



Technical Insights for Defence OEMs

Why deep drawing is becoming increasingly relevant in the arms industry

A concise analysis of how deep drawing and digital platforms shorten development times and secure supply chains in the defense sector.



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Introduction

The defense industry faces particular challenges: short delivery times, rapid development cycles, and a growing number of specialized solutions demand new procurement strategies. Traditional processes such as injection molding or CNC machining are reaching their limits – especially for small and medium production runs or highly customized geometries.

This whitepaper explains

- ✓ How market trends and framework conditions in the defense industry influence manufacturing
- ✓ Why deep drawing is becoming increasingly relevant as a process in the defense industry
- ✓ What advantages deep drawing offers specifically in the defense context
- ✓ For which applications and fields of use the deep drawing process is particularly suitable
- ✓ How Formary addresses these requirements



The goal: To give you an overview of how deep drawing and platform solutions will establish themselves as a future-proof solution in a complex, safety-critical market environment.

Market and framework conditions

Massive upgrades & funding programs

- Massive rearmament and funding programs characterize the landscape. In March 2025, Germany passed a defense package of almost €500 billion for defense and infrastructure, including a special €100 billion fund since 2022 and further funding from 2027 onwards.
- European tenders are intended to cover 50% of procurement from EU sources in the medium term, with new joint armaments initiatives.

Technological change: Dual-use and digitalization

- Technological change is shaping the industry, for example through drones, electronic warfare, autonomous systems and encrypted communication. Startups like Quantum Systems (Munich) with drone technology are attracting investors.
- Trends such as “AI-driven tactical communications” and embedded IoT systems are playing an increasingly important role in tenders.



Stricter compliance

- At the same time, the demands on compliance and supply chain security are increasing, for example through cybersecurity requirements such as CMMC 2.0 and necessary security certificates.

Thermoforming advantages in defense applications

Deep drawing offers a number of specific advantages that are particularly relevant in the defense context:

Advantages	Significance in the defense context
Lightweight construction	Essential for drones, mobile units, modular systems
Small and medium production runs	This is common practice for special projects, prototypes, and custom solutions.
Fast delivery times	They are often necessary for rapid iteration and development.
Freedom of form & freedom of design	Relevant to ensure the accommodation of various electronic components and functional reliability.
Material variety	Particularly relevant are flame retardant, ESD-compatible, weather-resistant and impact-resistant properties.
Cost savings compared to CNC/injection molding	Especially for quantities < 5,000 units.

Deep-drawn housings are particularly relevant for defense-related applications, where:

- ✓ Technical function and speed count
- ✓ Special geometries are required
- ✓ Standard processes (e.g., injection molding) would be too slow, expensive, or inflexible.

Applications of deep-drawn housings in the defense industry

The versatility of the deep drawing process is evident in various defense applications:

Sensors & Enlightenment



Housings for cameras, LiDAR or infrared sensors – lightweight, weatherproof and electrically insulating.

Drones & UAV systems



Fuselage fairings, covers and payload carriers benefit from weight optimization, rapid iterations and small-batch production.

Communication systems



Radios and encryption modules require ESD protection, thermal management, and precise integration.

Vehicle interiors & cockpit

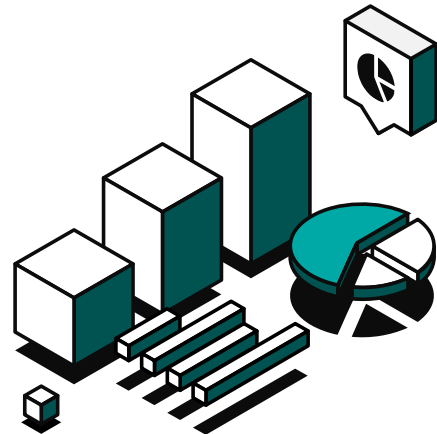


Control panels and covers can be designed ergonomically, are vibration-resistant and visually adaptable.

