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FROST & SULLIVAN BEST PRACTICES AWARD

GROUP COMMUNICATION TECHNOLOGY IN NOISY ENVIRONMENTS - GLOBAL

Technology Innovation 2019

cardo crew®

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2019 BEST PRACTICES AWARD

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Background and Company Performance

Industry Challenges

Frost & Sullivan's investigation of the North America personal protective equipment (PPE) market generated $1,159.9 million revenues in 2017 and is expected to grow at a compound annual growth rate (CAGR) of 2.9% during 2017 to 2022 to $1,339.6 million (by 2022). The fastest-growing segments are likely to include eye protection, face protection followed by head and hearing protection. In particular, the hearing protection segment generated $325.8 million in revenues in 2017 and is expected to grow to $354.1 million by 2022—a 1.7% CAGR[1].

There is a need for technology and innovation to expand market share; specifically, the growing use of PPE in the oil and gas market requires constant innovation and the use of the latest technologies to ensure that equipment is safe, durable, and comfortable to use and can meet regulatory requirements. The hearing protection sub-segment focuses on protecting workers from the harmful effects of high noise levels at workplaces. Basic earplugs only protect against all noises while the more sophisticated electronic earmuffs can filter out ambient noises and allow the wearer to communicate effectively. Such equipment, although more expensive, is gaining acceptance due to the benefits of enabling interpersonal communication and enhancing awareness of surroundings and safety for the wearers.

Accurate and effective communication is of critical importance in the O&G industry, so there is a growing need for communication headsets. Manufacturers are focusing on building high-noise communication solutions across operations to enhance worker productivity. The demand for such products helps drive the growth of the hearing protection sub segment. Upstream O&G activities involve high-noise pressures; therefore, hearing protection plays a crucial role in this sector. These products are equally important for downstream refining activities, where workers are continuously working beside pumps, motors, compressors, turbines, and other heavy equipment.

Although, the main focus of PPE providers is the protection of the workers, Frost & Sullivan believes that PPE manufacturers that can supply its customers with a solution that enhances situational awareness and communication capabilities will have a significant competitive advantage. The research and development of such a product may translate into higher spending; however, this can be offset by collaborating with innovate technology providers.

Technology Attributes and Future Business Value of Cardo Crew

Cardo Crew is a part of Israel-based Cardo Systems, a leading provider of wireless communication solutions for professional and recreational use. One of Cardo Systems' main product lines is its communication solutions for motorcycle riders, born from the founders, who are all avid motorcycle riders, and were frustrated with the lacking capability to remain in communication while on the road.

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[1] *North American Personal Protective Equipment Market, Forecast to 2022* (Frost & Sullivan, February 2018)

In 2015, Cardo Systems introduced the Mesh wireless intercom device that allows a group of up to 15 motorcycle riders to communicate in a conference call setting without removing their hands from their bike or eyes from the road. The solution is based on Cardo Systems proprietary intercom algorithms known as Dynamic Mesh Communication (DMC), which removes the need for users to connect to a base station when establishing a network between them. Furthermore, with DMC enabling a conference call setting, the conversation between the users can flow as naturally as if the users where in the same room even though they could be up to 10,000 feet apart.

Clear Communication Channels Means Safe and Efficient Operations

Drawing from the success of its communication solutions, Cardo Systems opened a PPE line, named Cardo Crew, to bring its innovative solutions to the PPE space. The Cardo Crew PRO-1 utilizes the same ethos as Cardo Systems products. Cardo Crew focuses on the technology so that the end-user can focus on their tasks, be it working in a factory, construction work, or conducting a rescue operation. The PRO-1 solution consists of a compact module form factor that combines Bluetooth and mesh intercom technology, located on compact size chip that can be fitted inside earmuffs, protective helmets, or dedicated communication terminals depending on the end users' needs.

Based on the DMC, the PRO-1 establishes an ad-hoc mesh intercom network that each user operates as an independent communication point similar to a cloud structure. Users can communicate directly without relaying the information via third parties. The DMC algorithms automatically configure the network as well as handle routing and connectivity issues so that the communication channels remain open even if connectivity becomes a challenge.

