THE APEX EVOLUTION

PRINTED ROCKET ENGINES
Better performance in half the time

OPEN FOR BUSINESS IN INDIA
The New Delhi office opens its doors to the Indian market

Nammo’s APEX ammunition excelled in all tests and at all targets during the latest qualification stages.
Dear readers,

Welcome to the 2017 edition of bulletIN. Over the last year, Nammo has experienced another incredible period of growth, fueled by our partners and passionate team of dedicated employees. This year’s bulletIN looks at some of the key events over the last 12 months, and the amazing accomplishments achieved by the Nammo Group in 2016.

A large part of Nammo’s business takes place in the international market and, therefore, it is vitally important to have a strong customer focus, to understand the customers’ needs. We measure this regularly; Nammo has a very good reputation and is known for talking straight, with a willingness to invest in technology to help solve issues for our customers. We are proud of this reputation, and intend to nurture and expand upon this in the years to come.

Nammo reorganized the business units on 1 January 2016, aligning with a specific focus to deliver niche and specialty products on time, and at the agreed price and quality to all customers. The past 12 months have proven this to be a successful adjustment to the business, and Nammo’s products and consumers have benefited from the enhanced customer focus.

We continually develop new products and solutions, in-line with the ever-evolving needs of the modern marketplace. Our M72 lightweight anti-tank weapon is a typical example of this incremental development, along with a substantial investment in long range artillery. We are also in the last qualifying phases of the 25 mm APEX ammunition for the F-35 aircraft – a huge milestone for the ammunition.

This is all made possible thanks to our brilliant engineers and through our values: dedication, precision and care.

We hope you enjoy reading more about Nammo and some of the milestones we have reached over the last year, and want to take this opportunity to thank you for your continuous support.

Morten Brandtzæg
PRESIDENT & CEO

Founded in 1998, the Nammo Group is a technology-focused aerospace and defense company specializing in high-performance defense and space solutions. The Nammo Group is driven by precision engineering, a dedication to safeguarding the environment, and the development of innovative, global solutions. Headquartered in Raufoss, Norway, Nammo has offices all over the world and works closely with national armed forces, providing industry-leading ammunition and munitions. Nammo’s world-class demilitarization facilities are considered by governments worldwide as a safe, environmentally-friendly method of destroying unwanted weaponry. As well as military partnerships, Nammo’s innovative technology is used in civilian products, such as propellants for space rockets and commercial ammunition for sports, hunting and competition.
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2016 marked a cornerstone for the 25 mm APEX ammunition; the round obtained Full Operational Capability (FOC) approval from the US Navy Safety Board, as well as approval for test flights from the US Air Force. It looks set to continue on this positive projectory next year, and, for the first time, the 25 mm APEX, will be fired from a flying F-35 aircraft in the first quarter of 2017.

This maiden flight for APEX is one of many flight certification activities, and part of the Live Fire Testing and Evaluation (LFT&E) program, which aims to evaluate the lethality of the ammunition, when employed in a realistic fashion against a variety of representative targets.

The firing test from the F-35 will be the last of the comprehensive LFT&E program APEX has been through. APEX has done very well in all the tests and at all targets, performing as well as predicted. The test program has indeed demonstrated APEX’s dual-purpose capabilities.

In 2014, the round’s penetration capability and fragmentation characteristics were assessed when it was fired at technical armor, steel and aluminum plates. The fragments were captured in recovery bundles and the velocity, direction and mass of almost all the fragments were registered. The data was analyzed and used to build a lethality model.

In spring 2016, the round was tested on a selection of real targets at Eglin Air Force Base. Among the targets were an armored vehicle, a thin-skinned vehicle, a helicopter and an aircraft. The results are being analyzed and used to validate and, if necessary, refine the damage prediction models.

When the LFT&E program is completed, the data will be incorporated into the Joint Munitions Effectiveness Manual (JMEM) to support mission planning for the F-35.
THE TEST PROGRAM HAS DEMONSTRATED APEX’S DUAL-PURPOSE CAPABILITIES
Why is the F-35 so important to Norway?

The F-35 helps create the freedom of action that Norway will depend on in any future defense situations. We control massive air, land and naval territories; our land and naval forces, as well as those of our allies, must be able to move and operate freely in those areas. The ability to establish and maintain control in our own airspace is an essential part of this effort.

Why is Norway also investing in several unique capabilities for the F-35?

We only have one kind of combat aircraft, which has to cover all our requirements. That means we have to be able to fly in all conditions and engage the full range of targets. As a result, we are investing in many different technologies, such as a drag chute for the aircraft, the Joint Strike Missile for the ASUW-role, and APEX ammunition for the gun. In our view, by the time all of these capabilities are integrated, Norwegian F-35s will be the most capable aircraft of their kind anywhere in the world.

What has helped shape the requirement for the APEX round?