Prototypes & test setups



Development prototypes or functional enclosures benefit from faster and more cost-effective manufacturing in early phases.



You can find out which growth drivers and challenges are affecting the defense industry on the next page.



Developments in procurement

Factor	Impact on procurement
Increased defense budgets (through special funds and special programs)	More development projects need to be implemented faster → e.g., housings for devices, sensors, communication systems
Trends in Miniaturization & Mobility	Demand for lightweight, custom-designed enclosures for UAVs, portable systems, modular field devices
Transition to agile development & prototyping	Defense projects are approaching civilian cycles – deep drawing offers fast, cost-efficient implementation.
Focus on dual-use and civilian integration	Defense companies are looking for flexible enclosures suitable for both civilian and military purposes.
Technological progress in electronics & sensor technology	More and more components require functional and protective plastic housings.
Shorter response times in procurement	Quickly available solutions via platforms like formary are gaining in importance.
Local Supply Chains: Political Pressure on European Sovereignty	Local production, short supply chains → Advantage for digital platforms with a manufacturing network



Procurement is undergoing a transformation: New budgets, technological requirements, and the trend toward agile, dual-use development are creating a growing need for flexible, fast, and adaptable manufacturing solutions. Platforms that can meet this demand with short lead times, a wide range of materials, and digitized processes are ideally positioned to do so.

Challenges in product development

Challenge	Impact on product development
Increased demands for modularity	Developers must design housings in such a way that they can be seamlessly integrated into modular armament systems – including precise fits.
Increasing miniaturization	Components are becoming smaller and more densely packed – this increases the demands on detail accuracy, dimensional accuracy and tolerance control.
Faster development cycles due to political situation	Time-to-market is becoming increasingly critical – developers are under pressure to deliver a finished solution faster despite complex requirements.
Small production runs with a high degree of individualization	Developers need to find solutions that are flexible, cost-efficient, and yet compliant with specifications.
Sustainability requirements & material availability	Material selection is becoming more complex – developers must examine alternatives, consider recyclability, and factor in supply risks.
Changed procurement logic at OEMs	Developers need to think ahead about how a component can be easily sourced or flexibly manufactured – even with changing supply chains.
Increased safety and testing requirements	The design must be such that testing processes (e.g. leak tests, drop tests or EMC tests) can be carried out efficiently.



In 2025, product developers in the defense sector will face the challenge of simultaneously meeting complex requirements such as modularity, miniaturization, environmental resistance, and short development times. This requires a deep understanding of processes, interdisciplinary collaboration, and increasingly, digital tools like formary to develop manufacturable and procurement-optimized solutions early on.

The most important thermoforming plastics for defense applications

For defense equipment housings, plastics that offer high mechanical strength, heat resistance, flame retardancy, and optionally EMC and ESD protection are particularly relevant. This material selection is crucial for reliably meeting safety-critical requirements.

Here are the most important materials, sorted by relevance to our range of applications:

ABS / PC-Blend

- High impact resistance
- Good temperature resistance
- Dimensionally stable

→ **Application:** Device housings, electronic assemblies

HIPS (High Impact Polystyrol)

- Lightweight and impact-resistant
- Easily malleable
- Economical in processing
-

→ **Application:** Internal covers, prototypes

PMMA / ABS (e.g. Senosan)

- Very good surface quality
- Scratch-resistant
- UV-resistant

→ **Application:** Protective housing, screen protector

PEEK

- Extremely temperature and chemical resistant
- Flame-retardant
- High-priced, high-end material

→ **Application:** High-security housings, sensor-adjacent components

FR-ABS (flame retardant)

- Flame retardant according to UL94-V0
- Robust and dimensionally stable

→ **Application:** Interior paneling with fire protection requirements

PVC / ASA

- Chemical resistant
- UV-stable
- Well suited for outdoor use

→ **Application:** Outdoor covers, communication modules

PET-G

- Transparent and shatterproof
- Dimensionally stable
- Food safe

→ **Application:** Viewing windows, protective elements in laboratory environments

