



Battery Packs, Chargers, and Battery Management Systems (BMS)

Volume 1: NOVA Battery Systems and Its Product Portfolio



Leader in Rechargeable Battery Energy Systems



Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

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Company Background

Nova Battery Systems (“NBS”) designs and manufactures safe, reliable **Custom Battery Packs, Battery Management Systems, and Custom Charger** solutions that meet customers’ power delivery and recharging system specifications.

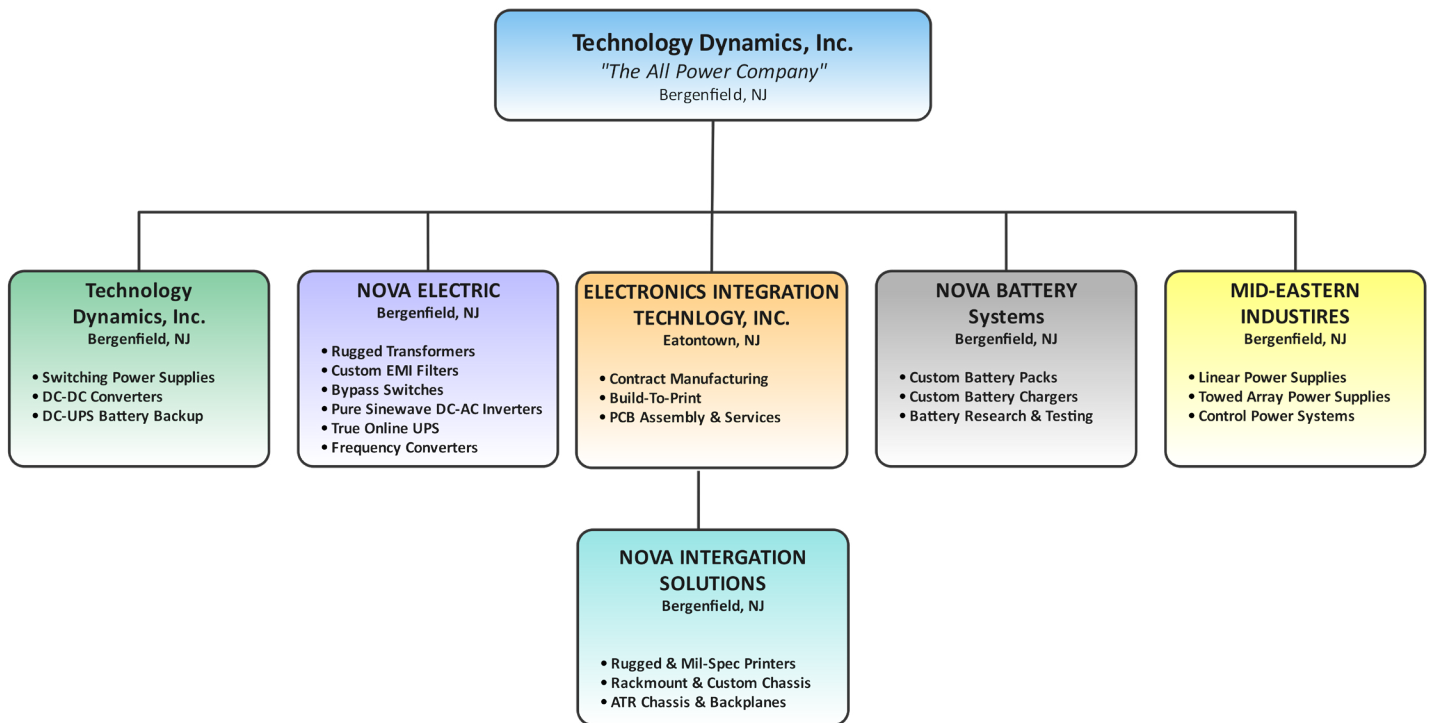
The company’s team of expert engineers has decades of battery chemistry experience with Li-Ion, Lithium Iron Phosphate (LiFePO₄) and Lithium Phosphate, many lithium primary chemistries (e.g., Li-Manganese Dioxide), nickel-based rechargeable chemistries such as nickel metal hydride (NiMH), sealed lead acid (for mobility devices such as electric scooters and wheelchairs, but not vehicular), and non-rechargeable alkaline cell chemistries. NBS’s rechargeable and non-rechargeable battery packs are suitable for most medical, environmental monitoring & detection, industrial, test & measurement, robotics, asset tracking and GPS, military and harsh environment, UPS critical power, and stationary power applications.