We built APEX on the experience gained from the F-16, then reviewed the types of ammunition planned for the F-35. It was clear that to achieve the maximum from our investment, something else was needed. For us, that was APEX, which will be available to all F-35 users once development is complete. We have already seen significant interest from our partners, particularly from Australia.

How would you describe the status of the Norwegian F-35-program as of today?

The status is very good and we are making rapid progress. We already have four jets at Luke Air Force Base, and we plan to receive the first aircraft in Norway at the end of 2017. This investment will truly strengthen all of the Norwegian Armed Forces, and we look forward to getting the aircraft to their future home at Ørland Air Station.
"This investment will truly strengthen all of the Norwegian Armed Forces...by the time all of these capabilities are integrated, Norwegian F-35s will be the most capable aircraft of their kind anywhere in the world."

MORTEN KLEVER, MAJOR GENERAL
THE RACE TO A RECORD

COMBINING FORMULA 1, FAST JET AND SPACE ROCKET IN ONE, THE BLOODHOUND SUPersonic CAR (SSC) IS AN INTERNATIONAL EDUCATION INITIATIVE FOCUSED AROUND A NEW WORLD LAND SPEED RECORD ATTEMPT. ONNO VERBERNE EXPLAINS THE PROJECT’S PROGRESSION

INSPIRING THE NEXT GENERATION
The overall aim of the BLOODHOUND project is to inspire a generation about science, technology, engineering and mathematics. Before the car had even turned a wheel, BLOODHOUND and its partners engaged with hundreds of thousands of school children in the UK and internationally; an initiative that is already generating results.

TEST TEAMS
In a crucial move towards setting a new record, a Rolls-Royce EJ200 jet engine Eurofighter Typhoon and a cluster of Nammo hybrid rockets are set to be installed in the BLOODHOUND SSC at the Newquay Aerohub in the second half of 2017.

The team will test the new systems in a slow (c.220 mph/354 km/h) shakedown along Newquay’s runway. This will also include a rehearsal ‘pit stop from hell’: an intense 40-minute period between timed runs, during which the car will be checked, refueled and made ready for the return leg.

A key aspect of BLOODHOUND’s mission is to share the adventure with a global audience and as such, the tests will feature live-streaming data and imagery from the car.
Once the shakedown test has been completed, the BLOODHOUND SSC will be loaded onto a CargoLogicAir Boeing 747 freighter in Cornwall and airlifted to Upington, South Africa. The BLOODHOUND SSC will then be transported by road to the team’s desert base at Hakskeen Pan. This self-contained village, complete with workshop and TV studios, will be set-up under the guidance of Martyn Davidson, Operations Director. The track itself has taken the local community four years to prepare, and is the equivalent of a two-lane road from Bristol to Moscow.

It is here that the BLOODHOUND SSC team will target speeds of 800 mph (1000 km/h) and a new world land speed record.
THIS NEW TECHNOLOGY HAS NUMEROUS BENEFITS, REDUCING RECURRING COSTS, SHORTENING DELIVERY TIMES AND MAINTAINING OR EVEN IMPROVING PERFORMANCE

The team from left: Jan Sturla Hegre, Arne Stenseth, Jan Erik Rønningen, Axel Kolsgaard and Sigmund Holmen.
For many years, the traditional form of composite propellants for solid propellant rocket motors have been based on an inert polymer, filled with ammonium perchlorate and aluminum powder. Although effective, these propellants have a substantial signature associated with their exhaust gases. Both ‘primary smoke’ from aluminum oxide particles and ‘secondary smoke’ from hydrochloric acid aerosol droplets create a significant trail of smoke when the missile is operated, meaning the disadvantages of using them are, literally, clear to see.

These ‘smoky’ or ‘reduced smoke’ composite propellants are unsuitable for missile systems that are controlled with transmission of optical signals, such as line-of-sight or laser guidance systems.

To try and avoid these issues, double-base propellants have been used to minimize smoke propulsion. This type of propellant is based on nitrocellulose binder and nitroglycerine energetic plasticizer. Although it is smoke-free, it has many disadvantages: an overly sensitive nitrate ester plasticize and poor low-temperature mechanical properties, for example, as well as the presence of toxic and environmentally unacceptable additives, including lead-containing burn rate modifiers.

Since 2011, Norwegian Defence Research Establishment has cooperated with Nammo to develop a new family of minimum smoke composite propellants based on reduced sensitivity nitramines (RDX or HMX), Glycidyl Azide Polymer (GAP) binder and low-sensitivity nitrate ethyl nitramine (NENA) energetic plasticizers. This type of propellant also contains a lead-free burn rate modifier system that is compliant with existing and upcoming environmental regulations (REACH).

In 2013, Nammo was awarded the contract for the development and qualification of the propulsion section of the Lightweight Multirole Missile (LMM).

LMM is developed by Thales Land & Air Systems of Belfast, UK, as a precision, laser-guided, lightweight weapon for light platforms to counter modern and emerging land, sea and air threats.

