



**“Wisdom is the reward you
get for a lifetime of
listening when you would
have rather talked.”**

Mark Twain

DRIVING GROWTH 

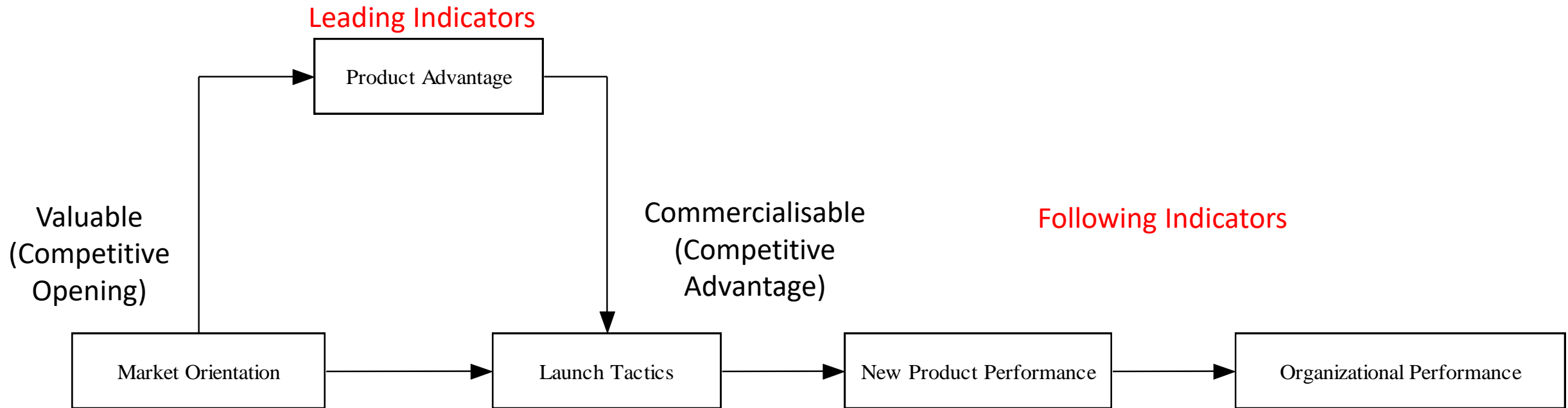
Voice of the Customer and Competitive Advantage

Leah Speser, JD, PhD, RTTP, NPDP

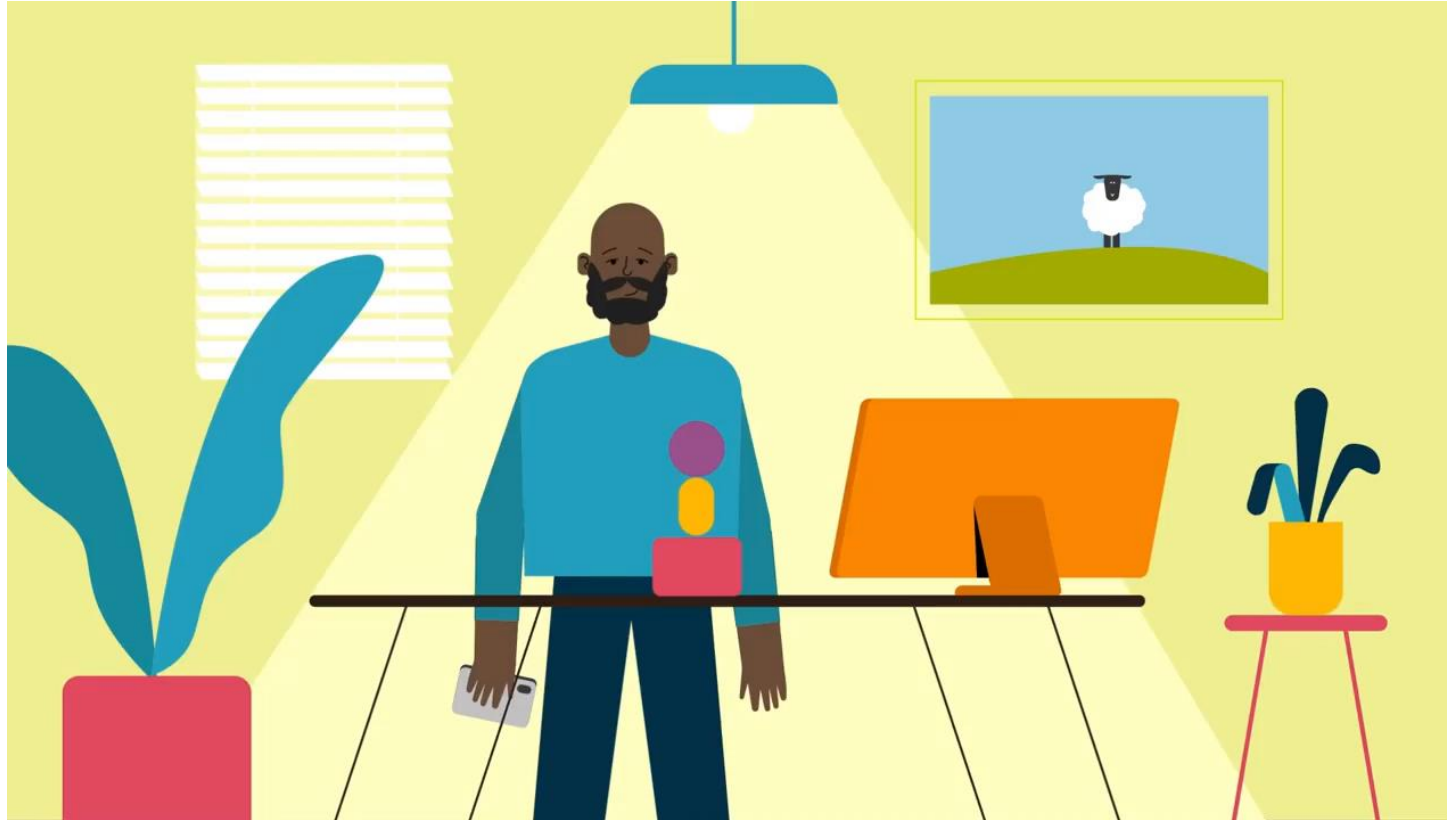


RESEARCH
& INNOVATION
FOUNDATION

▶ The Starting Point: Value for the Customer is How you Create Value for Your Company



▶ Voice of the Customer



[Toolkit on New Product Development and Inventions in the Public Domain \(wipo.int\)](http://wipo.int)

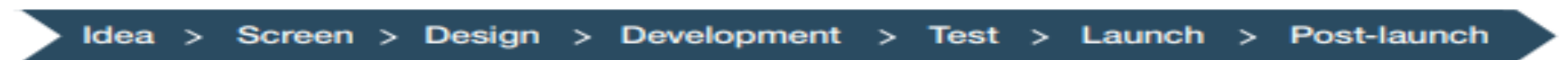
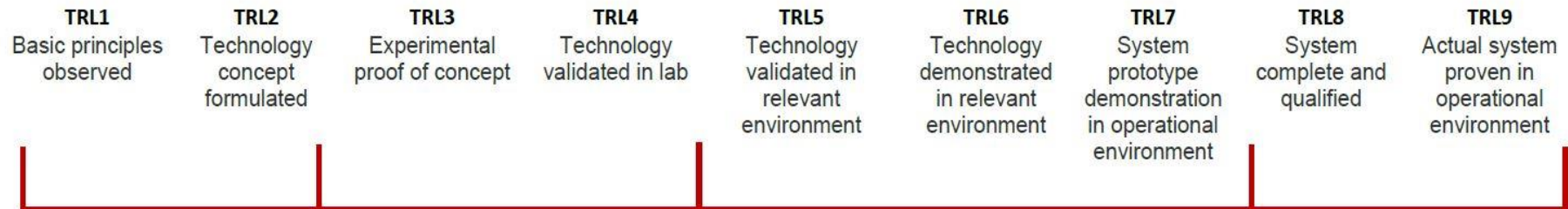
▶ Customer Requirements

Customer Requirements																						
	Importance to respondent	Average importance on a scale from 1 (low) to 3 (high)	Customers				End-Users				Future Customers				Experts				Other			
	Customer requirements																					
Performance		#DIV/0!																				
		#DIV/0!																				
		#DIV/0!																				
		#DIV/0!																				
		#DIV/0!																				
Ease of use		#DIV/0!																				
		#DIV/0!																				
		#DIV/0!																				
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		#DIV/0!																				
Price		#DIV/0!																				
		#DIV/0!																				
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Other		#DIV/0!																				
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- ▶ **Listening to the Voice of the Customer is like Skeet Shooting**



▶ Be Sensitive to Time-Lines for Intersection



[An Introduction to Technology Readiness Levels \(TRLs\) - RedKnight Consultancy | Grant Bid Writers | Funding Bid Writers | Bid Writers](#)

