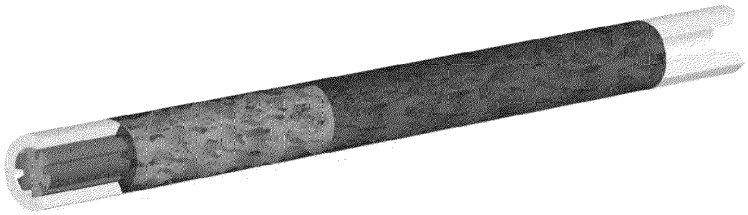
Horizon 3 Vapor

The Open Innovation Solution



Dennis Potter
Exhibit_13
6/29/2020

Case No. 1:19-cv-260
Defendant's Trial Exhibit
D0068

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Horizon 3 Vapor

Background

The Officer Forum Green Team offers the unique opportunity to engage in broad cross functional strategic discussions around future product innovations

Strategic Innovation in collaboration with R&D has undertaken to advance our product innovation across three horizons of vapor/aerosol that begin with significantly improved Eclipse technology and end with products capable of spanning the gap between tobacco and nicotine replacement therapies.

The main focus of this document is to promote broad strategic assessment of one potential Horizon 3 product approach.

In order to facilitate the discussion the following slides present

- Background research and insights into: Why Vapor
- Background to further explain the 3 horizons of innovation as they apply to vapor/aerosol products.
- Followed by a review of products and technologies we have reviewed and rejected over the past couple of years.
- Leading into a discussion of the technology associated with Fuma International LLC's product and why we currently believe it may present one of the best ways forward for a Horizon 3 Platform.
- Finally, the challenge for our cross functional strategic discussion

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Why Vapor

- Tobacco Vapor products and E-cigarettes are the most promising and possess the highest full migration potential.
- In concept, Vapors have a "migration pull" effect because they deliver on current ATCs desires while incorporating additional benefits.
  - Lowest change to smoking behavior
  - Positive migration motivation – pursuit of a new pleasure
  - Reduction of external stigmatization
  - Possibility to regain 'lost territory' usage
  - Retention of basic rituals
  - Similar product performance
  - Improved functional benefits: No odor, ETS, CO and tar
- However, current market products have significant deficiencies that introduce additional migration barriers
  - High upfront cost
  - Complex and messy setup, usage and maintenance
  - Learning curve e.g. need more information and high perceived complexity
  - Dependent on cigarettes as the reference (design and flavor profiles)
- By turning barriers into opportunities, Vapor products that embody the new pleasure paradigm have the potential to provide holistic pleasure and the seemingly impenetrable space once occupied by analog cigarettes is displaced by Vapor.