Nammo has successfully developed a specific GAP propellant with reduced sensitivity nitramines and low-sensitivity energetic plasticizers for the LMM second stage motor. As a result, in May 2016, the LMM propulsion system was qualified with Nammo’s GAP propellant.

Parallel with the propellant development and qualification efforts, a new production line for the LMM has been established in the new rocket motor plant facility. This includes automated casting equipment, enabling the casting of 250 rocket motors in only 4 hours, with the first batch of 250 rocket motors successfully manufactured in February 2016. During 2017, regular manufacturing of the LMM motor with GAP propellant will fulfill the remaining deliveries for the first LMM contract.

The LMM will be the first munition incorporating a GAP propellant in the UK defense inventory, and in the Western World.
The M72 Light Assault Weapon (LAW) reached its 50th anniversary of production at Nammo Raufoss, Norway, in 2016. The M72 family has a rich and successful history, owed to its lightweight, robust design and intuitive operation system.

Continuous improvement and development have propelled the success of the weapon since the introduction of the basic M72 LAW. This journey continues with the qualification of the M72 Fire From Enclosure (FFE), demonstrating once again how the LAW consistently evolves to exceed user requirements while maintaining its compact size and lethal performance.

Although the LAW started out as the successor to the famous World War II bazooka, continuous developments with new and innovative technologies have kept the M72 family ready for current operations. Recent variants include two new Anti-Structure Munition (ASM) models: the M72A9 ASM and M72 ASM Reduced Caliber (ASM RC), designed to breach buildings and walls with and without fragmentation, respectively.

TO BE CONTINUED
After decades of management by a consortium of companies, the M72 family is now owned entirely by the Nammo Group, and has been since 2007. Nammo is dedicated to the continued success and development of the M72 family; it plays a prominent role in the Shoulder Fired Systems (SFS) Business Unit, which was created as part of Nammo’s new corporate organization structure in 2016.

Continued development and system improvements for the M72 family are implemented at the two centers of excellence in Raufoss, Norway, and Mesa, Arizona. Close collaboration between the sites increases the development capacity and eliminates any project overlaps. The renowned role of M72 in the SFS Business Unit exemplifies the “One Nammo” spirit, as this international team works together to deliver a superior combat-enabling solution.

LOOKING TO THE FUTURE
As the M72 enters its next 50 years one thing is certain: with outstanding capabilities, modern fuzing and high-performance warheads, the future is brighter than ever. Teamwork, leadership, dedication and commitment are the hallmarks of the Nammo M72 team that continues to improve and deliver the very best M72 solutions to users around the world.
REACHING NEW HEIGHTS

THOMAS DANBOLT, PRODUCT DIRECTOR OF TANK & ARTILLERY AMMUNITION, DISCUSSES THE NEXT STAGES FOR NAMMO’S ADVANCED 155 MM AMMUNITION

Nammo has reached a significant landmark in the development of its advanced 155 mm Insensitive Munition High Explosive Extended Range (IM HE-ER) ammunition, which enhances the possibilities for the next generation of artillery munitions. Partnering with the Norwegian government, Nammo began developing the ammunition in 2012, and has recently completed the qualification rounds in late 2016. This comes as Nordic countries upgrade their artillery, introducing new gun platforms with L-52 barrels and creating a need for new extended range 155 mm ammunition.

DOUBLE THE DISTANCE
While traditional 155 mm shells on the market have a maximum range of 20-30 km, Nammo’s 155 mm ammunition is designed to provide minimum dispersion at a maximum range of 40 km. But Norway isn’t the only country to upgrade its artillery: Finland is also in the process of obtaining new guns, while countries such as Sweden and Lithuania have already introduced the new gun systems. This presents a huge opportunity for Nammo to offer its advanced 155 mm ammunition to a wider audience.

EXTENSIVE TESTING
The qualification of the ammunition marks a significant milestone in the 155 mm IM HE ER’s development. Extensive testing was conducted on the ammunition, such as environmental, transportation and firing tests, before the ammunition can pass the qualification stage. Such testing is a complex and rigorous process; during the maximum range test, airspace over Southern Sweden had to be closed off as the shells reached over 16 000 meters into the air in less than a minute, when fired over the important benchmark range of 40 km at sea level.

TOMORROW’S EXTREME RANGE
As Thomas and his colleagues take the next step in the Norwegian defense material agency contract, they also have one eye on the not-so-distant future. 2017 will see the team develop 155 mm extended range smoke and illumination shells, with the aim of qualifying the ammunition in 2018. The years beyond may see the introduction of ‘extreme range’ ammunition, something that Nammo, with its unique position as a multi-faceted company, is already exploring.
As technology in warfare evolves, so has the way battles are fought. Large-scale engagements have given way to quick skirmishes with enemies in urban environments, using guerrilla-style hit and run tactics. One issue is the threat posed by the many shielded vantage points from which enemy troops have the potential to outmaneuver advancing ground forces.