NBS has extensive in-house prototyping capabilities including sheet metal fabrication, 3-D CAD package design

and finite element analysis (FEA) and thermal simulation verification (CFD), 3-D printing, and ultrasonic sealing for plastics. Mechanical packaging is available in shrink wrap, hard plastics, or various metal alloys. In-house designed battery monitoring or monitoring/charging electronics provide telemetry over many communication interfaces including I²C, RS-232 serial, CAN bus, Bluetooth and WiFi.

NBS is a division of Technology Dynamics Inc., a multi-divisional company specializing in power conversion and power solutions for industrial and military applications. Founded in 1976, Technology Dynamics Inc. serves the US Military’s largest prime defense contractors, as well as many heavy industry and transportation authorities. The organization chart below represents TDI’s operating divisions and subsidiaries.

NBS is located in TDI’s main campus in Bergenfield, NJ. As an independent business unit, NBS has its own engineering and manufacturing resources and draws upon TDI’s resources when needed.



Leader in Rechargeable Battery Energy Systems

Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

Volume 1: NOVA Battery Systems and Its Product Portfolio

Focus Markets: Intelligent Buoys and Unmanned Underwater Vehicles

NBS is proud to supply manufacturers of electronic systems used in modern *intelligent buoys* and *unmanned underwater vehicles* (UUV) with a limited selection of both primary (non-rechargeable) and secondary (rechargeable) chemistries. Chiefly among the primary chemistries are lithium sulfur dioxide (Li-SO₂) and Lithium thionyl chloride (Li-SOCl₂), both supplied in custom designed packs by the NBS engineering team. For secondary chemistries, applications cover Lithium Ion (Li-Ion), Lithium Iron Phosphate (Li-FePO₄) and sealed lead acid absorbed glass mat (AGM SLA). We bring a more technical discussion of the different chemistries as follows.

Lithium Ion (Li-Ion)

As a source of stored power, Li-Ion batteries dominate many markets and products we use in our daily lives, such as portable electronics, the rapidly growing electric vehicle market, and are even on the vanguard of becoming an adopted energy storage technology for [electric] grid-energy storage. As with any technology, its appeal and adoption is highly dependent upon many factors, some of them being a specific application and its requirements, trade-offs with performance parameters such as energy/power density, discharge/recharge cycle life requirements, availability of lithium and other precious metals used in anode/cathode/electrolyte construction, manufacturing cost and end-user pricing, safety, its environmental impact.

On the matter of discharge/charge cycles, Li-Ion boasts one of the highest rates. For example, at 10% discharge, typical Li-Ion packs made by NBS offer up to 200,000 cycles, which derate to approx. 8,000 cycles @ 50% discharge, and 5,000 cycles @ 80% discharge. Cycle life performance is highly dependent upon a critically matched charging system and that the batteries are charged within the rated temperature range. All NBS charging circuits are designed in-house and typical are microcontroller/microprocessor based. The major advantage is that the customer or the end user can access the battery pack's performance via a user friendly graphical user interface, GUI. Through the GUI, charging parameters may be set (or changed), and are password-protected to ensure safety compliance.

While not as prevalent in intelligent buoys as other battery technologies described herein, Li-Ion certainly participates

in lighter duty power storage buoy deployments where operating environment conditions are more benign than deep sea or similar hostile operating conditions. NBS manufactures Li-Ion battery packs with onboard BMS and in many cases onboard recharging circuitry coupled to solar recharging, thus giving NBS an advantage to other companies with its broad battery technology experience in the intelligent buoy industry.

Lithium Iron Phosphate (LiFePO₄)

LiFePO₄ batteries, also abbreviated as LFP, feature a nominal OCV of 3.20 V output, a cathode of iron phosphate and an anode of graphite. It has a specific energy of 90/120 Wh/kg. The typical charge rate of LFP is 1C and the typical discharge rate ranges between 1C and 25C.