▶ **Listening to the Voice**

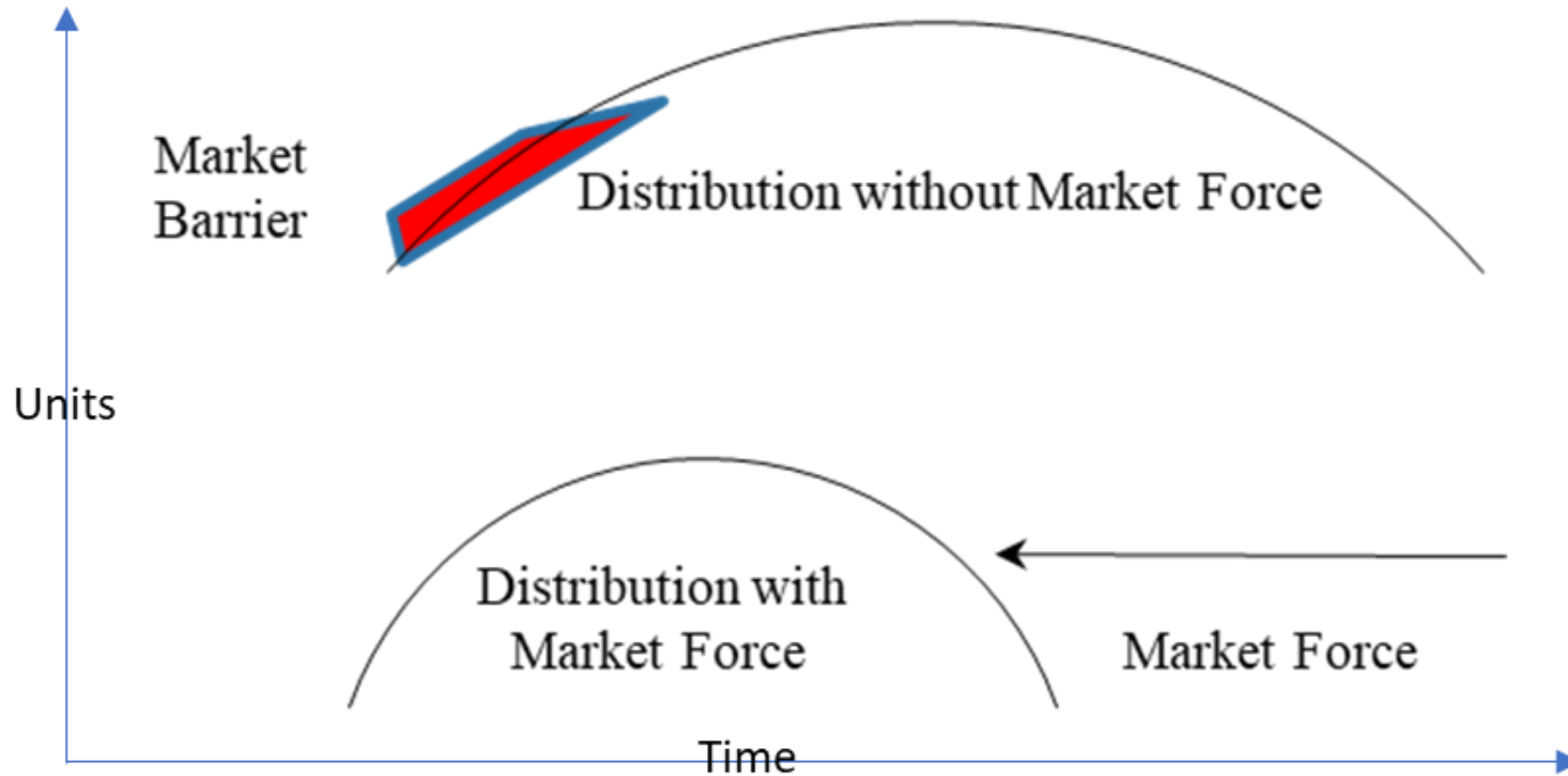
Primary Research

- Surveys
- Interviews
- Site Visits
- Mockup and Beta Test use
- Test Marketing (MVP)

Secondary Research

- Internet browsing
- Generative and other AI tools
- Patent databases
- Scholarly literature
- Catalogs
- Market research reports
- Other databases

▶ Market Barriers and Forces (Drivers) Affect Change and the Rate of Change



► Use Both Methods

To improve forecasting accuracy, combine forecasts derived from methods that differ substantially and draw from different sources of information.

Principles of Forecasting: A Handbook for Researchers and Practitioners, j. Scott Armstrong, [\(PDF\) Combining Forecasts \(researchgate.net\)](#)

- > Start out with exploratory searching on Secondary Sources, with or without ChatGPT
- > Go to Primary Sources
- > End with Secondary Sources

► Exploratory Searching

- > Functionality and “problem”, “need”, “requirement”
- > Chatbots – but always ground truth

[What ChatGPT is and what it's not: A three minute guide \(youtube.com\)](#)

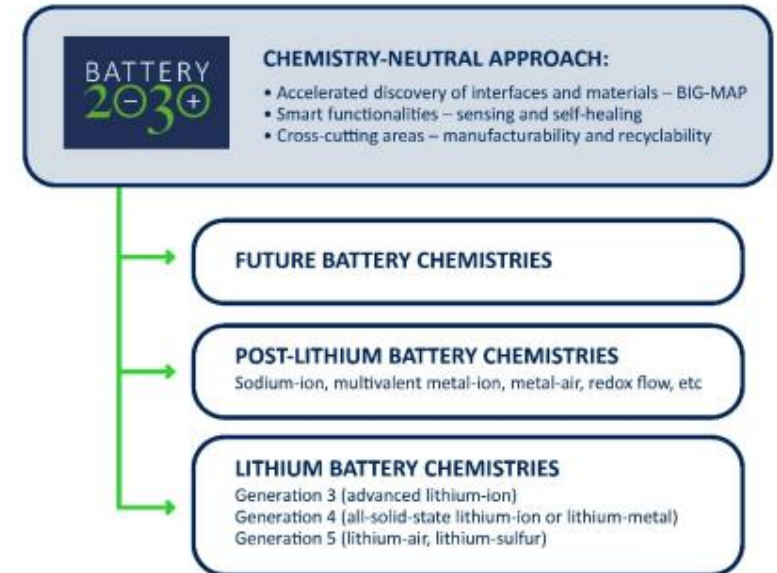
[\(26\) ChatGPT replicability | LinkedIn](#)

[\(27\) "Bearing" with It: Using ChatGPT to Solve New Product Development Challenges | LinkedIn](#)

➤ Roadmaps

Secondary Data: The More Authoritative, the Better

Roadmaps – my personal favorites



Functional Decomposition

http://www1.eere.energy.gov/vehiclesandfuels/pats/program/electrochemical_energy_storage_roadmap.pdf

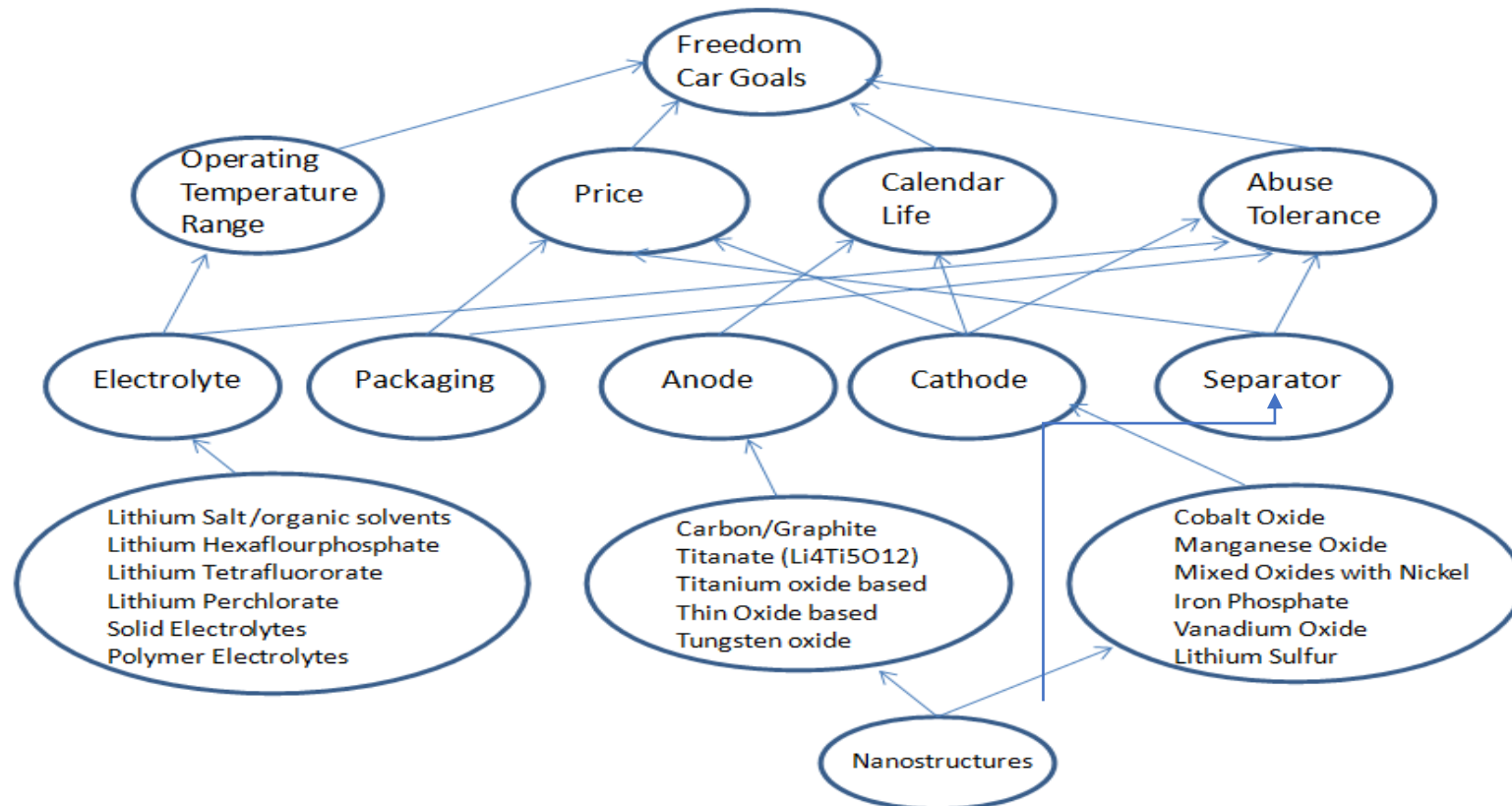
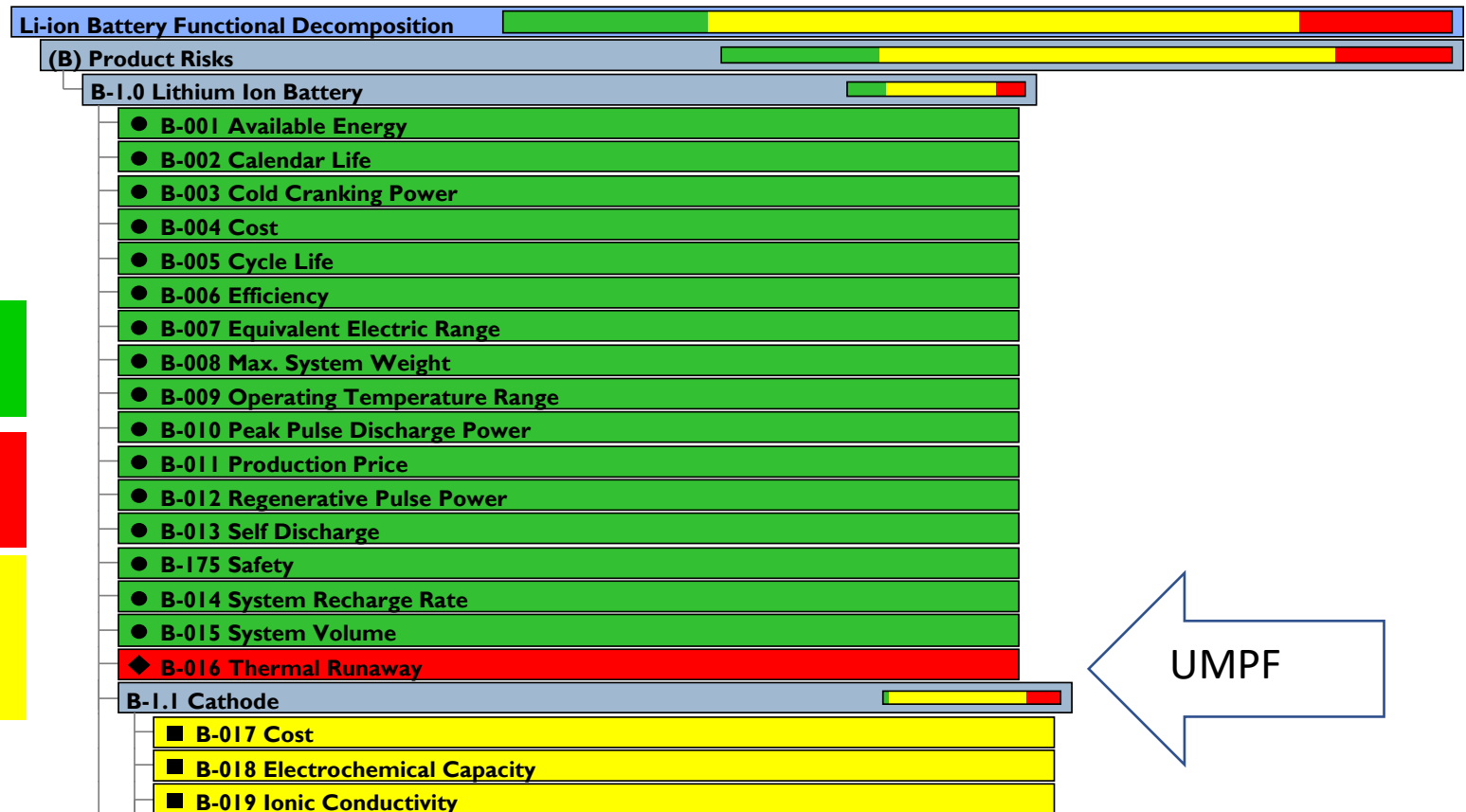