This new style of warfare has created an urgent need for small precision guided weapons, which can be used to eliminate threats with minimal collateral damage. Nammo has developed a family of rocket motors and warheads for use in these small squad-deployed guided weapons.

AN ALL-SEEING SQUAD

The new urban warfare scenario has the Defense Advanced Research Project Agency (DARPA) considering changes in both the way the battlefield is viewed, as well as how to address the threat with minimal collateral damage. Nammo has developed a family of rocket motors and warheads for use in these small squad-deployed guided weapons.

As military squads move through enemy terrains on foot, sensing threats and reacting quickly can be the difference between mission success or failure. The Squad X infrastructure uses information-gathering technology, such as network management systems, sensors and situational awareness applications, to create a clearer picture over multi-domain environments. It is implemented in user-friendly systems for soldiers and across combined armed forces equipment, such as helicopters, drones and infantry troops. As a result, squad members gain real-time knowledge of their team mates, adversaries and threats can be identified, giving forces more time to react and make the best decision.

Working under a US DoD Prime Contractor, Nammo is developing an advanced rocket motor for Squad X – a Defense Advanced Research Projects Agency (DARPA) program. Squad X is designed to extend and enhance foot soldiers’ situational awareness, by helping them fully understand their surroundings, which improves their detection and engagement capabilities. Ultimately, this system will enable foot soldiers to eliminate targets they cannot see from their positions.

THE SMART PROJECTILE

Joining forces with another industry prime contractor, Nammo is providing a tailored rocket motor and an optimized warhead for a 40 mm smart projectile, which looks at addressing ground combat issues from a different angle. As part of the Nammo Group, the program can implement technological expertise from other Nammo business areas for optimum results.

This new, powerful, hand-launched munition technology is based on a standard low velocity 40 mm round, and can be fired from 400–1000 meters with pinpoint precision, arming ground-based troops with the ability to accurately engage targets with minimal collateral damage.

Nammo’s 40 mm smart projectile can be fired from 400–1000 meters with pinpoint precision, arming ground-based troops with the ability to accurately engage targets with minimal collateral damage.
THE LIGHTWEIGHT REVOLUTION

KIM HELGE DAHL, PROGRAM DIRECTOR OF SMALL AND MEDIUM CALIBER AMMUNITION, EXPLAINS HOW NAMMO IS EVOLVING TO MEET THE DEMANDS OF MODERN WARFARE

REDUCED RANGE EXPANSION

Reducing the range of live ammunition is a necessity for modern-day warfare and training, providing a safer option in both close-range combat scenarios as well as training environments.

In addition, when training for urban combat, firing in all directions using live rounds often causes safety issues. This presents challenges and limitations for 360-degree awareness training, and decreases the number of firing ranges available for 12.7 mm ammunition.

Nammo’s response to these growing problems is a family of Reduced Range (RR) ammunition for operational and training purposes, including a Reduced Range Ball, Reduced Range Tracer and a Reduced Range IR Tracer. These cartridges not only make it safer to use live ammunition in politically sensitive or populated areas, but also improve training capabilities because the RR ammunition requires a much smaller safety fan compared to standard live rounds.

In addition to the existing 5.56 mm and 7.62 mm RR, the 12.7 mm projectile can be fired in a standard 7.62 mm range, due to its reduced ricochet, reducing the danger area, without compromising on performance.

FROM BRASS TO PLASTIC

Nammo is also one of the first ammunition companies to consider developing a complete, lightweight package for soldiers and the defense force as a whole, which aims to reduce the weight, cost and environmental impact.

Nammo believes that the future of all small caliber ammunition will be plastic casing, as switching from brass to plastic reduces the weight of the cartridge case itself by 30 percent, whilst maintaining the ability to operate in all environments.

Further benefits include improved accuracy due to the uniformity of the plastic molding. Subsequently, less variance means better accuracy and more stable velocity in the projectile, and heat management is also improved.

LIGHTWEIGHT SOLUTIONS

To work with the plastic cartridge casing, Nammo has developed a plastic link to offer a combined weight reduction of 82 percent. It will perform at the same level as the steel used today, and will cope with vast temperature ranges, vibration shocks and environmental tests.

In collaboration with the Danish company PPD (PlastPlack Defence), Nammo is also working towards a polymer replacement for the steel ammunition boxes and would be 65 percent lighter than the steel box.

OVERALL IMPACT

By adopting all four lightweight components – the case, link, box and pallet – Nammo expects to reduce the weight from 900 kg to 600 kg on one palette of ammunition. This represents a 33 percent drop, which is significant for both the individual soldier – who can carry more ammunition at one time – and in terms of logistics.