The mesh network does not require users to connect to mobile, WiFi, Bluetooth, or satellite network, thus enabling end-users to enjoy the benefits of PRO-1, whether operating in sensitive facilities where mobile phones might constitute a security risk or in a disaster zone where mobile connectivity may not be available. The mesh network can be expanded to include more than 15 users by utilizing the cellular network. Furthermore, the PRO-1 can operate as a bridge for mobile calls or 2-way radio communication so the operational commander can maintain contact with several team leaders at once over distances greater than 10,000 feet or in challenging environments with lots of obstacles for the signals.

A bike rider needs to focus on the road ahead and cannot be expected to monitor the connection to the communication network and the same holds true for an industrial worker. Hence the PRO-1 includes voice notification, alerting the user that a user is outside the range of mesh network and when the user is back within range. Furthermore, for users operating in a noisy environment, the PRO-1 reduces impulse noises and permits ambient noise, including human voice amplification so that users can hear each other clearly.

Additional hands-free features include battery level notifications. The PRO-1 draws its power from either a rechargeable battery pack or with replaceable batteries.

Utilizing Experience to Enable a Global Future

Cardo Crew's PRO-1 leverages the experience already collected from Cardo Systems. In particular, Cardo Crew employs the DMC algorithms developed by Cardo Systems into the PRO-1. Additionally, Cardo Crew is seeking to expand the Cardo brand presence— implementing lessons learned from Cardo Systems' successful products that, to date, have sold over 600,000 DMC products gloablly. In particular, Cardo Crew is looking to partner with original equipment manufacturers of protective gear to integrate the PRO-1 technology into their product lines. Cardo Crew is setting its sights on global coverage— with a heavier concentration in Europe and North America—and is already garnering interest from companies in sectors such as aviation, construction, maritime, as well as from law enforcement, military, and first-responder organizations.

Conclusion

Clear and stable communication channels are imperative for enhancing the safety of workers in noisy and dangerous environments. Cardo Crew's PRO-1 (PRO-1) communicating solution aims to empower its users to remain in contact without the need to remove hands or eyes from the task at hand. Utilizing its proprietary Dynamic Mesh Communication algorithms, the PRO1 enables the user to communicate with each other as if they were in the same room without the need to wait for one's turn or the need to push a button to talk.

With its strong overall performance, Cardo Crew earns Frost & Sullivan's 2019 Global Technology Innovation Award for group communication technology in noisy environments.

Significance of Technology Innovation

Ultimately, growth in any organization depends on finding new ways to excite the market and maintaining a long-term commitment to innovation. At its core, technology innovation, or any other type of innovation, can only be sustained with leadership in 3 key areas: understanding demand, nurturing the brand, and differentiating from the competition.

Understanding Technology Innovation

Technology innovation begins with a spark of creativity that is systematically pursued, developed, and commercialized. That spark can result from a successful partnership, a productive in-house innovation group, or a bright-minded individual. Regardless of the source, the success of any new technology is ultimately determined by its innovativeness and its impact on the business as a whole.

Key Benchmarking Criteria

For the Technology Innovation Award, Frost & Sullivan analysts independently evaluated 2 key factors—Technology Attributes and Future Business Value—according to the criteria identified below.

Technology Attributes

Criterion 1: Industry Impact
Criterion 2: Product Impact
Criterion 3: Scalability
Criterion 4: Visionary Innovation
Criterion 5: Application Diversity

Future Business Value

Criterion 1: Financial Performance
Criterion 2: Customer Acquisition
Criterion 3: Technology Licensing
Criterion 4: Brand Loyalty
Criterion 5: Human Capital

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analyst follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 **Monitor, target, and screen**	Identify Award recipient candidates from around the globe	• Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies	Pipeline of candidates who potentially meet all best-practice criteria
2 **Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3 **Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4 **Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 **Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized Award candidates
6 **Conduct global industry review**	Build consensus on Award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible Award candidates, representing success stories worldwide
7 **Perform quality check**	Develop official Award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8 **Reconnect with panel of industry experts**	Finalize the selection of the best-practice Award recipient	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best-practice criteria
9 **Communicate recognition**	Inform Award recipient of Award recognition	• Present Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 **Take strategic action**	Upon licensing, company is able to share Award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess Award's role in future strategic planning	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.