In automotive and similar applications, connecting four cells in series yields a nominal "system voltage" of 12.8 V. Traditional SLA cells require six (6) SLA cells to equal the LFP 4-cell complement, a distinct advantage to LFP technology. Addition to high energy and power densities, LFP also offers good safety characteristics, longer life span, no maintenance, light weight, improved deep cycle discharge and [re]charge efficiency, have 100% of their capacity available within a life cycle of between 1,000 and 10,000 discharge/recharge cycles (@ 80% discharge). LFP batteries can handle high temperatures with minimal degradation, and tolerate fast recharge rates. It is worth noting that LFP features superior thermal and chemical stability, stays cool in higher temperatures, and is incombustible when mishandled during rapid charges and discharges or when there are short circuit issues. Lastly, LFP is not typically prone to thermal runaway.



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Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

Volume 1: NOVA Battery Systems and Its Product Portfolio

LFP products are available in cylindrical, prismatic, and the familiar rectangular form factor prevalent in vehicular SLA batteries (i.e., SLA traction batteries). LiFePO_4 batteries may not offer the lowest cost point, but because of its long life span and zero maintenance position LFP as a good replacement candidate for [AGM] SLA batteries in most vehicular, marine (e.g., intelligent buoys), traction, and many solar applications.

Absorbed Glass Mat (AGM) Sealed Lead Acid (SLA)

A subset of maintenance free, valve regulated lead acid (VRLA) batteries, AGM is gaining popularity with more complex and multi-mission buoys chiefly because AGM SLA batteries can drive high current loads when needed, and, of course, can be recharged, typically via solar panels installed on the buoy. NBS AGM SLA supplies packs with advanced BMS electronics that can also include telemetry convenience; contact the factory for more information on telemetry options.

Even though AGM batteries generally do not perform well in high temperature environments (e.g., $> +50\text{C}$), NBS supplies packs specifically designed for operation in temperatures $>50\text{C}$. Let the NBS team know your application environments so that NBS can select the correct AGM battery.

Lithium Sulfur Dioxide (Li-SO_2)

It is surmised that the underpinnings of popularity of LiSO_2 is its high specific energy and energy density, typically up to 300 Wh/kg and 415 Wh/L, respectively; the ability to deliver high current and high power under specific load conditions; excellent low temperature performance and overall temperature range (-40 to $+55\text{C}$), and its long shelf life. In the open ocean, NBS LiSO_2 battery packs, usually in small footprint sizes, operate for years without replacement, far longer than their secondary pack equivalents. As with all lithium-based battery chemistries, LiSO_2 cells feature a high OCV: 2.95 V (nominal is 3 V). As with all batteries – including primary cells- OCV (or nominal voltage) values are highly dependent upon state of discharge and discharge temperature. Also, LiSO_2 's appeal adds a very flat discharge voltage curve during 90% of its capacity. Few other chemistries – primary or secondary – have such a flat voltage curve during discharge. Lastly, LiSO_2 's self-discharge rate is low, typically 1% of its rated capacity per month at room temperature; as temperature

increase, the self-discharge rate increases; the opposite occurs at lower than room temperature. Also, LiSO_2 cell sizes range from 1/2AA (14.2mm dia. x 27.9mm L) through “Long Flatt DD” (41.7mm dia. x 141mm L). A long time favorite with the military for equipment ranging from sonobuoys to SINCGARS radios, LiSO_2 is also a significant revenue producer for NBS for intelligent buoy electronics. NBS can produce battery packs up to 75 V constructed from 25 cells wired in series with a special operating temperature range of -50C to $+75\text{C}$.

Lithium Thionyl Chloride (Li-SOCl_2)

Lithium thionyl chloride cells feature one of the highest open circuit voltages, OCV, of 3.65 V with a nominal voltage between 3.3 V and 3.6 V, and an end voltage of 3.0 V. Its voltage curve during discharge performs similarly to LiSO_2 : very flat. Its self-discharge rate is exception, perhaps the best of all battery chemistries: between 1% and 2% per year at 20C (measured after 3 years). Storage at 70C results in capacity loss of about 5% per year.

Specific energy and energy densities range up to 590 Wh/kg and 1100 Wh/L, respectively. Low discharge rate cells are widely available in different sizes that are favorites in RF transponders, toll tags, and [volatile] semiconductor memory backup applications; medium and high discharge rate cells are available for applications such as emergency backup power, emergency lighting, and handheld communications equipment. While not as popular as LiSO_2 in intelligent buoys, NBS nevertheless manufactures packs with BMS comprised of either cylindrical or bobbin wound LiSOCl_2 cells.



Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

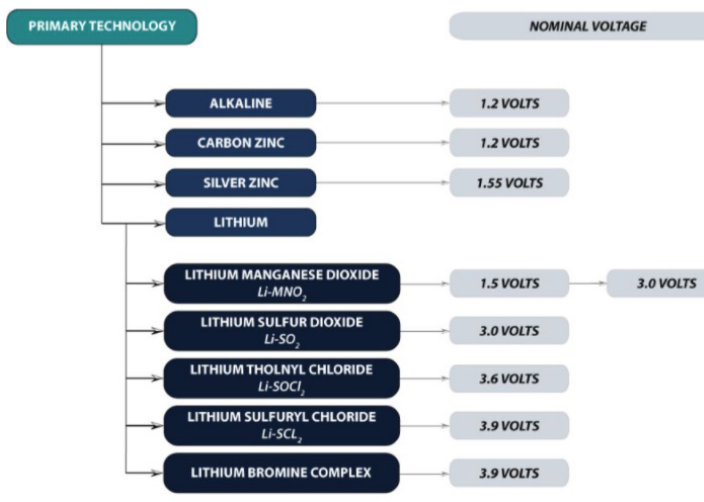
Volume 1: NOVA Battery Systems and Its Product Portfolio

Battery Types Offered

NBS offers custom battery packs comprised of individual cell in both chemistry types: primary (non-rechargeable) and secondary (rechargeable). As stated, battery packs with primary cells are not designed to be recharged and contain blocking diodes to prevent reverse charge flow in the event one such condition were introduced to the battery pack circuit.

Primary (Non-rechargeable) Cell Chemistries Offered

Primary batteries are single-use batteries, primarily utilized for convenience and lower initial cost. In general, primary batteries have a higher capacity than rechargeable batteries.



Advantages

- ✓ High energy density
- ✓ Low initial cost
- ✓ Convenient / widely available
- ✓ Great choice for intermittent-drain applications
- ✓ Good choice for low-drain applications

Disadvantages

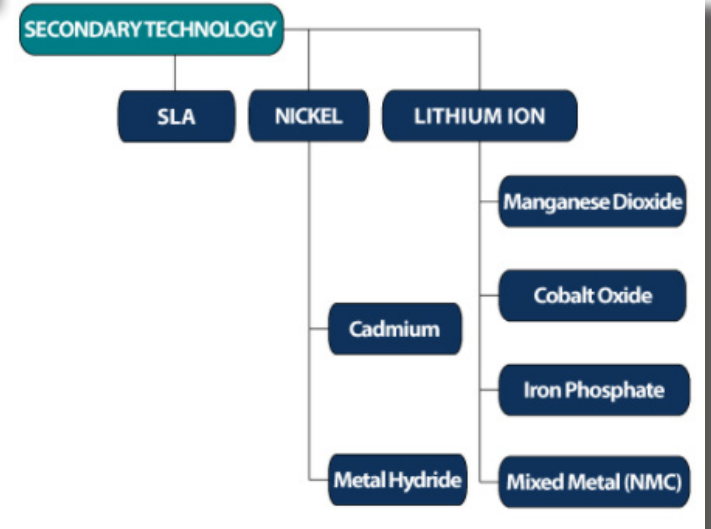
- Short life in high-drain applications
- Not environmentally friendly

Secondary (Rechargeable) Primary Cell Chemistries Offered

NBS has a full solutions portfolio that includes all rechargeable chemistries such as Lead Acid, NiCd, NiMH, Lithium Ion, Lithium Polymer, and Lithium Iron Phosphate in custom enclosures which can be hermetically sealed or encapsulated as required. The company will provide a complete electronics solution for each design suitable for the customer's application requirements.

NBS can also provide capacity monitoring, fuel-gauging, LED display of state-of-charge, LCD display, custom charging parameters, security measures, and anti-counterfeiting electronics. In addition, NBS can incorporate whatever communications interface may be required by the customer's application, including simple SMBus, CANbus, Bluetooth, and Wifi. Additional information on battery monitoring/management systems (BMS) are discussed in succeeding volumes of this publication series.

For your specific application, the following 2-page form provides many parameters that will help NBS pinpoint and fine tune a battery pack and battery monitoring/management (BMS) system response from which NBS can quote. Please complete as much information in the form as possible. Thank you.



Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

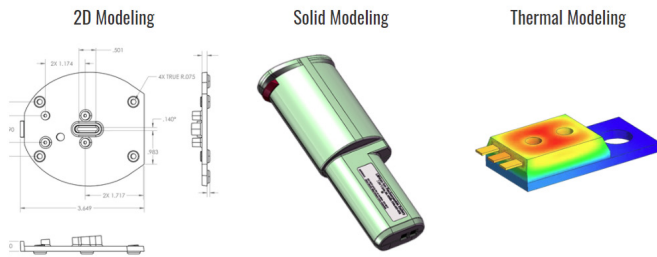
Volume 1: NOVA Battery Systems and Its Product Portfolio

Full-Service Manufacturing Provider

NBS is an ISO 13485:2016 and ISO 9001:2015 Certified company, with a formidable in-house engineering staff, plus the vertically integrated resources of our parent company Technology Dynamics, Inc. including sheetmetal fabrication, machining, PCB production, and environmental testing. All our non-distribution battery packs and chargers are manufactured in our New Jersey, USA facilities.

NBS's mechanical designers can create 2-D and 3-D models of designs, and perform thermal analysis when necessary. The company has 3-D printing capabilities to verify mechanical concepts, fits, and dimensions to help ensure the mechanicals are right the first time. NBS can design custom battery packs for simple shrink wrap, plastic enclosures, or with sheet metal. The company has ultrasonic welders for RF sealing of plastics, and its own sheet metal fabrication facility. Refer to information on the website for additional information:

(<https://novabatterysystems.com/company/facilities-2/>)



NBS has an in-depth understanding of all battery chemistries and will offer the optimal solutions for your requirements. The company will guide you through concepts, or work with detailed specifications provided by our customers. NBS will build full-scale prototypes and can perform thorough design verification and qualification testing either in-house or with our lab partners. The company will provide guidance through whatever certifications (DOT, UL, CE, CB, PSE, ATEX, IEC, RoHS, REACH, WEEE, etc.) might be required, and can handle all aspects of obtaining the necessary certifications to ship and sell the product in any market. NBS is partnered with several third-party labs for objective certification reporting and design evaluation.

Safety Compliance



User Compliance



Transportation Compliance



NBS can provide continuing design support for evolving requirements, as well as full support in the event of field issues or required diagnostics. The company's expert supply chain management team will properly source materials, manage BOM costs, and provide support in the case of part obsolescence.

For more information on NBS's battery and BMS engineering, validation, testing, and safety qualification, check our website or call us at our New Jersey division headquarters: (201) 244-3010.



Additional Markets Served

Although the focus of this volume is intelligent buoys and unamanned underwater vehicles (also referred to as "ROV"), NOVA Battery Systems is a full-line manufacturer of battery packs and chargers, serving many public and private sector markets. This section describes key markets served.

Robotics and Drones

Nova Battery Systems is an industry-leading provider of high performance rechargeable custom battery packs and chargers for the robotics market. Robotics are becoming increasingly important in various applications such as industrial, healthcare, defense and security. Many robots rely solely on battery power and must perform as expected in high level military or security deployments in UMV, bomb sniffing devices, and other highly dangerous conditions. NBS's custom battery packs are designed and manufactured to handle the harshest temperature, vibration, shock, and environmental conditions.

Many industrial applications require large lithium-ion (Li-Ion) and lithium iron phosphate (LFP) battery packs to power industrial robots. Lithium batteries, especially LFP, provide longer life than Li-Ion and are considered



Leader in Rechargeable Battery Energy Systems

Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

Volume 1: NOVA Battery Systems and Its Product Portfolio

safer. If your robotic application requires a custom battery pack, NBS can deliver the optimal solution. No matter how complex your robotic device, NOVA Battery Systems delivers superior performance for robotic applications.

Applications

- ✦ Unmanned vehicles
- ✦ Drones
- ✦ Rescue
- ✦ Industrial Automation
- ✦ Security

Medical

NBS specializes in the design and manufacture of smart battery packs and chargers for a broad range of portable medical equipment, from patient monitors to portable transcutaneous nerve stimulation units (“TENS”). Safety, quality and high reliability are designed-in on every battery pack used for critical medical applications. NBS’s engineering team carefully reviews all documentation, communicates with the customer and provides expert advice. Countless medical devices used in sustaining life and preserving health depend on customized battery packs, either as their primary energy source or as backups to protect against power failure.