The UN has set targets to reduce greenhouse gas emissions by 2020, 2030 and 2040. If the lightweight package is adopted all over the world for the 12.7 mm ammunition alone, Nammo is expected to meet the UN’s targets.
I remember it was autumn 1999 when I started my job at PressTec, at Schwerte in Germany. My first business trip with the company was to Lapua; we had delivery and quality problems there and Lapua’s production manager Markku Kortesoja was not happy with the performance of our deliverables. It was a cold atmosphere during the meeting and there were stern words about what Nammo Lapua expected from us. We very quickly understood the performance was not acceptable for their high-quality ammunition. All teams at PressTec worked very hard to develop the processes and the organization, utilizing our strong team spirit to search for the best solutions.

Two years later, we came back with the first positive results and Nammo Lapua accepted us as the first cupping source for their ammunition.

In 2007, Nammo bought PressTec, defining the next milestone in our company’s development. I was quick to learn that Nammo not only had a constructive customer base for us in Finland and Sweden, but also a very focused management team. These factors gave us the frame on which we developed PressTec to become a leading cupping operator worldwide. We were able to see the results every time through the feedback we gathered from our customers. We even received a quality award from one of the leading US-producers (among others), which was quite unusual for a European supplier.

PressTec provides Lapua with the best performing high-quality cup products especially for the Scenar L bullets, as well as for the military purposes in Nammo Sweden and Nammo Palencia. Our products’ reputed efficiency is particularly important for competitive ammunition.

Winning the HESS Award 2012 was very important for the PressTec team. Not only did it legitimize all of our hard work during the previous year, but it also motivated us to overcome our future challenges.

I would like to offer a huge thanks to our board and management team, and of course, the most important element; the biggest thank you to all of our employees who work very hard for consistently great results.

Dedication, Precision and care are our values. I feel this is a great formula for a successful career for all our employees, day to day and year on year!

Ralf Bollmann
SPOTLIGHT ON AIRBURST TECHNOLOGY

NAMMO HAS BEEN WORKING WITH PROGRAMMABLE AMMUNITION AND AIRBURST TECHNOLOGY FOR MORE THAN 10 YEARS, QUALIFYING THE FIRST 40 MM AIRBURST AMMUNITION TYPES ON THE MARKET

WHAT IS AIRBURST?

Airburst detonates the ammunition in the air close to the target. Using airburst, a much larger area can be covered with fragments, reducing the need for a direct hit.

This makes the airburst ammunition highly effective against hidden targets.

THE AIRBURST PRINCIPLE

The distance to the target is measured using a laser range finder, and the ballistic computer then calculates the time-of-flight to the target. Subsequently, the time-of-flight is transmitted to the ammunition, which starts a countdown to detonate above the target.

NAMMO’S SMART SOLUTION

For airburst ammunition to work successfully, there needs to be communication between the weapon platform and the ammunition.

Nammo’s solution to this is wireless communication. This provides a very flexible structure where the airburst ammunition can be easily integrated into existing weapon systems without modifications.

By using the modules from the existing 40 mm airburst, Nammo can develop airburst solutions in other calibers in the most cost-effective way possible.

As such, Nammo is currently working on the following airburst products:

- 40 mm AGL [qualified]
- 30 mm x 173 HEAB-T airburst ammunition
- 120 mm PMP airburst ammunition
- M72 airburst
NAMMO EXPANDS INTO INDIA

NAMMO OPENS ITS DOORS TO THE INDIAN MARKET, FROM THE NEW OFFICE IN NEW DELHI

On 3 June 2016, Nammo officially marked the start of Nammo India Private Limited by holding an official ceremony.

Based in New Delhi, representatives from the Indian Armed Forces and defense industries were present at the event, and the Norwegian Ambassador to India, Nils Ragnar Kamsvåg, showed his support by delivering a stirring speech. The Norwegian Defence Attaché and representatives from the Commercial Section (Innovation Norway) also participated in the celebrations.

With a local presence and a newly established office in New Delhi, Nammo is ready to support India in its defense modernization programs and to be an active participant in the “Make in India” initiative.

“"We have seen that the expertise, production cost and excellent quality of products manufactured by Indian industries correspond perfectly to several of our product lines,” said Kjell Kringsjå, Senior Vice President Business Development in the Nammo Group. "I believe we have great opportunities for cooperation ahead of us."

The Nammo Group is a world leader in the development and manufacture of shoulder-fired systems and high-performance ammunition products for various weapon platforms.

Indian Armed Forces have increasing needs, which correspond well to Nammo’s product portfolio. Nammo can offer both solutions and products that are adaptable to the requirements of the Indian Armed Forces.

Together with Indian defense industries, Nammo has defined concrete and interesting partnering areas, creating an excellent platform for strong cooperation in the future.