TABLE 1. Short-, medium-, and long-term goals for BIG-MAP, Sensing, Self-healing, Manufacturability, and Recyclability.

Research areas	Short-term (3 years)	Medium-term (6 years)	Long-term (10 years)
BIG-MAP	<p>Put in place a pan-European interoperable data infrastructure and user interface for battery materials and interfaces.</p> <p>Establishing integrated experimental and computational workflows.</p> <p>Demonstrating BIG-based hybrid physics- and data-driven models of battery materials.</p> <p>Deploy autonomous modules and apps for on-the-fly analysis of data characterisation and testing using AI and simulations.</p> <p>Developing multi-modal high-throughput/high-fidelity interface characterisation approaches.</p>	<p>Fully implementing BIG in MAP to integrate computational modelling, materials autonomous synthesis, and characterisation.</p> <p>Integrate data from embedded sensors into the discovery and prediction process.</p> <p>Develop and apply predictive hybrid models for the spatio-temporal evolution of battery interfaces/interphases to perform inverse materials design.</p> <p>Demonstrating transferability of the BIG-MAP approach to novel battery chemistries and interfaces.</p> <p>Integrating novel experimental and computational techniques targeting the time and length scales of electron localization, mobility, and transfer reactions.</p>	<p>Demonstrate the integration of manufacturability and recyclability parameters into the materials discovery process.</p> <p>Integrate battery cell assembly and device-level testing into BIG-MAP.</p> <p>Implement and validate digital twin for ultra-high-throughput testing on the cell level.</p> <p>Establish and demonstrate full autonomy and chemistry neutrality in the BIG-MAP.</p> <p>Demonstrate a 5–10-fold improvement in the materials discovery cycle and interface performance.</p>
Sensing	<p>Apply non-invasive multi-sensing approaches transparent to the battery chemical environment offering spatial and time resolution.</p> <p>Integrating sensors into existing battery components (e.g., separator, current collector, and electrode composite).</p> <p>Deploy sensors capable of detecting various relevant phenomena (e.g., interface dynamics, electrolyte degradation, dendritic growth, metals dissolution, and materials structure change).</p>	<p>Miniaturise and integrate the identified (electro)chemically stable sensing technologies with multifunctions at the cell level and in real battery modules, in a cost-effective way compatible with industrial manufacturing processes.</p> <p>Deliver proof of concept of higher quality, reliability, and lifetime on the cell and module levels.</p>	<p>Master sensor communication with an advanced BMS relying on new AI protocols by wireless means to achieve a fully operational smart battery pack.</p>
Self-healing	<p>Establishing a new research community that includes a wide range of R&D disciplines to develop self-healing functionalities for batteries.</p> <p>Developing autonomous and non-autonomous (on demand) self-healing functionalities for specific battery chemistries, targeting loss of capacity and loss of power.</p>	<p>Integrating self-healing functionalities into battery components (e.g., separator or electrode composite).</p> <p>Electrochemically stable non-autonomous self-healing functionalities triggered via an external stimulus obtained from an advanced BMS.</p>	<p>Established efficient feedback loops between cell sensing, BMS, and/or AI modules to appropriately trigger, by external stimulus, the self-healing functions already implanted in the cell.</p> <p>Designing and manufacturing low-cost biosourced and/or biomimetic membranes with controlled functionalities and structure as autonomous self-healing functionalities.</p>
Manufacturability	<p>Improving simulation tools, such as multiphysics models for reducing the computational burden of the manufacturing process.</p> <p>Demonstrating the implementation of current AI technologies through deep learning and machine learning methods for cell design (for Li-ion chemistries).</p> <p>Implementation of the AI-driven methodology for manufacturing (Li-ion chemistries) – including digitalisation.</p> <p>Improving and scaling-up of new manufacturing processes (3D printing, dry processing).</p>	<p>Proof of concept of a digital-twin of a cell design (based on Li-ion chemistries).</p> <p>Proof of concept of a digital twin of a cell manufacturing process (based on Li-ion chemistries).</p> <p>Input from BIG, MAP, sensing, self-healing, recycling and other innovation areas integrated into the design and manufacturing process.</p> <p>Digital twin methodology adapted to the manufacturability of new battery technologies and innovative new manufacturing processes.</p>	<p>An AI-driven methodology established for manufacturing, by integrating cell design sub loops that converge in a fully autonomous prototype system nourishing from BIG-MAP. The new concept is deployed to the industry and academia.</p> <p>This methodology, which will help found a new commoditised state of the art, will be progressively deployed in industry and academia.</p>
Recyclability	<p>Integrated design for sustainability and dismantling.</p> <p>Demonstration of new technologies for battery packs/modules sorting and re-use/re-purposing.</p> <p>Establishing a European system for data collection and analysis.</p> <p>Demonstration of new technologies for battery packs/modules sorting and re-use/re-purposing.</p> <p>Developing automated disassembly of battery cells.</p>	<p>Demonstrating automated cell disassembly into individual components.</p> <p>Sorting and recovery technologies for powders and components and their reconditioning to new active battery-grade materials demonstrated.</p> <p>Significantly improve, relative to current processes, the recovery rate of critical raw materials</p> <p>Testing of recovered materials in battery applications.</p> <p>Develop prediction and modelling tools for the reuse of materials in secondary applications</p>	<p>A full system for direct recycling is developed and qualified.</p>

Determine if Specs Exist and What they Are

- Green indicates a goal with specific numerical values**
- Red indicates a risk or common design hurdle**
- Yellow indicates a goal or a characteristic without a specific value**



Early warning technology for common characteristic resistances of lithium-ion batteries with thermal runaway†

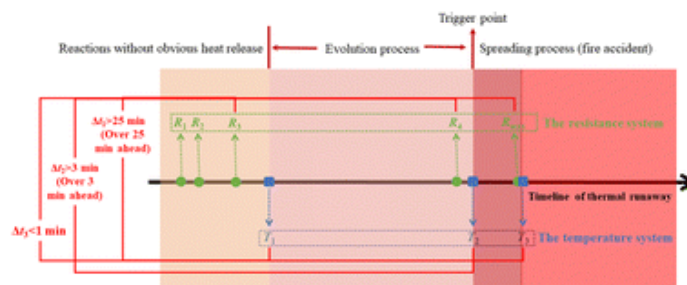


Zhigao Yang,^a Zhengjian Gu,^a Qianyi Tao,^a Jun Bao,^a Huanhuan Li^{*b} and Shengping Wang^{ib} ^{*c}

⊕ Author affiliations

Abstract

A technology for early warning (of over 25 minutes) of thermal runaway in lithium-ion batteries based on common characteristic resistances supported by thermodynamic calculations was derived. With great potential in practical application for avoiding property losses and human casualties, this technology was proven to be efficient and accurate.



PASSIVE PREVENTION OF THERMAL RUNAWAY AND FIRE PROPAGATION IN LI ION BATTERIES

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2023 NASA AEROSPACE BATTERY WORKSHOP

HUNTSVILLE, AL



Identifying and Controlling Thermal Runaway Risks in EV Battery Systems

Team All About Battery · January 16, 2024



A Comparative Analysis of Thermal Runaway Propagation in Different Modular Lithium-Ion Battery Configuration 2024-01-2901

Thermal runaway is a critical safety concern in lithium-ion battery systems, emphasising the necessity to comprehend its behaviour in various modular setups. This research compares thermal runaway propagation in different modular configurations of lithium-ion batteries by analysing parameters such as cell spacing and distribution, application of phase change materials (PCMs), and implementing insulating materials. The study at the module level includes experimental validation and employs a comprehensive model considering heat transfer due to electrical performance and thermal runaway phenomena. It aims to identify the most effective modular configuration for mitigating thermal runaway risks and enhancing battery safety. The findings provide valuable insights into the design and operation of modular lithium-ion battery systems, guiding engineers and researchers in implementing best practices to improve safety and performance across various applications.