NBS’ is dedicated to the safety and quality of the company’s integrated battery and charging solutions. NBS uses only top-brand cells and components that are of the highest quality. The company provides traceability, serialization, and ATE testing, and works together with the customer to provide all required regulatory agency compliance. Since medical battery technology is constantly evolving, NBS utilizes advanced testing methods to ensure that all its battery packs perform to their full specifications. NBS performs factory tests on every medical battery pack, and reviews the data with its customers. Additional custom testing, as requested by our customers can be performed upon request. The result is customized power solutions that have made NBS the premier vendor for battery packs for the largest companies in this field.

Applications

- ✦ Surgical Tools
- ✦ Portable Oxygen Concentrators
- ✦ Insulin Delivery

- ✦ Infusion Pumps
- ✦ Ultrasounds

Monitoring and Detection

The company’s engineering design team works with OEM customers to develop custom smart batteries for monitoring and detection applications including oceanographic, geophysical, and environmental. The company offers customized integrated power solutions with exceptional reliability, safety and overall performance. The company’s battery packs have performed flawlessly in some of the harshest environments and most challenging conditions worldwide.

The company works in partnership with the customer’s technical team to design custom solutions which meet stringent specifications including size, shape and weight – as well as operating characteristics including temperature range, energy requirements and battery life expectancy.

Applications

- ✦ Air Sampling
- ✦ Handheld Analyzers
- ✦ Radiation Detection
- ✦ Geophysical Devices
- ✦ Oceanographic

Industrial

NBS designs and manufactures custom batteries for a variety of industrial applications, supporting industrial OEM customers with smart SMBus battery management solutions. Designing the schematic and PCB, ATE testing and verification, and obtaining regulatory and transportation compliance are included in the company’s SOP.

Today’s industrial applications require high energy density in smaller packaging to meet size and weight challenges. As a result, Li-ion and LFP cells have become the cell of choice for industrial applications including material handling, automated guided vehicles (AGV) scanners, ruggedized computers, and many more. LFP cells are 3.3V, safe, and can perform up to 2000 cycles while Li-ion cells are higher voltage (3.6V – 3.7V,) and select cell models are rated for higher current and extreme temperatures at -40° to +70°C.

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Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

Volume 1: NOVA Battery Systems and Its Product Portfolio

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These products typically require a modular battery pack architecture with ruggedized features to ensure superior performance within varying outdoor environments and colder temperatures. The company's intelligent battery management system can monitor the pack's *State of Charge (SOC)* and *State of Health (SOH)* to help optimize runtime performance and extend battery life.

Applications

- ✦ Power Tools
- ✦ Automated Guided Vehicles (AGV)
- ✦ Utility Vehicles – Off Road
- ✦ Low-Speed Electric Vehicles
- ✦ Burden Carrier / Tow Tractors
- ✦ Forklifts and Cargo Moving Vehicles
- ✦ Telecommunications

Test & Measurement

The company designs and manufactures smart custom battery packs and chargers for unique OEM environmental applications. Portable powered field equipment requires batteries to be safe, reliable and meet OEM requirements for size, shape and weight. Our team of highly experienced engineers collaborates with the OEM's design team to review and understand the project scope, requirements and expectations. Cell selection is vital to a quality battery pack, and NBS only uses cells from premium cell manufacturers, thereby ensuring quality of performance and battery life. Once the review is completed, we will provide responsive, experienced and knowledgeable engineering support throughout the project life.

To further guarantee proper functionality and peak performance, Nova Battery Systems performs essential tests on all battery pack designs. From incoming inspection of material to in-process inspection during manufacturing, to final inspection of the finished product. Customer specific electrical, mechanical, programming or regulatory testing is done as required.

NBS provides premium custom smart battery packs, charging systems, fuel gauging, cell selection, battery pack design, quality, manufacturing, and customer service.

Applications

- ✦ Intrinsically Safe Environments
- ✦ Oceanographic Surveying
- ✦ Environmental Monitoring
- ✦ Air Sampling and Gas Leaks
- ✦ Radiation Detectors

Asset Tracking & GPS Satellite

NBS provides smart custom battery packs and chargers for asset tracking and industrial GPS satellites. In satellite applications, custom batteries must perform safely and reliably in higher temperatures to ensure optimum performance. NBS utilizes only premium cells, ensuring quality, high performance, and extended cycle life of the battery packs. The company also works with the customer to ensure regulatory compliance, UN safety transportation requisites, and any additional testing requirements.