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From left: Hogne Rykkje (Defense Attaché), Karanjit S. Chopra (Managing Director Nammo India), Nils Ragnar Kamsvåg (Norwegian Ambassador to India) and Kjell Kringsjå (Senior Vice President Business Development, Nammo Group).
AN ELITE PARTNERSHIP

PETE SIOMA, PRESIDENT OF NAMMO ENERGETICS INDIAN HEAD INC., DESCRIBES THE FORTHCOMING OPPORTUNITIES FOR NAMMO AND THE US DEPARTMENT OF DEFENSE

Two Nammo Business Units have joined forces to establish a new joint capability in the US: Nammo Energetics Indian Head Inc. (NEIH). The new venture is located at the Naval Surface Warfare Center Indian Head facility (NSWC/IH), 30 miles from Washington DC. This joint operation will report to the Aerospace Propulsion and Demil, Sea Safety and Services Business units.

Technology transfers from Nammo Raufoss and Nammo Buck will help support the start-up capabilities of NEIH. The new company will be led by Pete Sioma, who previously served as President of Nammo Inc. and who has been with Nammo for the past 11 years. NEIH’s principle capabilities will support the US Department of Defense with solid rocket motor propulsion, tactical warheads, and demilitarization services of US munitions inventory.

A 30-YEAR PUBLIC PRIVATE PARTNERSHIP

NEIH will operate under a Special Security Agreement (SSA). The SSA process took almost two years to complete and the agreement was finalized by Nammo and the US Department of Defense in August 2016. After long negotiations, NEIH finally signed a 30 year Public Private Partnership Agreement, known as P3, with the US Navy’s NSWC at Indian Head. The P3 Agreement defines how NEIH and the US Navy will jointly collaborate and operate the capacities and the capabilities within the facility.

NSWC/IH will make over 1 500 acres, 2 000 buildings and services available in support of NEIH operations. Nammo is making a significant financial capital investment in facilities, equipment and human resources to establish a state-of-the-art capability modeled on current Nammo operations – something that is highly competitive and retains the ‘Nammo culture’. Nammo believes that partnering with the US Department of Defense best supports its growth strategy in the US, while also maximizing market access with the significant capital investment required to participate in the US market.

The US military market is the largest by far and in today’s global economic environment there is significant pressure to spend defense dollars at home. This investment by Nammo will allow NEIH to operate inside the US National Technology Industrial Base (NTIB), with support from Nammo capabilities outside the US, while creating jobs in the US.
SECURING A LONG-TERM CONTRACT

PETER HEDSAND, SALES DIRECTOR AT NAMMO, REVIEWS THE INTENSE PROCESS IN ACQUIRING THE NEW FOUR-YEAR CONTRACT WITH THE POLISH ARMY

The Polish Army has been using Nammo’s shock tube starters for a number of years. However, in late October 2016, the Polish Army signed a four-year contract with Nammo, bringing guaranteed longevity to the already thriving partnership.

Shock tube starters are used by military and national forces to ignite explosives for planned detonations. Used for various missions, they ensure the personnel involved can orchestrate the detonation from a safe distance.

The contract marks a significant development in the partnership, illustrating the customers’ trust in Nammo, and the product offering. However, it didn’t just happen overnight; during the preceding 12 months, the Polish Army tested the shock tubes in an array of different environments, in various moisture levels, at different temperatures and even underwater.

Although Nammo’s shock tubes pass NATO’s testing regulations, forced through ever-more complex tests, the customer’s requirements became increasingly challenging. The Nammo team had to work hard to meet the Polish Army’s criteria – a challenge it was more than happy to accept and, eventually, overcome with gusto.

One of the main features of Nammo’s shock tube starters is the incredible short education time – the time it takes to teach a user how to safely operate the product (less than a minute). Additionally, it’s proven to be extremely strong, easy to handle, safe and highly reliable – all key features that make Nammo’s product superior to competitor offerings. Thanks to the high standards and tough additional requests of the Polish Army, Nammo has now set the benchmark even higher.

The new, four-year contract confirms Nammo’s success at conquering all challenges, as well as the Polish Army’s confidence in Nammo and the product. It also sets the stage for the next level of development as Nammo scales up its operations to fulfill the new order, and Peter Hedsand and his team look forward to the promising future of the shock tube systems.

THE NAMMO TEAM WORKED HARD TO MEET THE POLISH ARMY’S CRITERIA – A CHALLENGE IT WAS MORE THAN HAPPY TO ACCEPT AND, EVENTUALLY, OVERCOME WITH GUSTO. THE FOUR-YEAR CONTRACT CONFIRMS NAMMO’S SUCCESS AT CONQUERING ALL CHALLENGES, AS WELL AS THE POLISH ARMY’S CONFIDENCE IN NAMMO AND THE PRODUCT
“For the 14th time, Nammo has held the Multipurpose Symposium & Live Fire Demonstrations for our customers. And without hesitation, we can proudly conclude it was a huge success. With record participation from over 300 people from 34 countries, more than 100 different units or companies, and complemented by fantastic weather, our CEO Morten Brandtzæg welcomed them to a varied and intense three-day program.

It all started with the defile of historical military vehicles that have been used by the Norwegian Armed Forces. From the Hanomag 20B to the Ford M20 and the Chaffee M24 tank, the audience was treated to a piece of military history.

