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[www.nccar.us](http://www.nccar.us)

## NCCAR - The independent test place...

Welcome to the second edition of the NCCAR CarTech newsletter. We have great news - NCCAR is open for industry previews and evaluations - see the article below.

"Cash for Clunkers" has come and gone; the federal government has awarded \$2.4 billion for battery electric developments and maybe we are on the rise from the recession. What an interesting time it has been.

Here at NCCAR, we are on path to open our facility in December this year. The road course surface has been constructed perfectly - our tolerance of 1/8th of an inch over 10

feet has been achieved. The result is that it feels great and drives very well.

Several joint projects are currently underway. These include the NSF funded "driver assist" program; driverless vehicle development; a lithium battery research project; DoE/NETL funded advanced IT infrastructure implementa-

tion and a potential advanced chassis dynamometer with Recovery Act funding. Details will follow.

As always, thank you for your consideration, interest and support.

Simon Cobb,  
Chief Operating  
Officer.



Aerial view of NCCAR Phase 1A Completion

## NCCAR NOW OPEN FOR INDUSTRY PREVIEWS & MORE...

The two mile road course and small VDA are in place, the operations building is almost completed and the final landscaping is to start soon. The IT infrastructure will

be very elegant! Multi-channel, site-wide encrypted Wi-Fi, wireless phones, video safety surveillance and hard-wired ISP access points around the facility.

We have an interesting range of events and activities planned for the formal NCCAR launch. In the meantime, come and have a look around the NCCAR



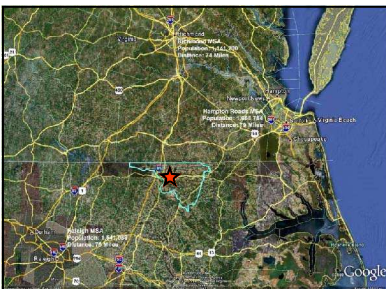
facility!

For more information or a closer look please contact us.

[NCCAR - Corporate:](#)



**So where is NCCAR located?**



NCCAR Location shown by the red star above

NCCAR is located on Interstate I95 just south of the Virginia state line in north-eastern North Carolina. The area is known as the coastal plain and is a fertile rural agricultural region with long established manufacturers and east coast tourism.

Three international airports are within two hours drive - Raleigh/Durham, NC and Richmond & Norfolk, VA plus Halifax/Northampton regional airport is just 9 miles from NCCAR.

Two full service international ports are close and interstate accessible - Wilmington, NC and Norfolk, VA.

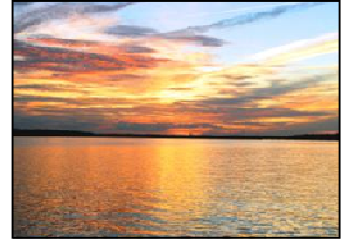
Three miles south of NCCAR on Interstate I95 is the city of Roanoke Rapids with a vast array of hotel accommodation (from motels to luxury suites) and restaurants. It also has quite a range of hardware stores

and automotive suppliers for those essentials and spares.

The surrounding area is home to fabulous, low traffic density public roads providing a broad range of features for vehicle validation. And when the test work is completed...the region also has many areas of outstanding



natural beauty from the local Lake Gaston (above) to the inland Albemarle Sound and the world renowned Outer Banks on the Atlantic coast (home of Kill Devils Hills where the Wright Brothers achieved true flight in 1903).



And then there's golf - eight courses in the immediate area.



To read more about North Carolina's Northeast region please turn to page four, or visit the web site as detailed below:

<http://www.visitncne.com/>



**“NCCAR has the best new road course on the East Coast”**

**How did the road course & VDA construction turn out?**

We are delighted to report that NCCAR has one of the finest road courses and vehicle dynamics areas around.

We have carefully evaluated our surface construction tolerance of 1/8 inch over 10 feet. The good news is that we have achieved it and by some measure. The skilled management and employees of Rose Brothers of Bethel, NC have produced a remarkable surface. The use of laser controlled “laying machines” and sourcing the hot asphalt

mix from just 3 miles away combined to ease the task.

Heated joints between the paths were used to ensure a hot fused joint with no voids within the pavement.