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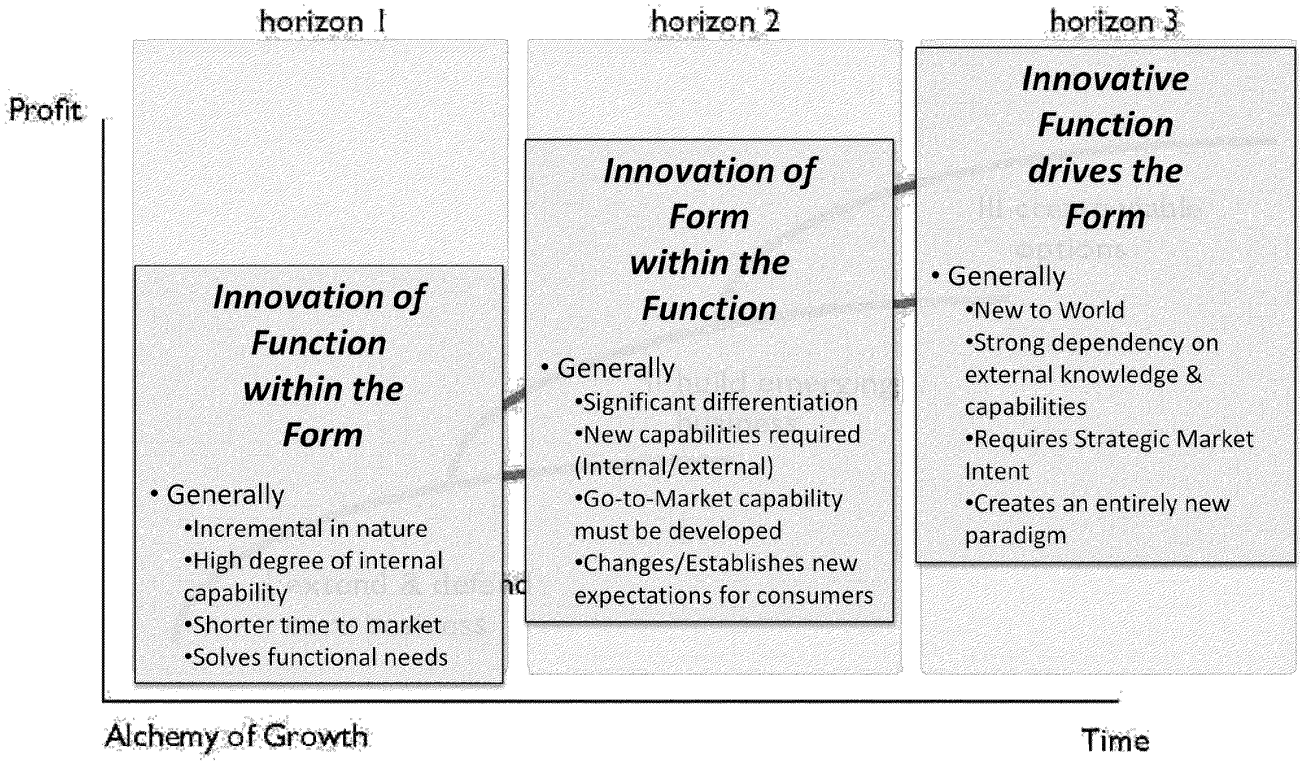
Innovation Approach

Simultaneous Effort Across 3 Horizons of Innovation



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3 Horizons Applied to Vapor

- The following slide is a graphical depiction of the 3 innovation horizon efforts for vapor
  - H1 optimizes the current eclipse model
  - H2 will attempt to change the consumers expectation away from cigarette by changing the form and ritual of the Eclipse product
  - H3 involves advancing our vapor understanding, exploration of new technologies for green field development and monitoring outside development for opportunities

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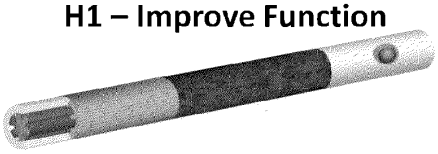
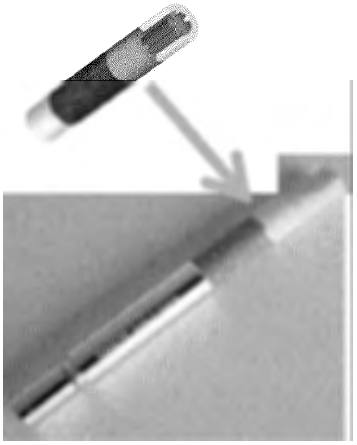
Aerosol Horizons