Author(s): Antonio Garcia, Javier Monsalve-Serrano, Amin Dreif, Carlos Guaraco-Figueira

Affiliated: Universitat Politecnica de Valencia, Universitat politecnica de valencia

Event: SAE/AABC - EV Mobility 2030

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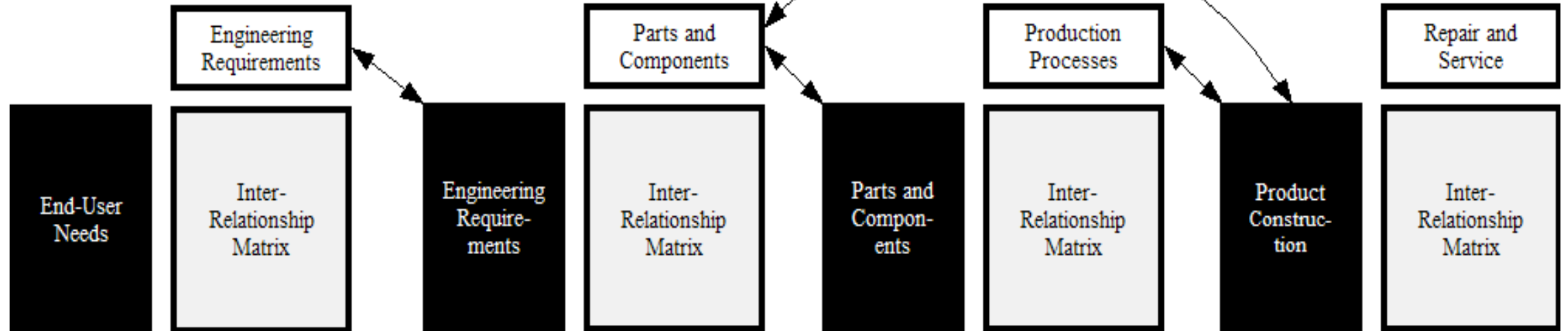
e-ISSN: 2688-3627

Electric Vehicle (EV) battery thermal runaway is a rare yet dangerous phenomenon. This happens when the battery's temperature rises out of control, which can lead to serious accidents.

Incidents, such as the electric van fire involving a Mercedes Vito EV in June 2023, highlight the real-world consequences of thermal runaway.

Key factors behind this incident could be overcharging, short circuits, or manufacturing defects. The risk of EV battery thermal runaway has resulted in plenty of research in this area. Understanding and mitigating these risks is paramount, with a focus on advanced sensor technologies, improved materials, and robust Battery Management Systems (BMS).

