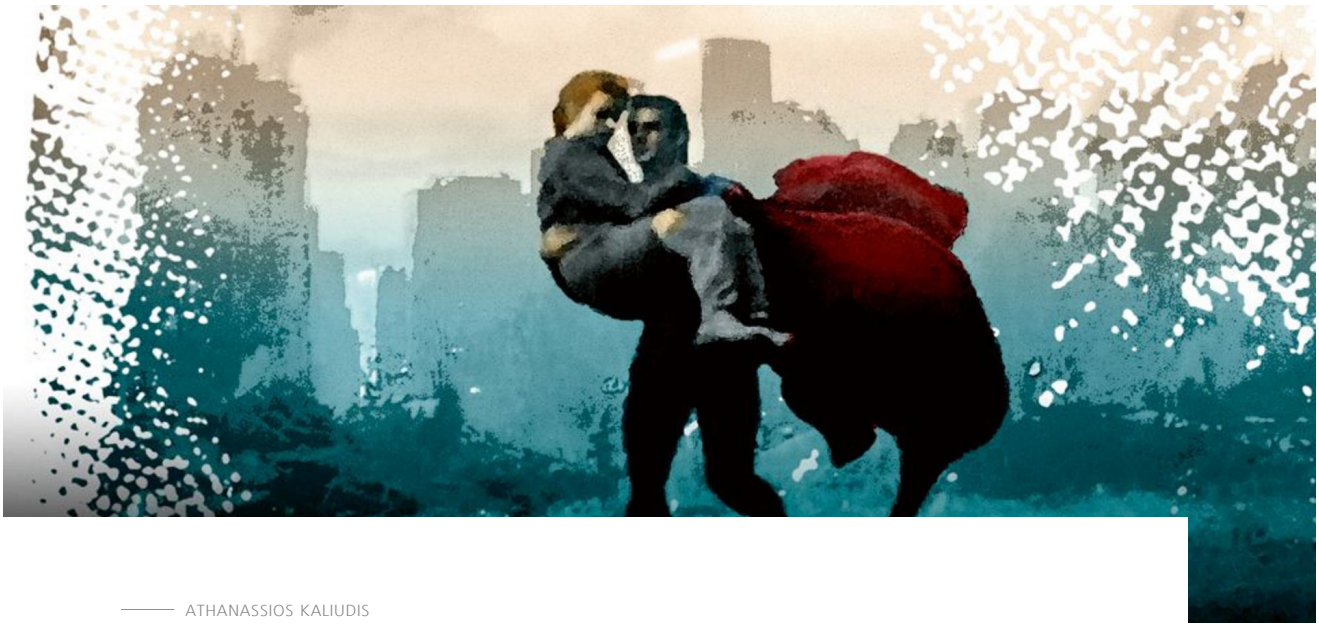

ATHANASSIOS KALIUDIS

Pop-Column: Laser meets Superman

Super sensitive: How superman's super-senses allowed engineers' imaginations to take flight — and why Lois Lane can handle more than any laser processing head.

Picture this iconic scene: Investigative reporter Lois Lane has once again taken too big a risk and fallen out of an airplane / spaceship / helicopter / skyscraper. The situation seems hopeless, and her fate is surely sealed. Lessons on Newton at school taught us that this kind of fall means hitting the ground at about 200 kilometers an hour, meaning certain death, at least for a normal person. But Lane is not normal – she is Superman's true love. And, fortunately, Superman can not only fly, but is also equipped with Kryptonian super-senses! He can hear Lane scream from a hundred miles away, locate her position, and see her falling, even through walls. At the same time, his superhuman brain processes all the data perfectly despite everything unfolding at such extraordinary speed. The result is a heady mix of romance and sci-fi: Superman catches her in the air, carefully equalizing their relative speeds to ensure she doesn't come to a nasty end when she collides with his super-strong arms. **The machine which knows it all** That's the kind of sensor technology that inhabits many engineers' wildest dreams, especially those who are currently investing so much effort in adding a healthy dose of superpowers to the realm of material processing. One thing they need is a tool that is super-flexible and capable of adjusting itself in a matter of microseconds. You've guessed it: the laser! And the second thing is a sensor system that allows machines to "see" and "feel" at breathtaking speed. These sensors can detect the position of the workpiece and the energy delivered by the laser as well as the pulse duration, light path and job progress – and they can even predict when a component might fail. At the same time, they can react faster than Lois can say "Clark." That yields processes featuring ultra-efficient loops with high tolerances at the preparation stage and absolute precision at the machining stage. **Can you bear it?** Obviously you still need hardware that can handle all this without collapsing – taking in its stride, for example, a laser processing head accelerating or braking at 9G. Of course, that wouldn't be a problem for Lois Lane. She can brake at 100G without coming to any harm, just before Superman gently brings her back to Earth – and we celebrate yet another happy ending.

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