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## TELECOM, AUTOMOTIVE MARKETS FUEL GaAs DEMAND


***Ready to go.*** *TLC's transmit/receive module could help reduce the size and lower the power consumed by cell phones, collision avoidance radar in cars, and microwave radio links.*

With the trend toward high-bandwidth communications in more compact, portable electronics, compound semiconductors like gallium arsenide (GaAs) have steadily been gaining ground on traditional silicon components. In contrast to silicon, GaAs offers faster operating speeds, consumes less power, and has light-emitting and detecting properties needed for optoelectronic devices. According to *Compound Semiconductor* magazine, the market for GaAs devices was over $2 billion in 1999, and some estimates show that figure growing to the tens of billions by 2003, even with the current economic downturn. To realize this level of growth, however, GaAs houses will need to better compete with the high level of device integration on a chip provided by silicon.

With advanced molecular beam epitaxy (MBE) growth processes and the use of 6-inch GaAs wafers, TLC Precision Wafers, Inc. (Minneapolis, MN), is a small company ready to meet these demands. In BMDO-funded research, the company is developing a GaAs-based integrated transmit/receive (T/R) module that will reduce the size and lower the cost of the ground-based, phased-array radar imaging systems used to detect and track missile attacks. This T/R module technology could also help reduce the size and lower the power consumed by cell phones, collision avoidance radar in cars, and microwave radio links.

In another BMDO-funded project, TLC developed technology to protect satellite communications electronics from radiation-induced, single-event upsets (SEUs). (GaAs, although more radiation-hard than silicon, is still susceptible to SEU spikes in radiation exposure.) The simplifications in circuit design resulting from this technology should reduce the cost of satellite telecommunications systems.

This research will complement an extensive array of products that TLC has developed with the help of other government and commercially funded R&D contracts. For instance, the company's "O" chip combines an oscillator (the circuit that transmits electromagnetic signals) that operates from 2 to 80 GHz with an output buffer amplifier. This chip replaces circuits in radar or communications systems that cost 4-times more and are 1,000-times bigger. In addition, TLC offers ultra-high-power amplifiers, phase modulators, millimeter wave switches, and other devices for the telecommunications and automotive markets. "Right now," says TLC president Tim Childs, "we've got a backlog of orders that will keep us busy for the next two years at our current production levels."

To help meet this backlog, along with the anticipated growth in market demand, TLC is now scaling up its production equipment to make the transition from an R&D house to a manufacturing firm. In the capital-intensive microelectronics industry, this will take a lot of money—probably in the seven figures. But, with realistic sales projections in the eight figures by 2007, this money shouldn't be hard to come by, even with today's investment climate.

*—T. Lynch*

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