► Concurrent Engineering/Design Coherence



▶ Primary Data: Talk to People ... and Listen

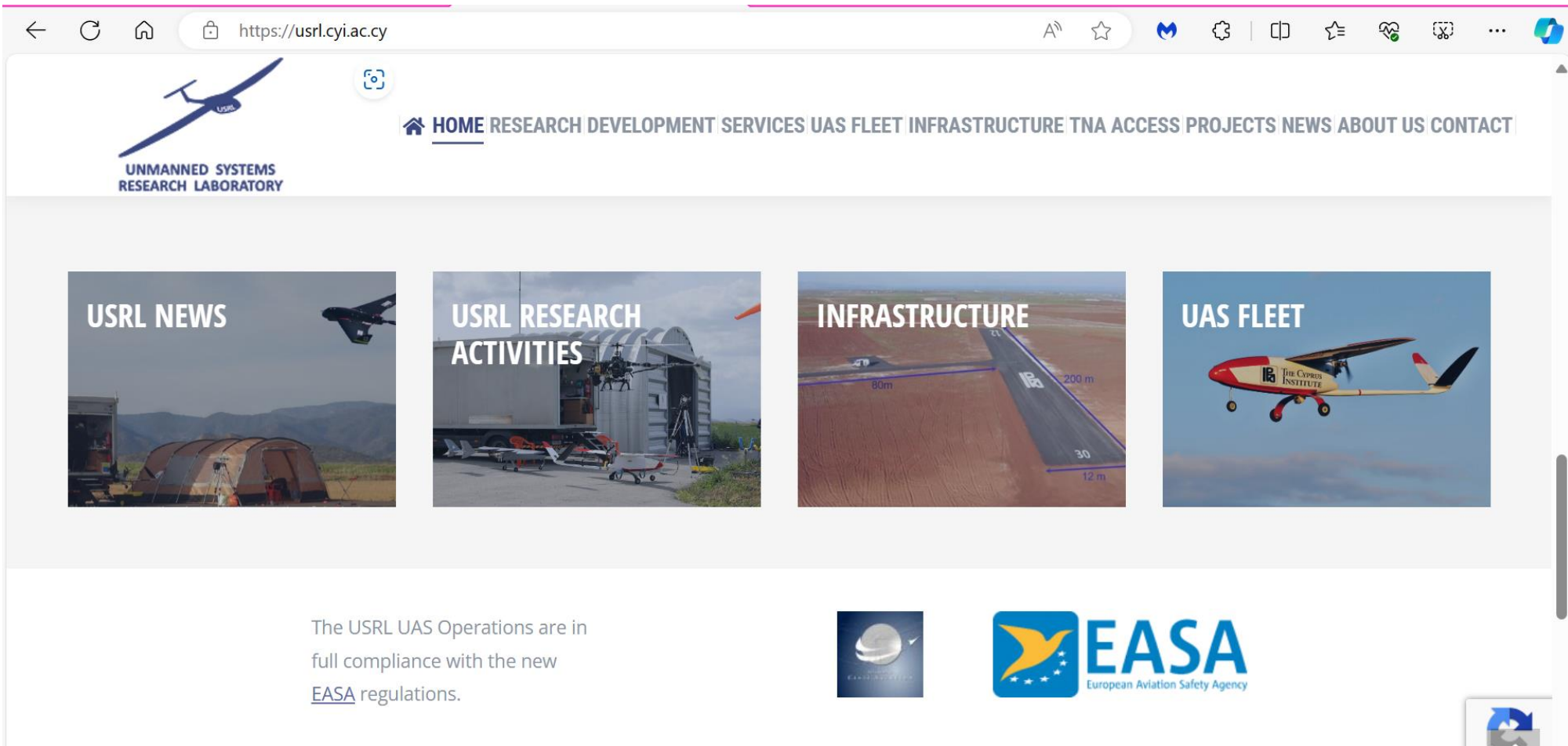
- ✓ End-Users
- ✓ Customers
- ✓ Experts



▶ Exercise



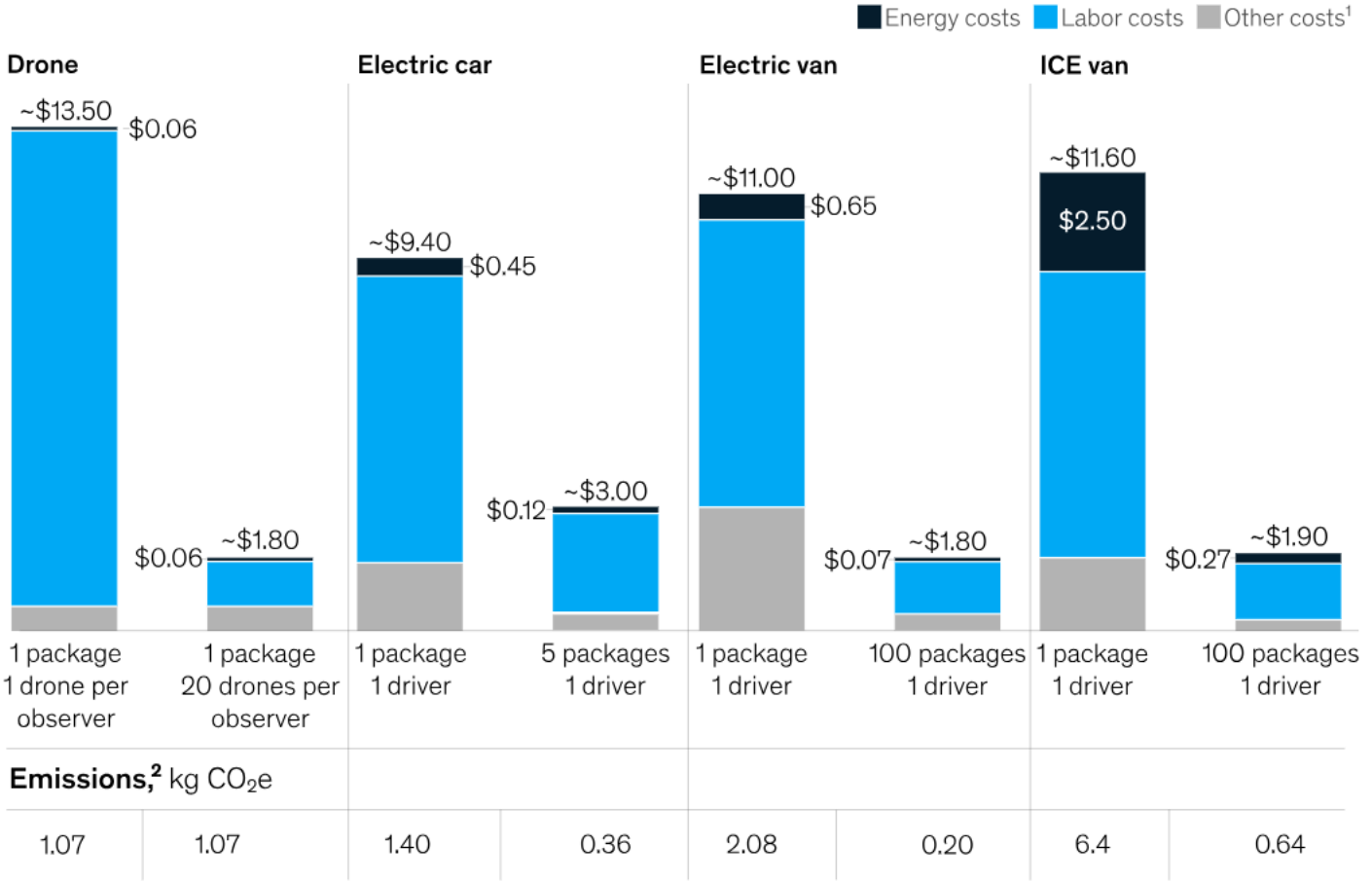
▶ Exercise



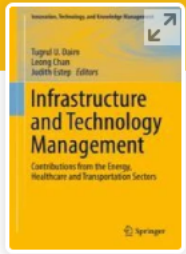
The screenshot shows the homepage of the Unmanned Systems Research Laboratory (USRL). The browser address bar displays <https://usrl.cyi.ac.cy>. The website header includes the USRL logo (an unmanned aircraft) and the text "UNMANNED SYSTEMS RESEARCH LABORATORY". A navigation menu contains the following items: HOME, RESEARCH, DEVELOPMENT, SERVICES, UAS FLEET, INFRASTRUCTURE, TNA ACCESS, PROJECTS, NEWS, ABOUT US, and CONTACT. The main content area features four large image-based buttons: "USRL NEWS" (with an image of a drone in flight), "USRL RESEARCH ACTIVITIES" (with an image of a drone being loaded into a hangar), "INFRASTRUCTURE" (with an image of a runway marked with dimensions: 80m, 200m, 30, and 12m), and "UAS FLEET" (with an image of a red and white aircraft). At the bottom of the page, there is a text block stating: "The USRL UAS Operations are in full compliance with the new [EASA](#) regulations." To the right of this text are the logos for the European Commission and the European Aviation Safety Agency (EASA). A small social media icon is visible in the bottom right corner of the browser window.

Drones could become cost competitive with other transport modes.

Example breakdown: unit delivery costs and emissions for a five-mile delivery of a 216-cubic inch package (six inches per side)



¹Other costs include asset, maintenance, and insurance costs.
²Scope 2 and Scope 3.



Infrastructure and Technology Management pp 387–412 | Cite as

Home > Infrastructure and Technology Management > Chapter

Technology Roadmap: Drone Delivery – Amazon Prime Air

Shiva Ram Reddy Singireddy & Tugrul U. Daim

Chapter | First Online: 11 January 2018

3924 Accesses | 31 Citations

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Chapter EUR 29.95
 Price includes VAT (Cyprus)

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What Do You Want to Know from End-Users?

Potential end-user on competitive opening	
Name	
Title	
Organization	
Phone	
Email	
Who would you use this product or service, why, and how?	
Importance of need(s) being addressed	
Key specifications and features to emphasize for this niche	
How long would you expect a product like this to be used before it has to be replaced? If consumables are involved, how often would they be purchased and in what lot sizes?	
Price and pricing factors for this niche - specifically, what price would you expect whomever buys to pay for such a product or service?	
Current and forthcoming substitutes?	
How would you want to be introduced to a product or service like this one?	
How important are things like delivery, installation, training, warranties, contract maintenance, help desks, rapid consumables delivery, and after-sales service for your satisfaction?	
What problems should be anticipated in making users like you aware of this technology and making it easy and desirable to use? Are things like training, maintenance by others, waste disposal or recycling, etc., important?	
Other potential roadblocks to your use?	
Additional insights	

What Do You Want to Know from Customers?

Food and other delivery?

Retail goods delivery?

Current or potential customer on competitive opening	
Name	
Title	
Organization	
Phone	
Email	
Importance of need(s) being addressed	
Who would use this product or service, why, and how?	
Key specifications and features to emphasize for this niche	
How long will end-users expect a product like this to be used before it has to be replaced? If consumables are involved, how often are they purchased and in what lot sizes?	
Price and pricing factors for this niche – specifically, what price would you expect to pay for such a product or service?	
Key competitors	
How would you introduce a product like this one?	
How important are things like delivery, installation, training, warranties, affordable consumables, credit for purchasing and after-sales service for customer satisfaction?	
Potential roadblocks to introduction	
What problems should be anticipated in making customers and end-users aware of this technology and in their acquiring it, using it, maintaining it, disposing or recycling it after its useful life, etc?	
Additional insights	

What do You Want to Know From Experts

What about the emissions? Is that going to be a problem downstream?

Expert on competitive opening	
Name	
Title	
Organization	
Phone	
Email	
Importance of need(s) being addressed	
Key specifications and features to emphasize for this niche	
How long will end-users expect a product like this to be used before it has to be replaced? If consumables are involved, how often would they expect to purchase them and in what lot sizes?	
Price and pricing factors for this niche? How do Customers think about price?	
Key competitors	
How would you introduce a product like this one?	
How important are things like delivery, installation, training, warranties, affordable consumables, credit for purchasing and after-sales service for customer satisfaction?	
Potential roadblocks to introduction	
What problems should be anticipated in making customers and end-users aware of this technology and in their acquiring it, using it, maintaining it, disposing or recycling it after its useful life, etc?	
Additional insights	

▶ Stretch and Discussion





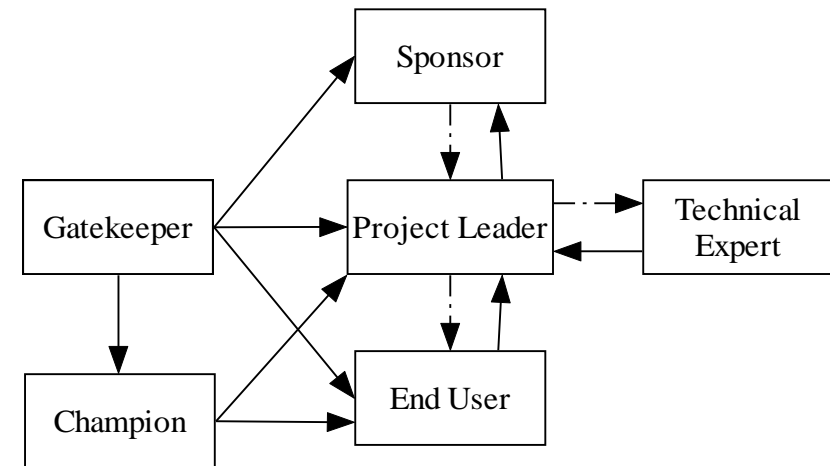
Tricks of the Trade for Calling End-Users and Customers

- Do enough market and technology research before hand to know the relevant terms and jargon and be able to participate in a conversation.
- Email everyone, provide your questions and ask if you can chat for no more than 10 minutes or so.
- Always clarify you are not selling anything but trying to figure out whether to write a proposal and how to focus it and explain why you think they may be able to help.
- If they are busy, ask when is a good time to talk and schedule it if possible. If they say they are the wrong person ask who to call and if you can mention you got their name from them.
- Look for common ground and leverage points.
- Be a poor working stiff.
- Know what you want to learn but be open to serendipity.
- If they ask you something you do not know the answer for, be honest and say if you can find out you will get back to them.
- Ask where they go for information and advice about the kind products or services you want to develop.
- Before saying good-bye, ask who else you should talk to and what other publications, sites, etc. they use to find business-relevant information.

▶ Who to Call in Companies

- Product Line Managers
- Marketing Managers and Staff
- Sometimes R&D Managers and Staff
- Division and Unit Managers (President, CTO, CNPD, Chief Engineer, BD, Marketing)
- C-Level Managers (CTO, CSO/VP R&D, CMO, CBD, CEO)
- Owners in SMEs

- Product Development Teams



▶ The Fishing Method

- 1) Develop a straw man.
- 2) Float it, then try it.
- 3) Adapt it to reflect comments and reactions.
- 4) Continue to no adaptation is needed.





▶ **Tips for Talking to Experts**

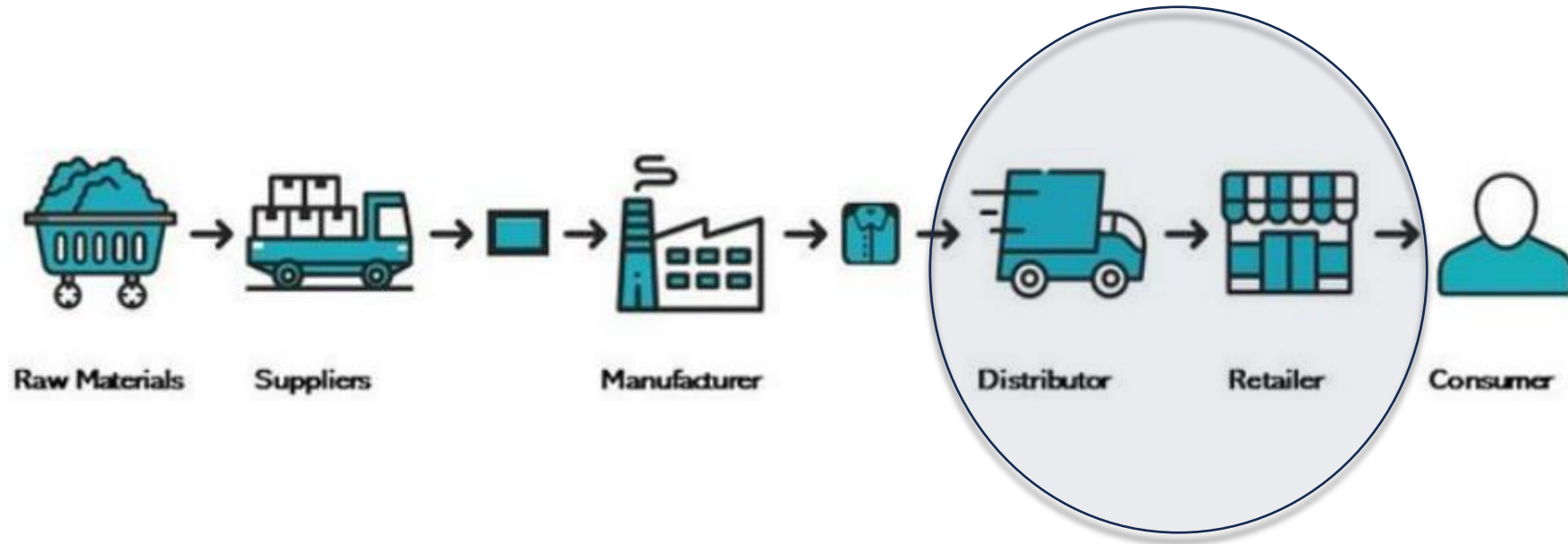
- Find them at nodal points in relevant communication channels.
- Explore the same kind of things as with Customers and End-Users plus some big picture stuff
- Start with what you read or saw which led you to call them. (“Schmeichel” a bit).
- Trade information to get information.