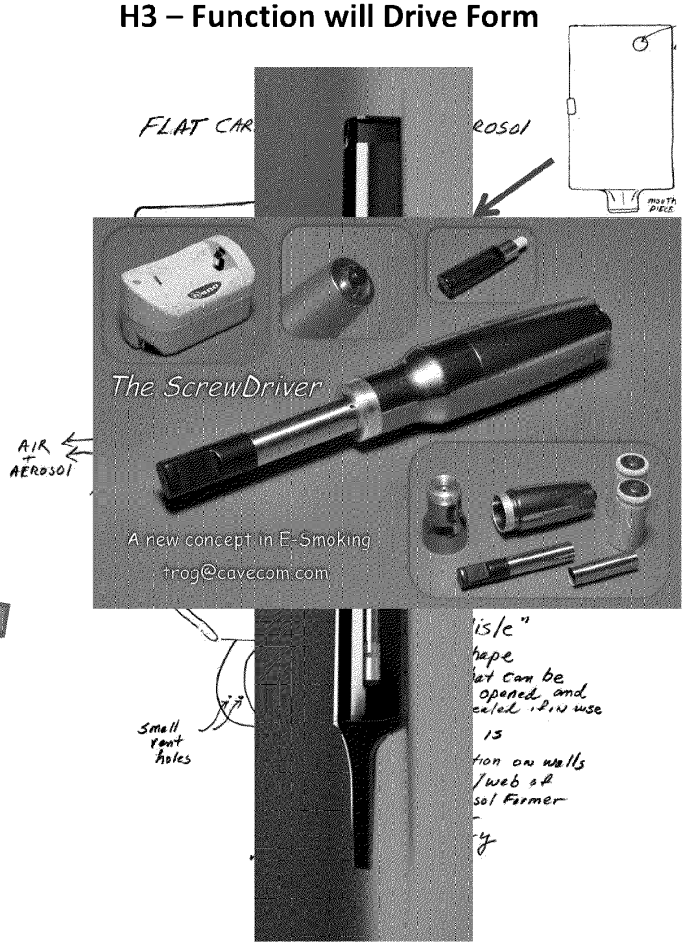
H1 – Improve Function



H2 – Improve Form



H3 – Function will Drive Form



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Horizon 3 Vapor

Advanced Aerosol Product

Objective

- Zero CO yield
- Optimized aerosol delivery
- Further reduction in potential risk

Multi Pronged Approach

- Superior understanding of aerosol delivery
- **Open Innovation (Proudly Found Elsewhere)**
- Green field development

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Horizon 3 Vapor

Open Innovation **(Proudly Found Elsewhere)**

Use our superior understanding of aerosol delivery to evaluate open innovation opportunities in the areas of emerging technology, Intellectual Property, and entrepreneurial ventures that have the potential to advance our Horizon 3 Vapor Innovation Objectives.

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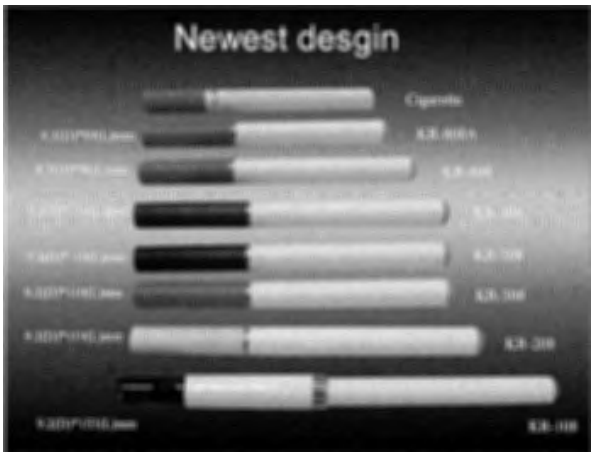
Entrepreneurial Ventures

- E-Cigarettes
  - Multiple brand names and outer design variants
  - Mostly imports (China, Germany, other)
  - Majority to date based on the Chinese design Model