This year’s theme for the Multipurpose Symposium & Live Fire Demonstrations was: ‘Your Future, Our Ammo.’

The theme highlighted our commitment to continuously develop and improve our products and services for our customers, in order to ensure that they would continue to choose Nammo as their main partner.

The sub-theme of ‘50 years with M72’ was a good example of how Nammo continues to develop a successful weapon system in order to meet changing requirements.

During the MP Symposium, we informed our customers about our progress on new technologies and concepts; the integration of our airburst technology across different calibers, our world-class armor-piercing technology, our unique IR-trace technology and our mission-specific training concepts, to name a few.

We had guest speakers from the Swedish Armed Forces, the Norwegian Armed Forces, the US Air Force and from Kongsberg, to underline our close links with our customers and partners.

We also introduced our range of reliable, effective and accurate ammunition designed for highly-trained units: Vantage Ammunition.

Last but not least, we provided our customers and partners with the possibility to test some of our ammunition on different targets. Because nothing is more convincing than your own experience!

We hope to see all of our customers and partners again in 2018.”
In 2016, the Health, Environment, Safety and Security (HESS) award ceremony took place at the Nammo Forum in Norway.

Every year, the coveted prize is awarded to a department or site that has shown strong improvement, worked closely to enhance internal education and has proven high levels of reporting – including taking follow-up actions on incidents and near misses.

The award went to the mechanical department (AFB) at Nammo Raufoss – which is part of the Large Caliber Ammunition business unit, and specializes in multi-spindle computer numeric control (CNC) machining, heat treatment and cold-forming jackets for 12.7 mm ammunition.

The judges found the department to be extremely well structured, with a strong focus on reporting, improving the working environment and automation of processes. They also emphasized the importance of preventive work by conducting stringent risk analysis. The department has successfully increased levels of reporting; they have not experienced any lost time, injuries or accidents, and they have managed to maintain a low level of sickness-related absence.

For over 30 years, part of this department ran its operation inside a mountain cave. In 2015, this production line was moved from the mountain cave into new facilities in Raufoss Industrial Park. The overall project has been a huge success, in terms of time, quality and cost, and no accidents have occurred. Employees also welcome the addition of natural daylight after moving to the new building!
MEET THE WINNERS

The winning team was Nammo NAD within the Demil, Sea Safety and Services business unit.

The core of their work takes place 1,000 meters underground at the Løkken Verk mine in Norway. Although small, the team has succeeded in significantly increasing annual sales – achieving an outstanding 100 percent growth over the last 5 years.

TEAM OF THE YEAR

TEAM OF THE YEAR IS AWARDED TO A GROUP THAT HAS MADE A POSITIVE CONTRIBUTION AND REPRESENTS A GOOD EXAMPLE OF BUILDING A STRONG, COMPETITIVE CULTURE, BASED ON OUR COMPANY VALUES AND THE ‘ONE NAMMO’ SPIRIT

MEET THE WINNERS

This award-winning team has fully embraced the company values, as well as the ‘one Nammo’ culture and teamwork concept, by demonstrating an eagerness to help whenever requested to do so. They have made significant contributions to past successes at both Vingåkersverken and Buck, frequently taking on tasks involving the disposal of problematic ammunition and facilitating on-time, cost-effective delivery for other members of the business unit.

Working conditions at the mine in Norway are unlike any other area in Nammo. The team remains highly motivated and focused at all times, delivering effective production reviews that are structured to include all workers at the site.

From left to right: Bertil Pålsrud (SVP HR), Tor Bjørklund (President Nammo NAD), Urban Öholm (EVP DSS), Marianne Granheim (Office Manager Nammo NAD), Jon Møkkelgård (Safety Manager Nammo NAD) and Morten Brandtzæg (CEO).
NAMMO RAUFOSS WINS VOCATIONAL AWARD

TORKEL AASS, HR MANAGER FOR NAMMO RAUFOSS, EXPLAINS HOW THE TEAM WON THE NORWEGIAN ENTERPRISE (NHO) VOCATIONAL AWARD

OUTSTANDING AMBASSADORS

In a ceremony held in September 2016 at the Confederation House in Oslo, Nammo Raufoss was the proud recipient of the Norwegian Enterprise (NHO) vocational award.

The NHO vocational award aims to promote vocational education and training skills through visualizing good training establishments. As such, entrants must adhere to a number of strict criteria, including a willingness to take on apprentices, as well as a focus on professional development, customer satisfaction and local affiliation.

Vegard Løkken, Production Manager at Nammo Raufoss, commented: “We have an excellent system for how we work with apprentices at Raufoss, and we work closely with both the regional training office for industrial trades and the local secondary schools.”

A LONG TRADITION IN VOCATIONAL TRAINING

Nammo Raufoss’ extensive vocational training programs take place at the Raufoss Industrial Park.