▶ Contacting Experts

- Government Officials Working in Relevant Areas
- Trade and Professional Publications
 - Editors
 - Authors
- Trade/Professional Associations and Societies
 - Officers and committee chairs
 - Presenters at meetings
 - People doing posters
 - Exhibitors at meetings
- College, University, and Research Lab Based
 - Researchers for technical matters
 - Consultants with Industry for anything else
 - Technology Transfer and Business Development staff
- Distributors
- Private Consultants and Market Research Companies
- Expert Witnesses



▶ Supply Chain Members as Experts



▶ Stretch and Discussion



▶ Patent Searching



US008959726B2

(12) **United States Patent**
Peters et al. (10) **Patent No.:** **US 8,959,726 B2**
(45) **Date of Patent:** **Feb. 24, 2015**

(54) **ZIPPER**

(75) **Inventors:** Scott Lawrence Peters, Pittsford, NY (US); David Whitney Lyndaker, Holley, NY (US); Nancy Elizabeth Peters, Akron, NY (US)

(73) **Assignee:** DNS Designs, LLC, Pittsford, NY (US)

(* *) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 18 days.

(21) **Appl. No.:** 13/406,473

(22) **Filed:** Feb. 27, 2012

(65) **Prior Publication Data**
US 2012/0174283 A1 Jul. 12, 2012

Related U.S. Application Data

(63) Continuation of application No. 12/484,296, filed on Jun. 15, 2009, now Pat. No. 8,146,214.

(51) **Int. Cl.**
A44D 1/00 (2006.01)
B21P 19/04 (2006.01)
A44B 19/26 (2006.01)
A44B 19/58 (2006.01)

(52) **U.S. Cl.**
CPC *A44B 19/38* (2013.01), *A44D 2202/00* (2013.01)

(58) **Field of Classification Search**
USPC 24/388, 433-435
See application file for complete search history.

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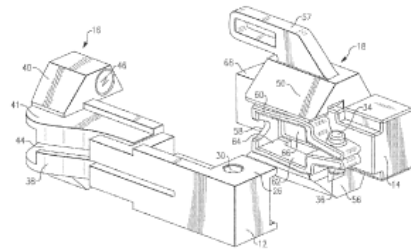
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PCT International Search Report and Written Opinion for International Application No. PCT/US2010/038358, Date of Mailing Mar. 17, 2011, 11 pages.

* cited by examiner

Primary Examiner — Robert J Sandy
Assistant Examiner — Rowland Do
(74) *Attorney, Agent, or Firm* — Patent Technologies, LLC, Robert D. Gunderman, Jr.

(57) **ABSTRACT**
A fastening device that provides for ease of alignment and operation. The fastening device has a first locking body having a first magnet, a second locking body having a second magnet, a slider body slidably connected to a first zipper track, the first locking body affixed to the first zipper track, and the second locking body affixed to a second zipper track. The first and second locking bodies reversibly form a single element while in use through the attractive force of the first and second magnets.

12 Claims, 9 Drawing Sheets



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FIG. 9 is a front view of the second embodiment with the right and left sections of the pin and box assembly in the assembled configuration where slider body 102 has pulled away from the pin and box assembly. Lower body 104 can optionally possess an extension 88 which extends from the lower body along zipper track 108. The extension can be designed to fit inside slider body 102. Extension 88 can also be designed to maintain stiffness and/or alignment between lower body 104 and the first tooth of zipper track 108. This stiffness or alignment will assist in proper functioning of the slider body. Extension 88 can possess an element 98 that reversibly engages with an element (not shown) of slider body 102 to hold the slider body in place until the slider is pulled. To allow slider body 102 to easily engage the base structure formed by the joining of lower bodies 104 and 106, extension 88 can be designed to possess a lead-in element 100. Lead-in element 100 extends horizontally from extension 88 and can reversibly interact with the opposite side of the zipper mechanism. In a preferred embodiment, the upper edge of lead-in element 100 is tapered to guide slider body 102 onto the base structure.

Another mechanism to assist in proper functioning of slider body 102 is to use a tapered or narrowed first tooth on zipper track 108. The taper would allow the slider to more easily engage the tooth. Additionally, slider body 102 could be modified to possess a lead-in element (not shown) that facilitates engagement of the first zipper tooth with the slider, or could be modified to have a wider opening on the upper edge that interacts with the opposite zipper track.

In yet another embodiment of the present invention the two lower bodies fit together with one on top of the other to bring the zipper tracks in alignment, rather than side-by-side. In this configuration, the topmost lower body would contain a magnet or other element positioned to interact with a magnet or complementary element in the lowermost lower body. Once the lower bodies are properly aligned, the slider body is also in the proper alignment and can be used to interlock the zipper tracks.

Although the present invention has been described in connection with a preferred embodiment, it should be understood that modifications, alterations, and additions can be made to the invention without departing from the spirit and scope of the invention as defined by the specification, claims, and drawings.

What is claimed is:
1. A fastening device, the fastening device comprising:
a first locking body having a first magnet with a magnetically interacting operable surface;
a second locking body having a second magnet with a magnetically interacting operable surface;
a slider body slidably connected to a first zipper track;
the first locking body affixed to the first zipper track;
the second locking body affixed to a second zipper track;
wherein the magnetically interacting operable surface of the first magnet is generally perpendicular to the top surface of the first zipper track and the direction at which teeth of the second zipper track protrude is generally normal to the magnetically interacting operable interface of the first magnet; and
the magnetically interacting operable surface of the second magnet is generally perpendicular to the top surface of the second zipper track and the direction at which teeth of the first zipper track protrude is generally normal to the magnetically interacting operable interface of the second magnet;

US 8,959,726 B2

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wherein the first and second locking bodies reversibly form a single element through the attractive force of the first and second magnets.
2. The fastening device of claim 1, wherein said first or second magnet is a ferromagnetic material.
3. The fastening device of claim 1, wherein said first or second magnet is a rare earth magnet.
4. The fastening device of claim 1, wherein said first or second locking body further comprises a guidance element.
5. The fastening device of claim 1, further comprising a pull tab connected to the slider body.
6. A method of manufacturing the fastening device of claim 1, the method comprising the steps of:
joining a first magnet to a first locking body;
joining a second magnet to a second locking body;
joining a slider body to a first zipper track;
affixing the first locking body onto the first zipper track; and
affixing the second locking body onto a second zipper track.
7. The method of manufacturing as recited in claim 6, wherein said first or second magnet is a ferromagnetic material.
8. A garment comprising:
fabric having a first side and a second side; and
a fastening device comprising a slider body slidably connected to a first zipper track
wherein the first zipper track is affixed to the first side of the fabric;
a plurality of teeth beginning with a first tooth connected to the first zipper track;
a first locking body affixed to said first zipper track, the locking body comprising a first housing element that contains a first magnet with a magnetically interacting operable surface, and further comprises a first vertical element that reversibly interacts with the slider body; and
a second locking body affixed to a second zipper track wherein the second zipper track is affixed to the second side of the fabric;
a plurality of teeth beginning with a first tooth connected to the second zipper track;
the second locking body comprising a second housing element that contains a second magnet with a magnetically interacting operable surface, and further comprises a second vertical element, wherein the magnetically interacting operable surface of the first magnet is generally perpendicular to the top surface of the first zipper track and the direction at which teeth of the second zipper track protrude is generally normal to the magnetically interacting operable interface of the first magnet; and
the magnetically interacting operable surface of the second magnet is generally perpendicular to the top surface of the second zipper track and the direction at which teeth of the first zipper track protrude is generally normal to the magnetically interacting operable interface of the second magnet;
wherein the first and second locking bodies reversibly form a single element through the releasable interaction of the first and second magnets.
9. The garment of claim 8, wherein said first or second magnet is a ferromagnetic material.
10. The garment of claim 8, wherein said first or second magnet is a rare earth magnet.
11. The garment of claim 8, wherein said first or second locking body further comprises a guidance element

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CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of application Ser. No. 12/484,296 filed on Jun. 15, 2009, the entire disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is related to a zipper-type fastening device, and, more particularly, to an improved pin and box assembly and improved slider body.

2. Description of Related Art

In the years since their invention, zippers have become ubiquitous. Zippers can be found in all types of clothing such as pants, dresses, and jackets, on carriers such as bags and luggage, and in gear such as sleeping bags and tents. In addition to serving as decoration, zippers can join together two sides of a garment, such as in the operation of a dress, and can serve as means to removably attach two pieces of fabric, such as in the attachment of a removable hood to a jacket.

Fastening devices such as zippers can be separating or non-separating, and can be one-way or two-way devices. In a separating zipper, each of the two zipper tracks, comprising the tape and attached teeth, are connected to different elements that are primarily joined only by the interlocking zipper teeth. In a non-separating zipper, both zipper tracks are connected to a single element such that interlocking and unlocking the zipper teeth creates an opening in that element. A two-way zipper comprises two slider bodies that can work together or separately to interlock and unlock the zipper teeth. A one-way zipper comprises a single slider body as well as a pin and box assembly that aligns the zipper teeth contained on at least one of the zipper tracks.

In their simplest form, one-way separating zippers are composed of relatively few parts, including: an origination assembly with a pin and a retainer body at the lower limit of each row of zipper teeth; two pieces of tape that are attached to fabric on one side and contain zipper teeth on the other; a slider body with a pull-tab; and two top stops at the upper limit of each row of teeth.

To fasten two pieces of fabric together, the operator inserts the pin from the lower limit of one row of teeth into the retainer box at the matching lower limit of the other row of teeth. This aligns the teeth into an operable interlocking format. Once aligned, the operator pulls the latching mechanism, called the slider body, along the teeth track. Wedges inside the slider body force the teeth of each track to interact. If the teeth are aligned, the hook of each tooth settles into the hollow of an opposing tooth. The operator can continue to pull the slider body and interlock the teeth until the slider terminates at the top stops located at the upper limit of each row of teeth.