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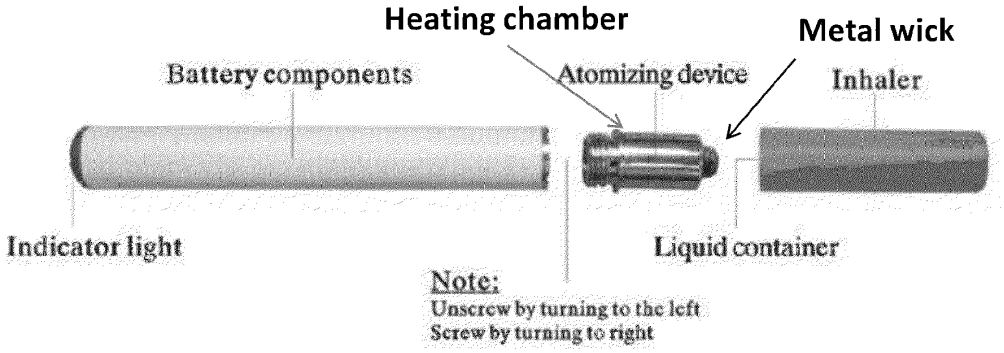
E-Cigarette standard 3 piece design

- Generally the control circuits cut the power after about 2 sec. to protect the fine wires of the heating coil and metal wick
- Users complain of messiness, fluid leakage and frequent cleaning of the coil
- Most follow a reverse flow design e.g. liquid must move counter to air flow
- Our current belief is that most of the aerosol deposits in mouth, throat and upper airway
- Virtually all entries to date use Propylene Glycol (PG) as the aerosol former
- Current theory for why PG: lower boiling point, wet ability and flow ability vs. Glycerin's highly viscous nature

1.Structure of the Super Cigarette body

The Mini Electronic Cigarette body is composed of atomizing device, microcomputer controlled circuit and lithium battery components. An operating mode indicator light at tip of the battery components.



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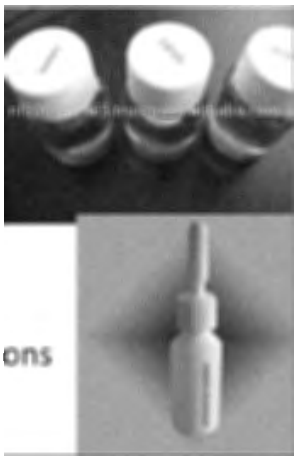
E-cigarette 3 piece design

- Accessibility of the design leads to consumer modification/adulteration
  - Off brand or home modified e-juice
  - home made pad replacements
  - After market power and control mods
- These mods are needed because the products as designed fail to deliver to the ATC's expectations
- Highly engaged users are forced to become hobbyists



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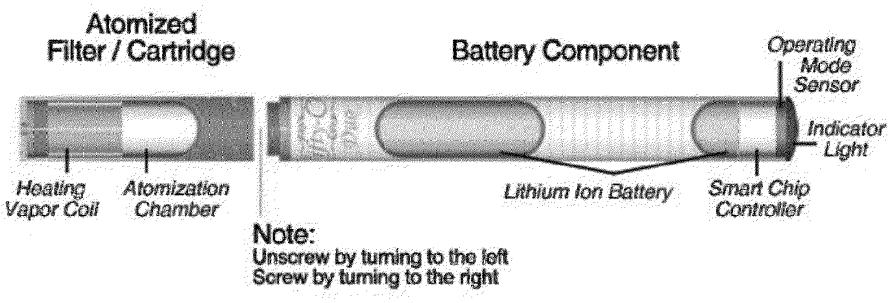
Two piece e-cig

The newest models attempt to resolve some of theissues by combining the 'atomizer' and reservoir

- Less mess, simpler, less tampering, preserves the "razor blade model"
- Smoke 51 appears unique in it's down stream flow design
  - But this creates a warning to users not to tilt the product beyond horizontal as this may result in e-liquid flowing to mouth.

Smoke 51

Structure: The Fifty-One Duo™ Electronic Cigarette is comprised of an atomizing device, a microcomputer controlled circuit, and a rechargeable lithium battery. An operating mode indicator light can be found at the tip of the battery.