Applications

- ✦ Asset Tracking Devices
- ✦ Global Positioning
- ✦ Satellite
- ✦ RFID

Military

Portable devices utilized by today's armed forces use battery power as their primary energy sources or as backup power. Common hardware such as communication devices, transceivers, GPS, and night vision equipment all use some type of lithium battery power. Weight and size play a crucial role in critical military equipment, and have led to a demand for smaller and lighter battery packs that will reliably perform in the most adverse environments.

NBS offers high quality custom battery pack, battery monitoring, and testing solutions for military and government applications where uptime is critical. The company's custom batteries and chargers meet the highest standards in rigorously testing military power sources. NBS battery packs are offered in custom metal enclosures, transit cases, and cabinets for ground mobile (surface vehicles,) below-deck shipboard, submarine,



Leader in Rechargeable Battery Energy Systems

Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

Volume 1: NOVA Battery Systems and Its Product Portfolio

and aircraft applications of all types. These applications are characterized by compliance to MIL-STD-1275, MIL-STD-1399, MIL-STD-810, MIL-S-901, MIL-STD-704, MIL-STD-167, RTCA/DO-160, and more.

Applications

- ✦ UAV and Drones
- ✦ Night Vision Cameras and Goggles
- ✦ Handheld Communication
- ✦ Stationary, Land-Based Systems
- ✦ Ground Mobile Vehicles, Surface Ships and Submarine
- ✦ Aircraft

Uninterruptible Power and Critical Power Systems

NBS develops integrated, field-proven battery and charging solutions for uninterruptible power supply systems (UPS) used in military, industrial, and commercial installations. To eliminate the possibility of battery failure, NBS designs battery management systems (BMS) with varying degrees of built-in intelligence to monitor battery performance, along with selecting the most optimum cell type to ensure that battery power is ready when utility power is lost.

UPS battery packs typically features sealed lead acid, premium high purity lead acid, Li-Ion, or LFP (LiFePo4) batteries. Compared to traditional sealed VRLA cells, Li-ion and LFP batteries are smaller, lighter, have faster charge times, and improved service life. They also offer improved monitoring thanks to the integrated Battery Management Systems (BMS) included in such packs.

NBS offers a full array of battery power for UPS Systems to suit any commercial, industrial, or military application, including those that require compliance to military environmental and electrical standards such as MIL-STD-1275, MIL-STD-810, MIL-S-901, MIL-STD-167, MIL-STD-1399, MIL-STD-461, MIL-STD-704, and RTCA/DO-160.

Applications

- ✦ Shipboard
- ✦ Onboard Server Backup
- ✦ Onboard Network Backup
- ✦ Ground Mobile
- ✦ Energy Storage Modular Solutions

Stationary Ground Power

NOVA Battery Systems is committed to supporting

comprehensive battery power solutions in a wide variety of industries and applications, including power utilities, mission-critical facilities, cable networks, nuclear plants, oil refineries, manufacturing facilities, processing plants, and countless more. Custom battery power is also used in many other applications where preventative maintenance, system reliability, and mission-critical testing is necessary.

With an in-depth knowledge of the Ground Support Equipment industry, NBS provides expert engineering support to develop and deliver battery power solutions that are tailored to the customer's critical needs.

Applications

- ✦ Electrical Generation Power Plants
- ✦ Electrical Power Substations
- ✦ Oil Refineries
- ✦ Mission Critical facilities
- ✦ Petrochemical Processing Plants

Leader in Rechargeable Battery Energy Systems

Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

Volume 1: NOVA Battery Systems and Its Product Portfolio

Customer’s Application for Quotation

Please complete the [Information Request Form](#) below to receive information on your product(s) of interest. This form will help us to properly respond to your requests with the specific information you require. The more details you

provide about your application, the better we can respond to your application interest with specific details, pricing, lead time, and, if applicable, transportation qualification requirements.

Please fill in yellow areas. If unknown or undecided leave blank.