To unfasten the pieces of fabric, the operator pulls the slider body back along the closed track. The wedges inside the slider body force the interlocking teeth apart and separate the zipper closure.

Despite the ease with which zipper-type closures operate, many individuals encounter difficulty joining together the pin and body. Others may have difficulty grasping the small slider body or pulling it along the zipper's teeth. Examples of individuals who often encounter these difficulties include small children, people wearing gloves for protection, elderly, and people with poor vision, macular degeneration, or cataracts. Additionally, people with disabilities such as arthritis, mul-

tiple sclerosis, cerebral palsy, pervasion developmental disorders, Down's syndrome, ataxia, diabetes with neuropathy, stroke (CVA), paraplegics, Lou Gehrig's Disease, Parkinson's, and head injuries can also find the operation of zippers to be difficult.

It is therefore a principal object and advantage of the present invention to provide a device for easier alignment of the pin and box of a zipper.

It is another object and advantage of the present invention to provide a device for easier operation of a zipper slider body.

It is a further object and advantage of the present invention to provide an improved zipper for use by individuals with limited dexterity.

Other objects and advantages of the present invention will in part be obvious and in part be expressed hereinafter.

SUMMARY OF THE INVENTION

In accordance with the foregoing objects and advantages, the present invention provides a fastening device comprising: (1) a pin affixed to a first zipper track, the pin comprising a first magnet and at least a first engaging (or interlocking) element; (2) a box affixed to a second zipper track, the box comprising a second magnet and comprising at least a second engaging (or interlocking) element complementary to the first interlocking element from the pin, wherein the pin and box form a single element through the releasable interaction of the first and second magnets, and the first interlocking element of the pin reversibly interacting with the second interlocking element of the box; and (3) a first slider body, wherein the first slider body comprises at least one releasing element that reversibly disengages the first interlocking element of the pin from the second interlocking element of the box. The engaging/interlocking elements preferably correspond in interlocking fashion, but could engage one another in an otherwise conventional manner that doesn't require actual interlocking relation.

The invention further provides a fastening device comprising: (1) a pin affixed to a first zipper track, the pin comprising a first magnet and at least a first interlocking element; (2) a box affixed to a second zipper track, the box comprising a second magnet and comprising at least a second interlocking element complementary to the first interlocking element from the pin, wherein the pin and box form a single element through the releasable interaction of the first and second magnets, and the first interlocking element of the pin reversibly interacting with the second interlocking element of the box; (3) a first slider body, wherein the first slider body comprises at least one releasing element that reversibly disengages the first interlocking element of the pin from the second interlocking element of the box, and further comprising a third magnet as well as defining at least one ridge element; and (4) a second slider body component comprising a fourth magnet and defining at least one groove element, wherein the first and second slider body components form a single slider body through the releasable interaction of the first and second magnets, and the ridge element of the first slider body component removably fitting into the groove element of the second slider body component.

The invention also provides a fastening device comprising: (1) a slider body slidably connected to a first zipper track; (2) a first locking body affixed to said first zipper track, the locking body comprising a first housing element that contains a first magnet, and further comprising a first vertical element that reversibly interacts with the slider body; and (3) a second locking body affixed to a second zipper track, the second locking body comprising a second housing element that con-

Despite the ease with which Zipper-type closures operate, many individuals encounter difficulty joining together the pin and body. Others may have difficulty grasping the small slider body or pulling it along the Zipper's teeth. Examples of individuals who often encounter these difficulties include small children, people wearing gloves for protection, elderly, and people with poor vision, macular degeneration, or cataracts. Additionally, people with disabilities such as arthritis, multiple Sclerosis, cerebral palsy, pervasion developmental disorders, Down's syndrome, ataxia, diabetes with neuropathy, stroke (CVA), paraplegics, Lou Gehrig's Disease, Parkinson's, and head injuries can also find the operation of Zippers to be difficult.

It is therefore a principal object and advantage of the present invention to provide a device for easier alignment of the pin and box of a Zipper. It is another object and advantage of the present invention to provide a device for easier operation of a zipper slider body. It is a further object and advantage of the present invention to provide an improved zipper for use by individuals with limited dexterity.



Other Useful Secondary Sources

Company Information

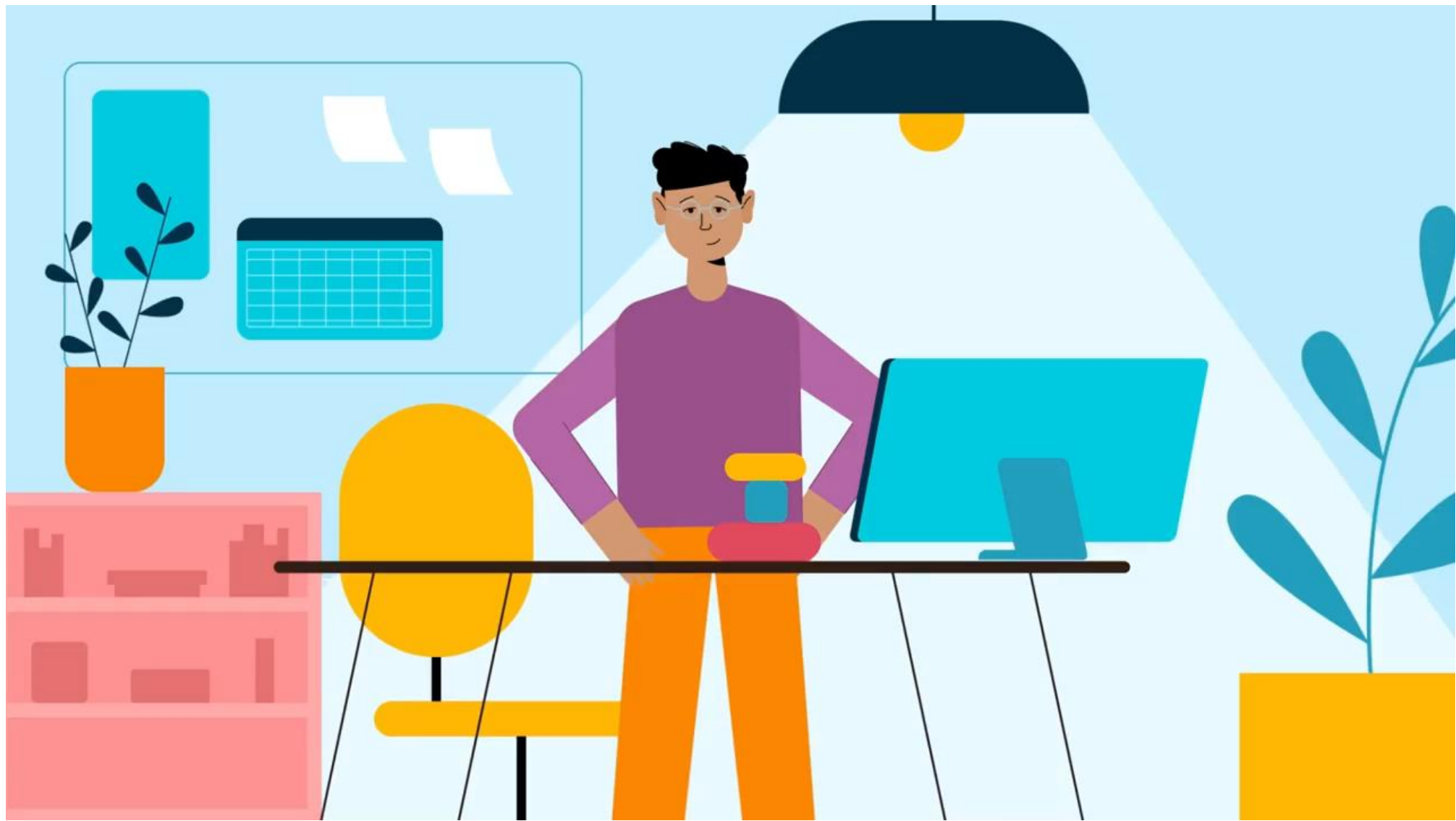
- Product and R&D plans in Annual Reports
- Government filings
- Press Releases
- Scientific and trade press articles

Trade Literature

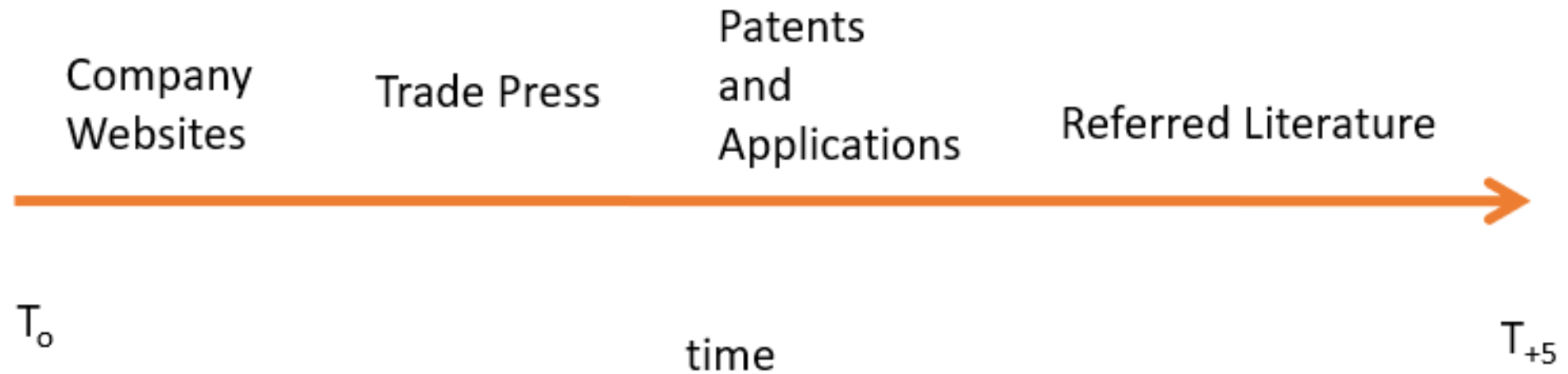
- Annual reviews and overviews
- New product announcements
- Hiring announcements