Conductive ABS (z. B. ABS-ESD)

- ESD-safe and conductive
- Specifically designed for electronics protection

→ **Application:** Enclosures with EMC/ESD requirements

Application areas where these plastics are crucial:



Für Engineering Buyers / Head of Developments

- Focus on blend materials (ABS/PC, PMMA/ABS)
- Ideal for functional production and pre-production enclosures



For UAV / Sensor Project Managers

- ESD or EMC plastics (e.g., Conductive ABS)



For security technology / field devices

- ASA/PVC or PMMA/ABS
- Robust, weather and UV resistant



For Strategic Buyers

- UL94-V0 materials and auditability (evidence, test certificates)



Learn more about thermoplastic materials in our white paper "Material Guide for Thermoformed Plastic Parts" → <https://www.formary.de/whitepaper-ebooks/materialleitfaden-fuer-kunststoff-tiefziehteile>

Advantages of plastic housings in the defense sector



Weight loss

Plastic is significantly lighter than aluminum or steel – essential for UAVs, portable systems or vehicle parts.

→ **Advantages:** Better transportability, lower energy consumption, higher payloads



Complex geometries & design freedom

Deep drawing enables complex shapes, indentations, clip connections, etc.

→ **Advantage:** Integration of functions, simplified assembly, more cost-efficient assemblies



Cost efficiency for small and medium production runs

Inexpensive tools compared to injection molding or CNC machining.

→ **Advantage:** Faster ROI for prototypes, small series or program-related small batches



Short lead times & agile development

Fast tool production (e.g. aluminum molds), short cycle times in deep drawing.

→ **Advantage:** Time-to-deployment is significantly reduced – crucial when program pressure is high



Material variety for special requirements

EMC/ESD-safe plastics, flame retardant (UL94-V0), UV resistance, chemical resistance.

→ **Advantage:** Flexibly configurable depending on the intended use



Economical & auditable

A combination of cost-effective production, a short supply chain, and a formary platform for process reliability.

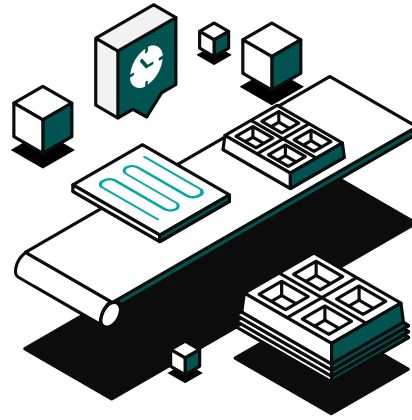
→ **Advantage:** Compliance with MIL specifications, documentation requirements, traceability



Resilient Supply Chain

Platform-based manufacturing via DACH partners with flexible capacities.

→ **Advantage:** Reduced risk of supply bottlenecks, rapid rerouting in case of failures.



Use of formary in product development and engineering

Formary delivers custom plastic enclosures faster and more precisely – through [CAD analysis](#), [design feedback](#), and [digital manufacturing](#). Ideal for development managers in safety-critical projects who don't want to wait 2-3 months for a part.