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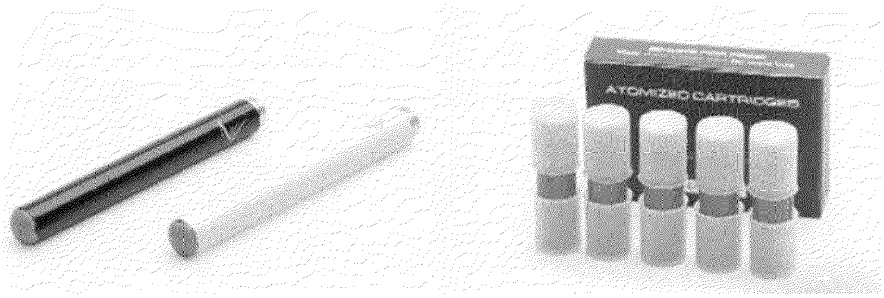
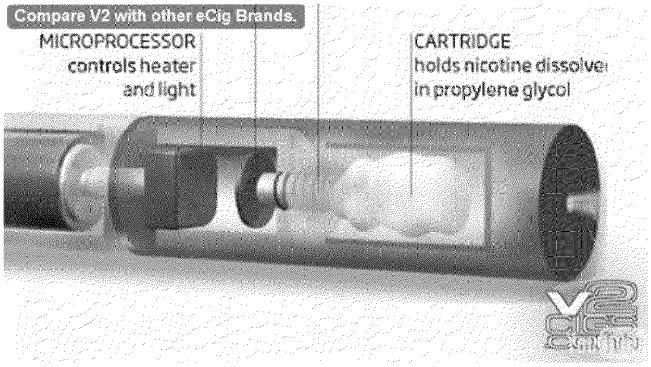
Two Piece e-cig

- These models continue to be PG delivery based
- V2 offers a model with manual switch for longer puffs
  (again an attempt to address known complaints)
- Essentially same or similar vaporizing method
  (cautions to maintain horizontal posture to prevent fluid seepage to the mouth)

V2





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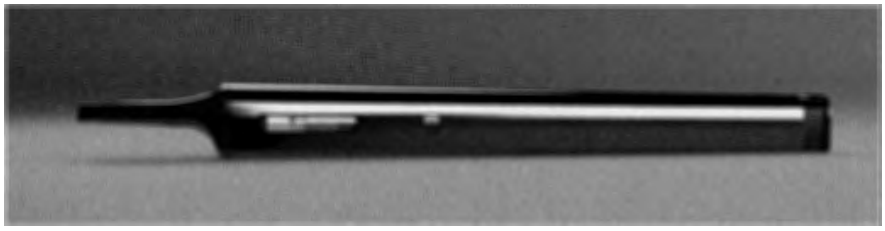
Entrepreneurial Ventures

Ploom



- Tobacco based aerosol delivery product
- Pipe classification by the TTB
- Primarily uses PG as aerosol former
  (similar issues as previously described)
- Butane catalytic converter heating system
- Smoke volume limited to head space evacuation
- Sweet note to all flavors, condensate taste buildup on mouth piece
- Potential to modify for higher heat required to move to Glycerin based system
- Qualitative studies suggest consumers negative to the complexity
  - Three piece design, carry butane for refill, heat source too close to lips
- In limited market launch, San Francisco and internet sales

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Other entrepreneurial ventures

We believe all of these will fail to meet ATC expectations

Low temp. heat (no aerosol)

Zero Style
(no heat no aerosol)

Kindconsumer
saving lives. changing an industry

Uses asthma inhaler tech.