▶ **Discussion and Break for 10 Minutes**





▶ Data Sources and Time to Market

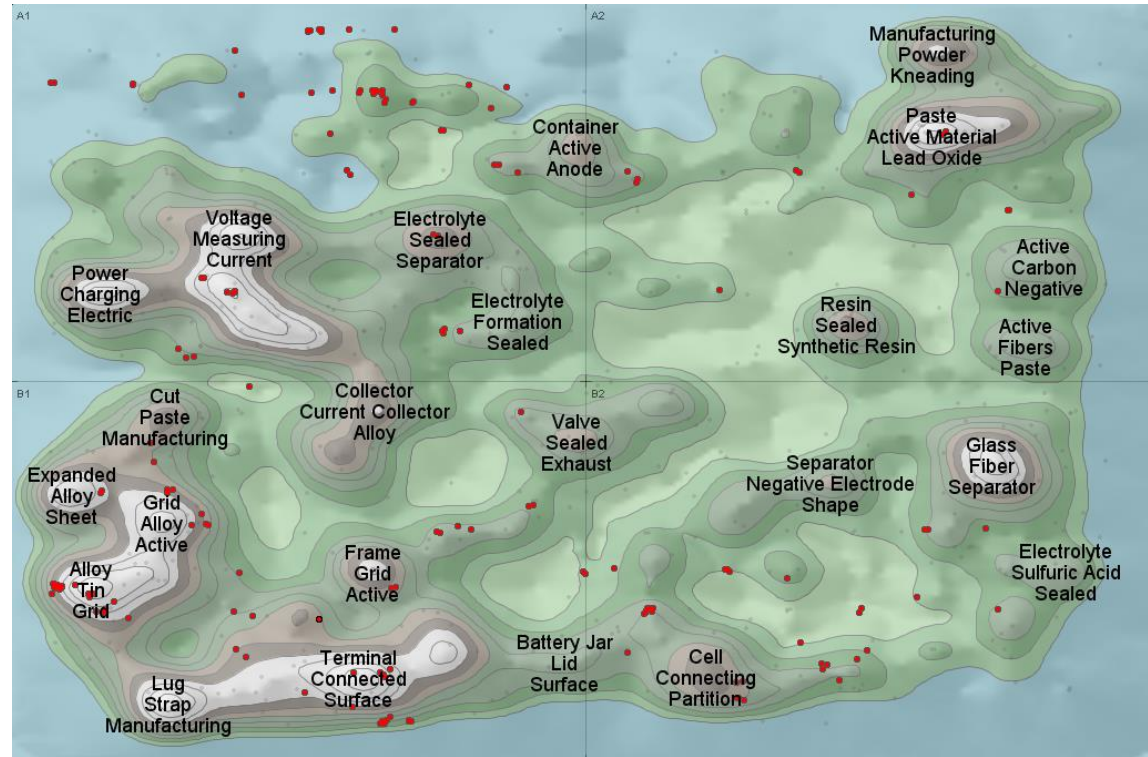


Each industry has its own product/service generation timing and time from research to market.

► Competition to Amazon



▶ Patent Searching and Landscaping



<http://www.cleantechpatentedge.com/wp-content/uploads/2012/10/Screen-shot-2012-10-10-at-12.23.41-PM.png>

▶ Competitive Advantage

Closeness of good on a scale of 1 to 10

Desired core benefits and features (customer requirements)											Average
Our product											#DIV/0!
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▶ Exercises

How many companies make delivery drones?

Compare Amazon, Zipline, and Flirty

100 companies



Compared to commercial aviation, drone delivery is less capital intensive because of the smaller aircraft sizes and commercially available technology. With such relatively low barriers to entry, over **100 companies** currently compete in this segment.

Drone delivery: More lift than you think - McKinsey & Company

 www.mckinsey.com/industries/aerospace-and-defense/our-insights/future-air-...

How do drones avoid obstacles?

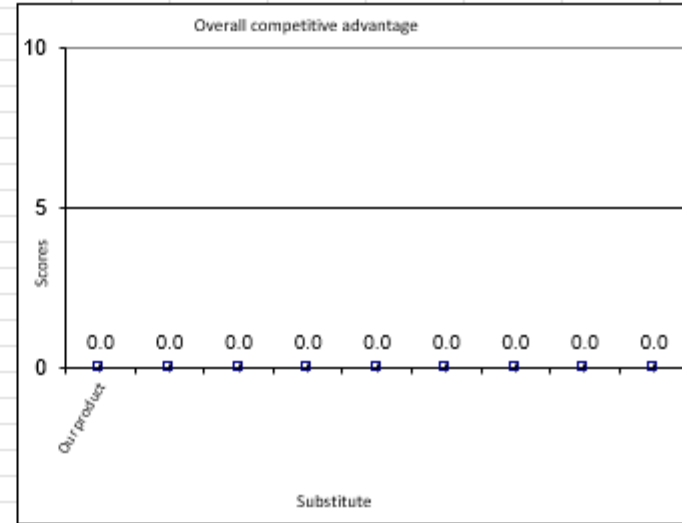
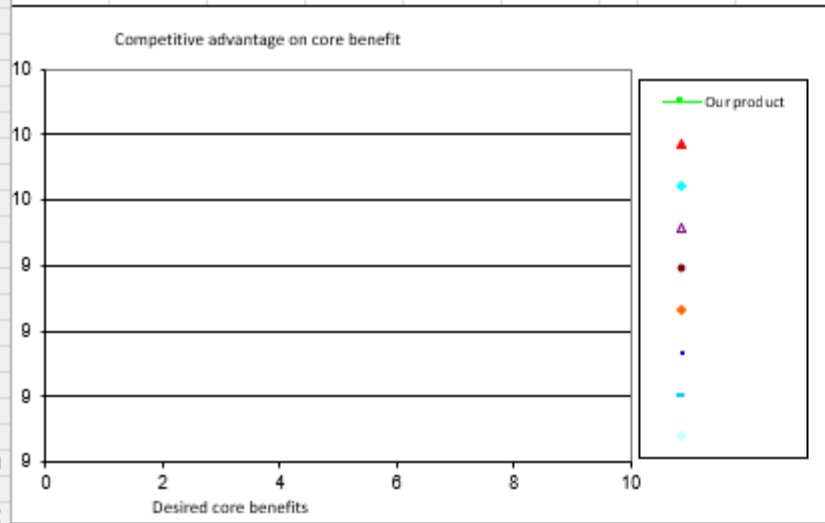
What are the legal issues?

How fast can drones >

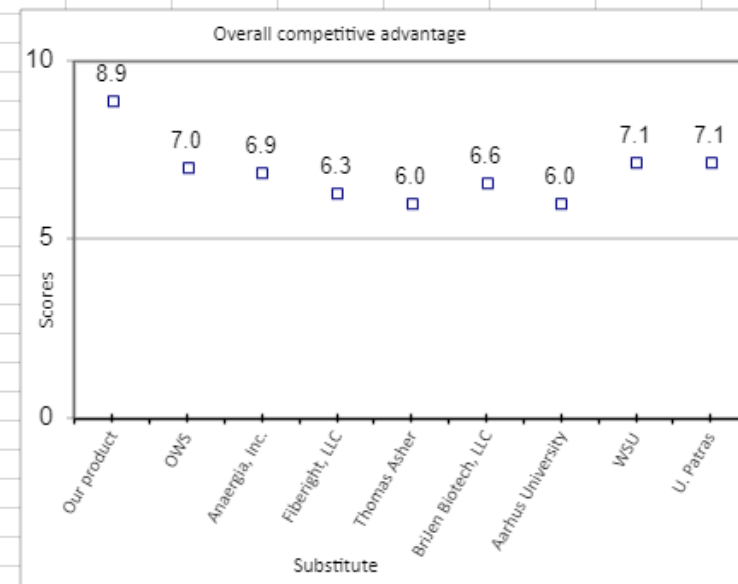
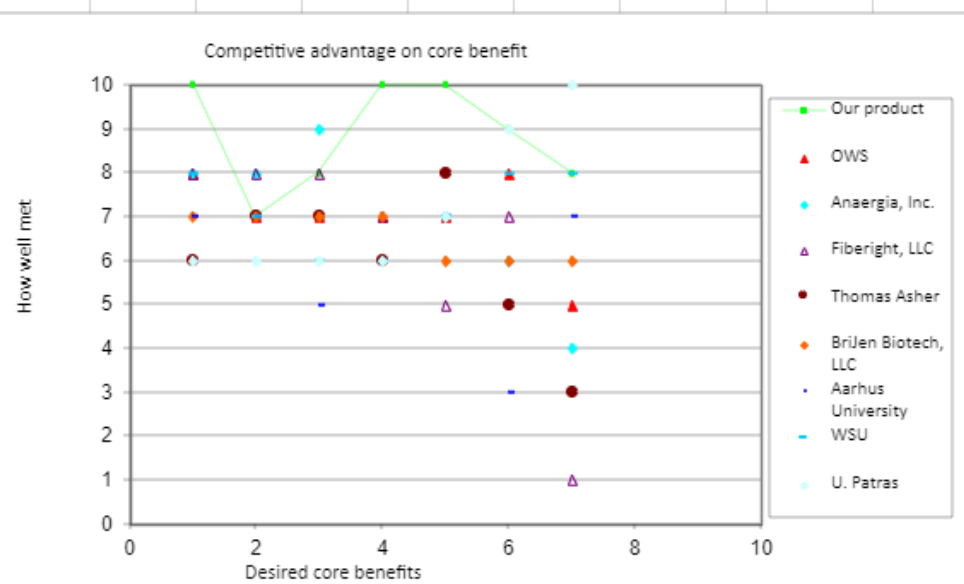
Type a message...



Competitive advantage plots



Competitive advantage plots



► Take-Aways

“Dreams surely are difficult, confusing, and not everything in them is brought to pass for mankind.”

Homer

“Walk a mile in the other guy’s shoes.”

Mary T. Lathrap

“Wisdom is the reward you get for a lifetime of listening when you would have rather talked.”

Mark Twain

“An ounce of prevention is worth a pound of cure”

Benjamin Franklin

▶ Thank you!

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