DfM tool for deep drawing

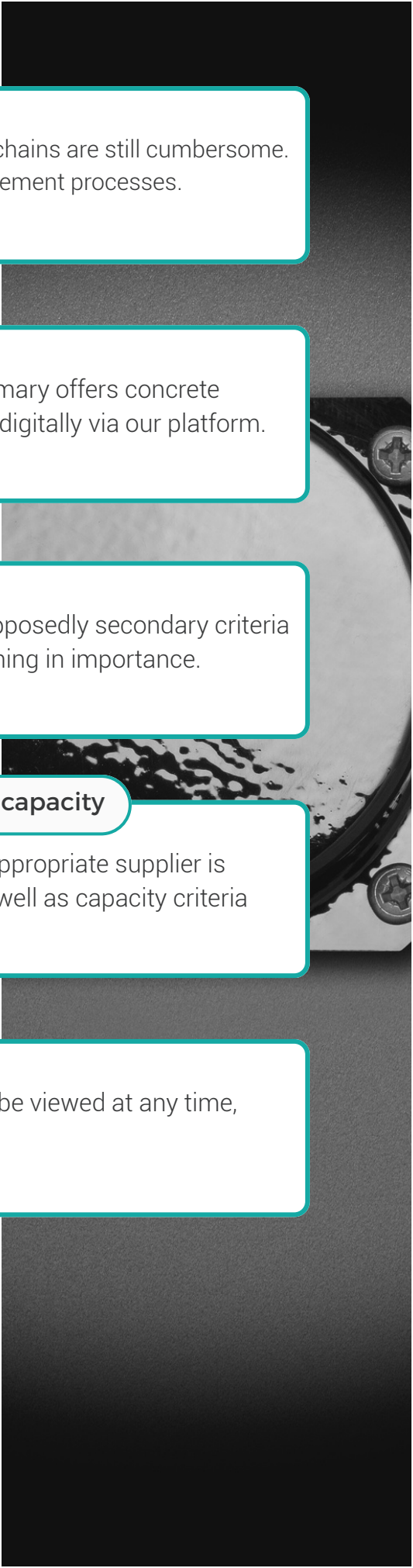
Developers in the defense industry need technically robust enclosures. Our [automated feasibility analysis](#) saves on expensive iterations and technical dead ends.

CAD-based configuration of enclosures

The rapid conversion of [3D data into manufacturable enclosures](#) is crucial for time-to-deployment. Digital platform solutions are far superior to conventional processes in this regard.

Production of small and medium series

Many military applications (e.g. test equipment, prototypes, small series for special operations) do not require mass production – the broad formary supplier network delivers speed and quality here.

The background of the slide is a grayscale image of a circuit board, showing various components and traces. The image is partially obscured by white text boxes with teal borders.

Digital, end-to-end processing

The defense industry is becoming more agile, but many supply chains are still cumbersome. The formary approach is a real advantage in time-critical procurement processes.

Technical consulting & customization

Development departments expect engineering support – formary offers concrete support for optimizing enclosure design, both hands-on and digitally via our platform.

Cost advantages through supplier matching

Price remains a crucial factor in the defense industry, but supposedly secondary criteria such as reliability, quality, and technical performance are gaining in importance.

Automatic supplier selection with always available capacity

The AI-supported formary matching of each request to the appropriate supplier is based on manufacturing-relevant and qualitative criteria, as well as capacity criteria when speed is essential.

Digital customer portal for order tracking

In our customer portal, the tracking of all order statuses can be viewed at any time, ensuring full project transparency at all times.

Why act? Why now? Why formary?

Recurring challenges - and the Formary solutions for them.

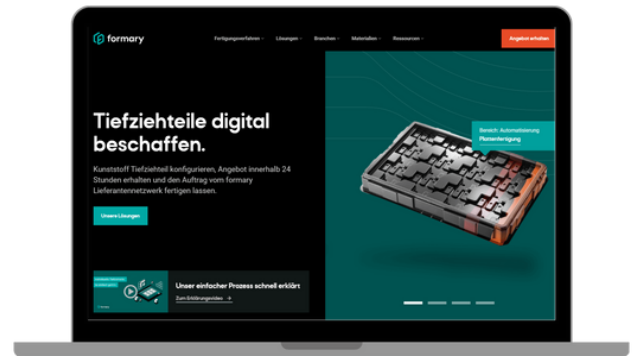
1. Slow processes

Many contract manufacturers are too slow with prototypes and small series, while at the same time new projects – for example in the areas of UAVs, sensors or communication devices – are already starting under high time pressure.



