Drones, 3D Printing, and Operational Freedom: The Army Must Trust Its Soldiers

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In an era where operational advantage is measured in weeks (sometimes days), innovation cannot remain confined to large industrial programs or multi-year procurement cycles. Standards are needed — for safety, interoperability, traceability — but an opposite and complementary principle is also needed: **the controlled freedom to experiment from the ground up, where problems arise and where solutions are often quicker, cheaper, and more aligned with field realities.**

A recent case from the **U.S. Marine Corps** clearly illustrates how “standards” and “creativity” can coexist: the FPV drone **HANX**, designed and developed by a maintenance sergeant, **Henry David Volpe**, using 3D printed components and an internal prototyping process in the lab. The decisive point is not just technical. It is cultural and organizational: innovation was **enabled** (spaces, tools, communities of practice) and then **standardized** (approval and compliance)

without stifling it.

The Message of HANX: “Marines for Marines,” but with Clear Rules

HANX was born in a context where the United States is tightening requirements on drones and components for reasons of **national security** and “supply chain trust.” The logic of compliance (here referred to by the theme **NDAA-compliant**) serves to reduce risks of vulnerabilities, foreign dependencies, and unverified components.

Yet, within that perimeter, the Marines made a counterintuitive choice for many bureaucracies: instead of blocking everything out of fear of risk, they created a path that allows for the **rapid construction and modification** of an economical and modular system, designed for different missions (reconnaissance, logistics node, load adaptations) and upgradable without entirely depending on contractors.

The result is a transferable lesson: the creativity of personnel is not “anarchy” if the organization defines **minimum standards** and a **rapid validation process**.

The Italian Risk: Standards as an End, Not a Means

In many European military organizations, the term “standard” ends up being interpreted as synonymous with “immutable” or “non-modifiable.” The paradox is that security is protected (rightly) but agility is lost: “closed” systems are purchased, difficult to repair in the field, impossible to adapt to new threats, and often slower to update than the scenario evolves.

The phrase attributed to Volpe is enlightening: **drones purchased through contractors often cannot be modified; an internal design, on the other hand, is born to be changed**. It is the difference between “product” and “capability.”

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A Proposal: “Open Standards” and Disciplined Creativity

If the Italian Army wants to harness the inventiveness of its personnel (and there is), it must not abandon standards: it must **redesign them** with a precise goal — to enable adaptation and speed. Some practical principles:

1) Mandatory Minimum Standards, Not Stifling Specifications

Define a non-negotiable *baseline*:

- cyber and supply chain security (component traceability, approved suppliers, firmware/telemetry management);
- interoperability (frequencies, protocols, C2 integration where needed);
- safety (batteries, procedures, training, risk management).

Everything above the baseline (payload, shells, supports, accessories, ergonomic improvements, printed parts) must remain **modifiable** with clear rules.

2) Rapid “Operational Approval” Paths

HANX went from lab to deployment thanks to an approval path and collaboration between competent teams and commands.
In Italy, an equivalent is needed: ***fast track* for unit prototypes, with standardized tests, transparent criteria, and certain timelines**. Not to “skip the rules,” but to prevent the rule

from becoming endless waiting.

3) Permanent Laboratories and “Innovation Campuses” Connected to Units

The value is not the 3D printer: it is the ecosystem. At Camp Lejeune, the Innovation Campus offered a place where skills and problems meet, and where individual initiative becomes a collective project.
For the Army, this means territorial nodes (even small) with:

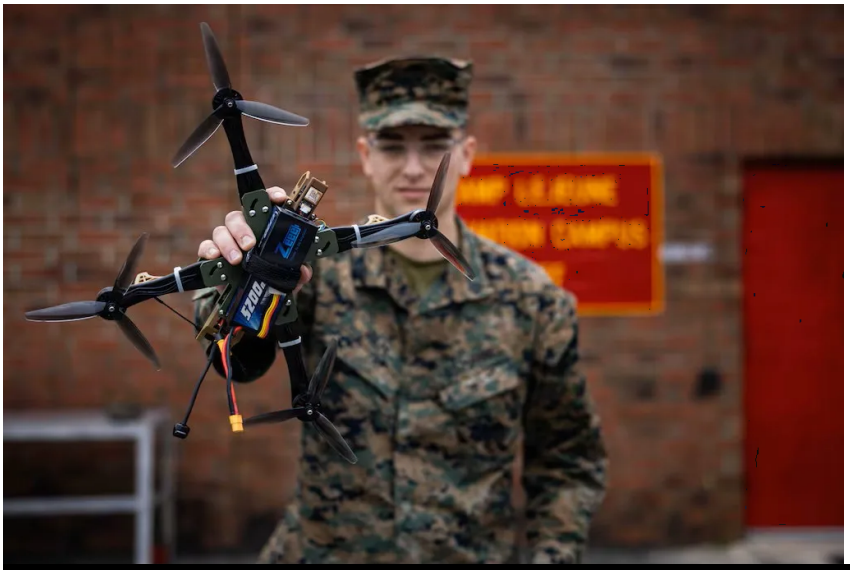
- tools (3D printing, electronics, RF testing, simulation);
- technical and legal-administrative tutors;
- a catalog of reusable projects (internal design repository).

4) Internal “Design Authority” and Controlled Repository

To prevent creativity from turning into fragmentation, a technical hub is needed that:

- validates modifications;
- versions projects;
- publishes “kits” and manuals;
- collects lessons learned from the operational theater.

It is the equivalent of a military *open innovation*, but with quality and security control.



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5) Incentives: Reward Those Who Solve Problems, Not Just Those Who Follow Procedures

HANX required hundreds of hours and widespread collaboration; without recognition, similar initiatives fade.

The Army should treat certain projects as “operational results”: with career paths, certifications, dedicated time, and the possibility of transferring the solution to other units.

Conclusion: Creativity is a Strategic Resource (If You Standardize It)

The point is not to “do like the Americans,” but to learn the essential: **standards must protect security and interoperability, not prevent adaptation**. The HANX case shows that an economical and rapid system can be built, compliant with security constraints, without giving up the soldiers' ability to invent, iterate, improve.

For Italy, the choice is between a model where innovation “arrives” (late, closed, expensive) and one where innovation “is born” even in the units — and then made reliable, scalable, secure. Standards, yes. But standards that allow the operational intelligence of those who, in the field, see first what doesn't work and how to fix it to breathe.

News link: https://www.militarytimes.com/news/your-military/2026/02/06/us-marine-designs-corps-first-ndaa-compliant-3d-printed-drone