BATTERY DESIGN INFORMATION - PRE SPECIFICATION

General Information	Customer Response
Date:	
Requested By:	
Company:	
Address:	
Telephone:	
Email:	
Cell & Project Information	Customer Response
Market Segment:	
Application:	
If Medical application, Class I, II, or III	
Project Name:	
Annual Volume:	
Target Price:	
Prod Life Cycle:	
Mass Production Start:	
Primary Supplier or 2nd/.3rd Supplier:	
Competitors:	
Mechanical Information	Customer Response
Length	
Width	
Thickness	
Enclosure	
Connector	
Wire Length and Gauge	
Other:	
Other Information	Customer Response
Pack internal or external to device?:	
User replaceable?:	
Sheet metal, plastic, 3D print, shrink required?:	
Typical operating environment?:	



Leader in Rechargeable Battery Energy Systems

Custom-Designed Battery Packs ♦ Battery Management Systems (BMS)

Volume 1: NOVA Battery Systems and Its Product Portfolio

Electrical Information	Customer Response
Primary (Non-rechargeable) or Secondary (Rechargeable):	
Preferred chemistry (Lilon, LiFePO4, NiMH, NiCd, SLA, etc.):	
Cell Type:	
Number of series cells:	
Number of parallel cells:	
Required Run-Time:	
Required Operating Voltage:	
Required Capacity:	
Cut-Off Voltage:	
Charging Voltage if applicable:	
Charging Current if applicable:	
Discharge Current or Power:	
Pulsed load? If yes, please define:	
Constant Current or Constant Power Load:	
Fuel-gauging required:	
SMBus required:	
Other Communication Bus required, if yes what bus?:	
Other known parameters: precharge, taper, etc.	
Operating temperature range:	
Storage temperature range:	
Required shelf life:	
Other Requirements:	
Charger Information	Customer Response
Charger required?:	
AC/DC converter?:	
DC Input Voltage:	
USB:	
Other:	
Standards and Compliance Testing Required	Customer Response
UN 38.3 DOT:	
UL 2054:	
IEC 62133:	
UL File:	
CE:	
CB:	
PSE:	
RoHS:	
Other:	
Other Requirements	Customer Response
Samples Required? If yes, how many and when?:	
Request Type: Production, Engineering, Pre-Eng, Evaluation:	
Additional Comments /Sample Purpose	Customer Response

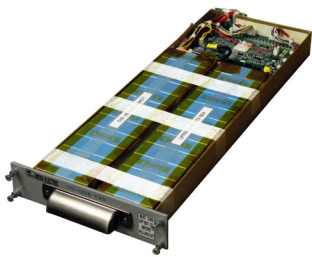
Quality Management Systems and Certifications

NBS is an ISO9001:2015 and ISO13485:2016 Certified company dedicated to providing safe, high quality products.

Nova Battery System's Quality Policy is to maximize customer satisfaction and safety, while assessing and mitigating risk through the following:

1. Meet or exceed customer satisfaction through on-time delivery of defect free products and services.
2. Continue statutory/regulatory compliance.
3. Develop a reliable supplier base, capable of defect free products and service delivery to the company.
4. Maintain a safe work environment with a goal of zero accidents or reportable incidents.

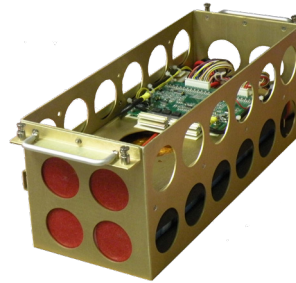
NOVA Battery Systems invites you to visit our website for viewing our current ISO 9001:2015 and ISO 13485:2016 certificates: <https://novabatterysystems.com/company/nbs-quality/>



1U Battery Tray



3U Battery Tray



4U Battery Tray



5U Battery Tray

Nova Battery Systems resides within a 50,000 square foot factory complex in Bergenfield, NJ USA, approximately 20 minutes from New York City. This plant includes all necessary facilities for the complete design, manufacturing, and testing of our entire product line.

These facilities include:

- Custom battery pack and charger engineering center
- PCB layout & assembly
- Box build turnkey assembly
- 3D printing
- Customized sheet metal fabrication
- Ultrasonic welding
- Fully equipped machine shop
- Plastics prototyping
- Electrical and environmental testing



Having all facets of the design and production of our products under one roof ensures total quality, reduced deliveries, and gives Nova Battery Systems the ability to rapidly customize products per unique customer requirements.