Aeros (no heat no aerosol)

Duke
UNIVERSITY
Jed Rose

Nicotine & Pyruvic Acid

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Meeting ATC expectations

- For discussion purposes Vapor and Aerosol tend to be used interchangeably but there are real differences
  - Vapor tends to refer to a single substance suspended in the air which may or may not be visible (think steam or fog vs. high humidity)
  - Aerosol can be solid or liquid particles suspended in a gas (like air). These particles can be complex mixtures and form a range of droplet or particle sizes.
  - Whether vapor or aerosol both tend to dissipate with time either by evaporation (visible to invisible but still vapor) or precipitation – combining to form larger droplets/particals which fall out of the gas/air suspension.
- Cigarette smoke is best described as an aerosol, but it does contain vapor components
- The critical requirement is droplet/particle size
  - Too large or too small it tends to deposit in the throat and mouth

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Fuma International LLC

May represent the highest potential H3 aerosol technology we have seen to date

- US Manufacturer
- Interested in working with RJRT (contacted us)
- Claim to have IP on mouthpiece and liquid formulation
- Inventors still in place as potential resource
- CA in place

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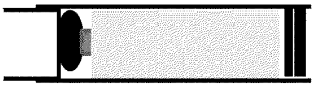
Fuma two piece e-cig

Best viewed in "slide show"

- Unique heavier gauge heating element may enable alternate aerosol formers for control of droplet size
- New central flow design
- Instructed to take 2 short puffs to pre-heat at start (also suggest a new aerosol type)
- Perceptibly increased aerosol volume
- Does not appear to have timed cut off

Heating element

Porous tube



Metal tube

Fluid Reservoir

Screw connection

Retainer ring

Mouth end cap

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Other potential Fuma Benifits

- Designed to accept competitor's battery
- US based manufacturer
- Potential to further reduce component part costs
- Market strategy focused on traditional tobacco distribution networks

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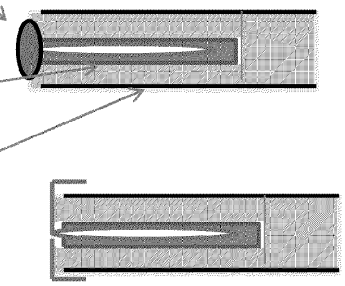
Potential for Tobacco e-cig based on FUMA

Concept

- Incorporate a heating element similar to the one found in Fuma brand e-cig
- Surround the heating element with a tobacco based substrate
- Insulate with low efficiency tow
- Utilize an e-cig battery as the power source with flow activating switch
- Each plug = one use, so continue to sell in 20's
- Need quick connector mods



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Fuma International LLC

Discussion

Potential benefits RAI:

- Advance our H3 Aerosol Platform
- Place a "bet" in a promising e-cig approach
- Potential to adapt to tobacco
- Modify or take as is to FDA as NRT (Rx or OTC?)
- Source of open innovation for further design
- Influence Fuma's positioning in market

Benefits to Fuma:

- Source of capital to expand/compete
- Credibility in market
- $$ Sale or license
- R&D knowledge
- Open to exploring partnership models

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Fuma International LLC

Potential to Cover 3 Bets

Fuma:

- Fund Fuma to play out the current e-cigarette market

RJRT:

- Collaborate to adapt the technology to tobacco based.

Niconovum:

- Collaborate to gain Rx or OTC NRT approval from FDA

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Green Team Challenge

What are the strategic imperatives within our individual areas of accountability that need to be addressed in order to be successful against each of the “3 bets”?

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Other reading

- NJOY Brief Provides Compelling Argument Why FDA Lacks Authority to Regulte Its Electronic Cigarettes as Drugs/Devices

http://tobaccoanalysis.blogspot.com/2010/07/njoy-brief-provides-compelling-argument.html

- Kansas AG: new smoke free law doesn't affect electronic cigarettes

http://www.kansas.com/2010/07/06/1391740/ban-doesnt-include-electronic.html

- Fuma Site
- http://www.myfuma.com

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Notes Summary:

Slide 3: 'Joel'
Slide 6: 'H1 - Improve the overall functionality
H2 - Modernize the form
H3 - Does Horizon 3 already exist in the form or product like Ploom or e-cigarette or will it take on a yet to be envisioned form and function?'

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