The solution:

Digital platform specifically for technical housing components with an engineering focus.



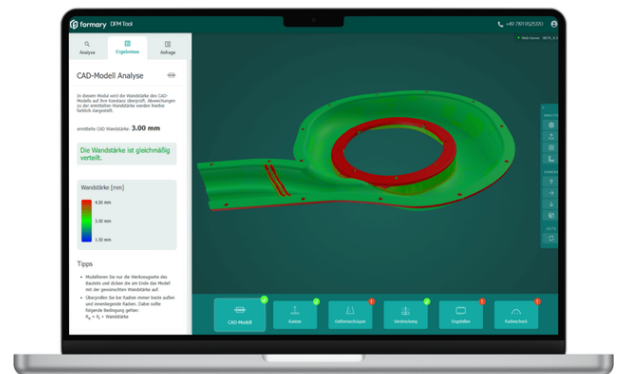
2. Complex procedures

Injection molding is often too expensive, time-consuming and complex in early phases – especially when series production launches or field tests are imminent.



The solution:

formary DfM analysis: direct deep drawing check of your query data including optimization suggestions.



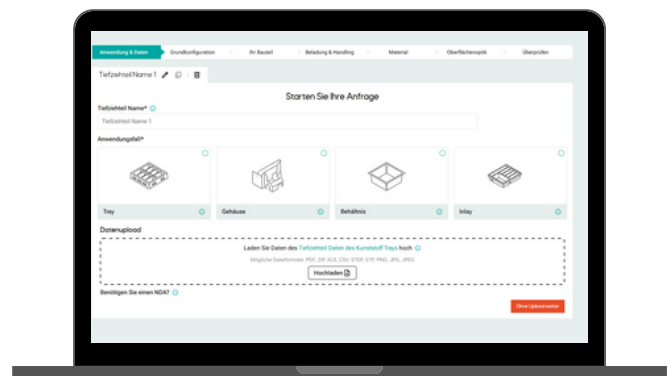
3. Lack of transparency

Lack of information on the status of offers, sample and series deliveries for critical projects.



The solution:

CAD-based inquiry process and tracking of delivery from A to Z.



4. High internal costs

High internal costs for feasibility analyses, design and procurement in already overburdened engineering teams.



The solution:

Network of specialized deep-drawing machines – formary always has free capacity.



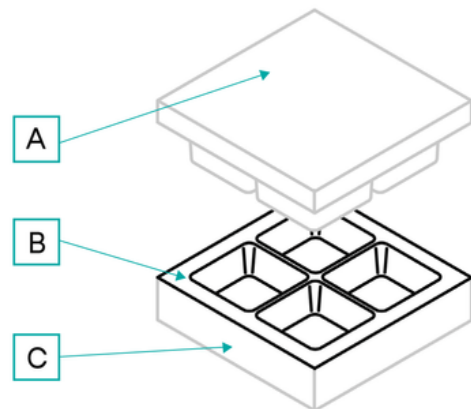
5. Untapped potential

The technical potential of modern manufacturing remains untapped, even though the industry is becoming more open to platforms and digitalization.



The solution:

Speed: Prototypes and small production runs in record time.



Furthermore, formary offers two crucial advantages that make all the difference in technical projects:

Technical understanding

We speak engineering – not sales language.

- Expert advice on equal terms.

- Scalability

- By connecting to qualified deep-drawing partners, formary enables the rapid scaling up of procurement volumes – for example, for series launches or short-term needs in safety-critical projects.

Typical objections – our answers

objection

“

We only work with established suppliers.

”

“

Our geometries are too complex for deep drawing.

”

“

We need metallic materials, not plastic.

”

“

We have too little internal capacity for new projects.

”

formal answer

“

Many companies use us as a supplement when speed or geometry is an issue.

”

“

That's exactly why we have our DfM analysis tool – it shows directly whether it works and how we can optimize for deep drawing.

