



INSTITUTE FOR TRADE AND TRANSPORTATION STUDIES

PROMOTING REGIONAL AWARENESS FOR IMPROVING FREIGHT TRANSPORTATION

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NEWS UPDATE

🌐 **Training for ITTS Member States:** Over the past few weeks, ITTS conducted training for its member states on the data integration work and the Freight Economic Analytical Toolkit (FEAT). These videos were created from the online training sessions, so please forgive the casual discussions. The videos are posted on the ITTS YouTube channel.

🌐 **Smart Rivers:** ITTS is organizing an afternoon meeting on economic development and its relationship to Domestic Navigation in conjunction with the Smart Rivers Conference.

The meeting, which will be held Thursday afternoon on September 21, will be open to anyone interested in discussing the role of domestic navigation (which includes not only inland waterways, but also domestic coastal ports, such as the Gulf Intracoastal Waterways and the Atlantic Intracoastal Waterways) to economic development.

Please reach out to me if you are interested in attending either in person or via conference call.

ITTS has created a YouTube channel to better share training materials. Please go to the ITTS Research website for the link to these videos.

New Working Paper: 3D Printing

ITTS commissioned a paper on 3D Printing from Bill Ankner and Robert L. James entitled "Industry Significance of 3D Printing to Transportation Logistics, Traffic Activities, Planning and Asset Management". The paper is intended to serve as a starting point in the discussion concerning how 3D printing could shape everything from supply chains to the work of state departments of transportation.

3D has the disruptive capability to replace important segments of mass production and much of the supply chain that supports it. 3D occurs on demand -- collapsing the supply chain to its simplest parts, adding new efficiencies to the system. With the capability of printing on demand, there will no longer be a need for 3D susceptible finished goods to be stacked and shelved in warehouses.

These efficiencies run the gamut from the cost of distribution to assembly, inventory and carry all the way down to the product itself. As the process goes forward, scrap is reduced, customization is maximized and assembly cycle times are improved. As a result, the global supply chain is torn apart and reassembled as a new local system.

Industries that use 3D printers include engineering, architecture, medical, industrial design, construction and many others – most notably effecting aerospace, automotive, healthcare, and jewelry manufacturing. A 2016 survey by PricewaterhouseCoopers (PwC) indicates that 3D awareness and use are on the rise.

- Over 70% of manufacturers currently have adopted 3D printing primarily for prototyping and final products meeting unique customer requirements.
- 52% of manufacturers expect 3D printing will be used for high volume production in the next 3 to 5 years.
- Global spending on printers was predicted to reach \$11 billion in 2015 and forecast to reach about \$27 billion by 2019.

- 22% of manufacturers predict 3D printing will have a disruptive effect on supply chains.

However, 3D printing is at the "end of the beginning" of its development as users anticipate printer costs to go down, a wider variety of printable materials to become available and make production faster. Manufacturers are still on a learning curve regarding how Additive Manufacturing (AM) can be integrated with existing manufacturing processes and logistics practices. They need to address intellectual property concerns and to train a 3D savvy workforce.

The purpose of this paper is to provide an overview and perspective regarding the significance of 3D printing to the transportation planning, operations, construction and asset management activities of surface transportation agencies. This white paper is specifically addressed to State Departments of Transportation, and other stakeholders impacted by 3D printing's potential to have a highly disruptive and explosive effect on manufacturing, logistics, supply chain and infrastructure management, finance and development.

In addressing the essential question: Why should Departments of Transportation begin to account for the use and impacts of 3D printing in their business and thinking processes? It describes present and developing 3D processes, uses, noting that:

- 3D printing or additive manufacturing is reaching a tipping point where its impact is being felt strongly in several manufacturing sectors and broadly growing in others. Increasingly, it will influence how and where goods are produced and delivered, allowing for increased final production close to points of consumption.
- Ultimately, 3D printing may foster increases in localized manufacturing, customization and consumption, making changes in supply chains and the demand for infrastructure

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The Institute for Trade and Transportation Studies provides research data and expert opinions to its members concerning the effects of commercial freight movements on domestic and international activities, with reference to infrastructure and transportation needs, and safety implications.

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▶ LAMBERT'S LAGNIAPPE

*la-gniappe |lan'yap|:
something given as a bonus or extra gift.*

According to George Gershwin, it's "summertime and the livin' is easy" - but doesn't it seem like this summer has been more wet than dry? There's nothing easy about that.

August plunges us back into routine and forces a return to "normalcy" with the return to school, schedules and buses. There is already preparation for fall activities or talk of how great football teams will be this year. From a transportation perspective, August sees the mad rush of imported cargo for the upcoming Christmas and Holiday shopping seasons. The exceptional distraction this August is the solar eclipse.

Historically, the eclipse was an act of the gods (one could read Isaac Asimov's short story "Nightfall" for an interesting comparison). But how will people respond

to the eclipse? Will they stop their cars to take pictures or simply park illegally on the side of the road? Will people simply gather with others to see the eclipse, sharing glasses and jokes? Will someone sing "A Total Eclipse of the Heart"? The only certainty is that for a brief few minutes, we will all be simply people staring up into the sky. And that is a beautiful thought. (Be careful with your eye wear!)

While the eclipse will not bring our society into collapse, once it passes, the world will return to its normal rhythm of making, selling, and consuming. Transportation will continue to make so much of what we do today "easy", as is often forgotten when we plan our Labor Day weekend or scurry to buy yet more school supplies.

Enjoy this unique eclipse and the return to all that is conventional this Fall season. ■

New Working Paper: 3D Printing

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that supports the new manufacturing and consumption model. Consequently, long-range transportation planning will be affected by the changes wrought by 3D printing, challenging and changing current capital investment and financial assumptions and decision-making models.

- 3D printing technology offer DOTs the opportunity for productivity and cost-saving advances in such areas as: replicating and re-engineering aging infrastructure components and mechanical parts; creating digital files that allow considerable reductions in parts inventories; developing prototypes of advanced materials, pre-testing their installation capacities, and fabricating physical scale models of prospective bridges, highway and facility projects and the topography of where they will be applied.

- USDOT may be cognizant on AM materials and manufacturing benefits. However, if the GAO 3D Status Report is any indication, 3D implications for surface transportation are not publicly being discussed. The time to begin those discussions is now.

Takeaways: The timing of a widespread mass production of 3D impacts is uncertain

but accelerating. The application of the technology to industrial parts—using metals as well as polymers — has shifted 3D printing from the theoretical into the practical in high-tech fields like aerospace and automotive production. The potential cost savings across the entire supply chain – in the range of 50%-90%, especially for slow moving and customized products -- are too great to be ignored. Many experts see these changes having major mass production systems-wide and distribution-wide effects within the next 5 to 10 years. AM technology can create an increasingly diversified array of products, eliminate key segments of the supply chain, cluster production and delivery at the consumer's doorstep. It is part of a digitization of data and processes that have fueled e-commerce, advanced robotics and helped direct the internet of things. Like the above, its disruptive and explosive elements need to be articulated and applied in transportation and infrastructure planning and operations. State transportation departments, too, should identify 3D processes, products, and parts usages that can be employed to improve operations, as well as infrastructure maintenance and delivery. ■