Currently, the Nammo Raufoss training school has a total of 18 apprentices, covering 5 vocational fields. Candidates from the school have participated both in the Norwegian Championship for vocational professions and the World Championship in WorldSkills.

These positive and encouraging activities granted Nammo Raufoss the NHO Vocational Award 2016, which recognizes the team’s dedicated efforts in the area of vocational training.
In early 2015, commercial brands at Nammo didn’t have a social media presence. Fast-forward to today, Lapua, Vihtavuori Powders and SK Ammunition are all active on social media – and end users are engaging with these brands in a big way.

With Nammo Lapua’s social media strategy, the company aims to provide an interactive communication channel with end users of Nammo commercial brands, which began with Facebook.

REACHING THE END USER
Social media is a valuable tool for raising brand awareness on a global scale and reaching a designated target audience. It provides an opportunity for commercial brands to ‘meet’ the end user on a more personal, interactive level – and the brands’ extremely loyal fans appreciate direct contact, which in turn strengthens their loyalty.

The use of Facebook stats, surveys and a host of other methods also present a chance to learn more about consumers. In addition, the brands can share knowledge about specific products and how to use them, and end users can also talk about their experiences.

OVERCOMING CHALLENGES
However, content development is not a straightforward process. The brands and products promoted are sensitive topics, and it is vital that brands send out the right messages online. As such, the Nammo Lapua Brand & Marketing Team follows and develops content guidelines to ensure the right balance for the target audience.

APP LAUNCH
In October 2016, Lapua launched a new Ballistics app: the first mobile ballistics app to utilize the 6DOF calculation model, making it the most accurate product of its kind on the market.

Nammo Lapua organized a social media campaign to raise awareness of the app, which also covered the pre-launch period. To create additional hype around the launch, Nammo Lapua released a teaser video on Facebook and in the Lapua newsletter, and the campaign was then reinforced on launch day.

The results of the campaign were overwhelmingly positive. On Facebook, the organic – i.e. unpaid – campaign posts were viewed a total of 27 000 times, with 2 000 post clicks and circa 400 reactions – such as likes, shares and comments. In total, the campaign posts were viewed over 150 000 times and resulted in more than 1 500 app downloads. The videos also gained over 24 400 views on YouTube. Across a period of two weeks, the app itself was downloaded 7 235 times and was one of the most downloaded apps in the sports category in several countries.
In October 2016, Nammo invited Berger Bullets’ employees to a meeting at the company’s facility in Fullerton, California, to announce the acquisition and reassure them of the process. Berger Bullets’ immediate goal is to significantly improve the availability of its products while maintaining its commitment to upholding the highest level of industry quality.

Much of what has made Berger Bullets successful will remain unchanged. The main updates to the company as part of the Nammo Group will come from collaborations with its new family of premium brands within the commercial ammunition unit.

Founded in 1955 by Walt Berger, Berger Bullets has been making bullets for over 60 years. Walt started making rifle bullets because he believed that he could make them better than the market’s offering at the time.

This part-time hobby soon turned into a large-scale operation, gaining a reputation as the gold standard for rifle bullet manufacturing in the industry. Today, all of Berger Bullets’ target, varmint hunting and tactical shooting applications are made to Match Grade standards, which highlight a strong attention to detail throughout the supply chain.

By joining forces with Nammo, Berger Bullets is set to advance even further. The acquisition will also strengthen Nammo’s commercial ammunition footprint in the US, as it supports Berger Bullets in four key areas: production capability expansion, advanced engineering, innovative product development, and the opportunity to share ideas.

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Nammo's ethical code of conduct runs through the heart of the business, seeking to nurture a value-based company culture and high ethical standards in all employees and third parties. It is therefore important to have a business philosophy that every employee can uphold.

To achieve this, annual training on the ethical code of conduct (with a specific focus on anti-corruption and bribery) is carried out internally. Nammo's ambition is to make sure that all employees understand, and are in compliance with, the working standards set out by the company's management.

Nammo's strict anti-corruption key messages highlight the company's expectations, in line with the anti-corruption laws all Nammo employees are bound to:

- Nammo has a zero tolerance policy on corruption and bribery
- Openness and transparency are key to combating corruption
- Failure to comply with our zero tolerance policy will be considered a serious breach of the employee's obligations towards Nammo
- Employees are obligated to immediately notify their superiors if they become aware of any corrupt practices in the course of their work at Nammo

"I expect all our employees and anybody acting on behalf of Nammo to comply fully with our ethical code of conduct. I also emphasize that Nammo has a zero tolerance policy towards any form of corruption."

MORTEN BRANDTZÆG, PRESIDENT AND CEO
Nammo's vision: Securing the Future

• We will protect our national and allied forces with high-quality defense products
• We will secure the future development of eco-friendly products, processes and services
• We will secure our continued growth based on a strong financial performance
• We will develop and secure a long-term, sustainable business for our customers and employees
• Our future development depends on a secure and safe working environment

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