”

“

We offer materials with high durability, ESD protection, and flame resistance – ideal for many modules.

”

“

That's exactly what we're here for: We relieve the burden on your design with manufacturing-ready input and digital process control.

”

“

Our purchasing guidelines are very strict.

”

“

We work with strategic partners from the DACH region and provide standardized documentation for compliance & ITAR.

”

What you gain with formary

Development cycles are getting shorter, geometries and interfaces are becoming increasingly customized, while traditional manufacturers often react too slowly or inflexibly. Formary offers clear advantages here and makes the difference measurable:

Key figure	They will formary	What is formary?
Time-to-Prototype	6–8 weeks	2–3 weeks
Effort required for inquiry process	4–5 voting rounds	1 digital upload + feedback
Iterations until series release	3–4 cycles	1–2 cycles (using DFM tool)
Cost for Prototype	High (custom production)	Reduced through matching and automation

With formary, you gain access to a partner network of over **100** manufacturers. This supplier network offers you access to **unlimited production capacities** and all processes and post-processing in deep drawing.

The Formary algorithm matches your product with the most suitable supplier. You'll receive your offer the same day. You have a **100% guarantee** on:



Full-service support
from A to Z



Competitive prices
through cost-efficient
processes



100% certified
manufacturing facilities



Largest deep-drawing
machinery park in the world



Expertise in
development and
series production



Always available
production capacity for
delivery time and quantity

Our solution to the problems in the plastic parts market



Average manufacturer

Full capacity, no dependence on individual
providers



Capacities



Has only 5-10 machines in its production
available

All manufacturing processes and product areas
through partner network



Manufacturing expertise



Can only be used in certain product areas
cover

Access to materials, additives,
recyclates, prototypes & large volumes



Material options



No relevant material stock or
diversified procurement options

Matching algorithm for optimal
combination of price, quality, cost, and
delivery time



Cost transparency



Significant differences in
calculations

Offer within 24 hours including consultation, 3D
services, DfM analysis, express service



Fast processes



Long offer and concept phases



This means that with the formary platform you will receive the following time advantages, cost advantages and flexibility for your product:



Reduce project times

Reduction of the time between inquiry and quotation, between order placement and samples, between samples and series production up to →

70%

Digital processes

24-hour offer

Free capacity



Reduce project costs

Fewer administrative tasks such as comparing offers, following up on delivery dates and receipts, obtaining documents, delayed time-to-market, etc., up to →

30%

Project management

Transparency

DfM-Analyse



Expand the scope of solutions for your projects

Increased chances of successful project implementation, regardless of small quantities, special materials, special colors, tight delivery deadlines, or complex geometries, up to →

95%

Largest fleet of machinery

Express delivery

Material availability

References

Many customers from industry, automotive, mechanical engineering, medicine, robotics and defense are already successfully digitizing their procurement.



Mercedes-Benz



ZOLLER

smiths detection



“

Besides the straightforward inquiry process, the project management was particularly pleasant in our collaboration with formary. I always knew exactly where the project stood in the timeline. Agreements were always honored.

”

Ralf Grammelspacher

zimmerlin
EDELSTAHL-TECHNIK

It's that easy - Your project with formary



Inquire online

Configure and request a quote for a deep-drawn part online in 60 seconds. You will receive immediate access to your customer portal.



Instant offer

You will receive a quote for your custom part on the same day. formary will advise you on all aspects of materials and feasibility.



Development & Implementation

Formary selects the ideal manufacturer for your project and handles the entire development and order processing.



Approvals

For each approval step, you will receive the design data (PDF drawing and CAD file) from formary, as well as the sampled parts for series production approval.



deep-drawn parts are obtained

The manufacturer produces your series order and you receive your quality-tested parts - you don't have to worry about anything.



Performance discussion & optimization

Together we analyze the project and identify further potential.



[Procure deep-drawn parts digitally.]

Contact us if you
have any questions



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