The pace of construction was remarkable. The 3½ inch coarse stone base layer was started on Friday July 24 and finished six days later. Next, 1½ inches of fine top layer took a further four days completing on August 7. In total 14,057 tons were delivered and laid.

Shoulders are in place and final grading and seeding has been completed.

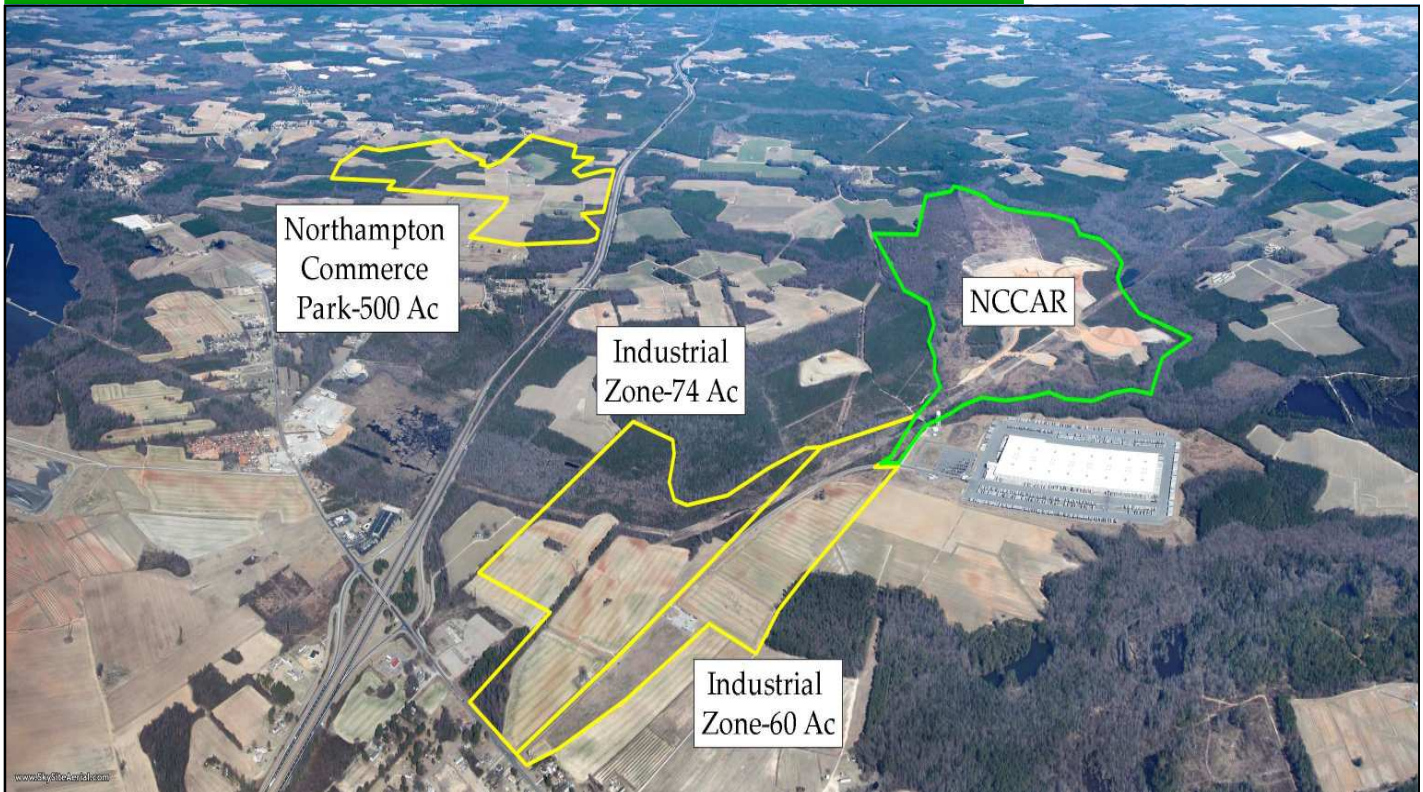
Next steps are skilled evaluation by selected experts in appropriate vehicles, definition of white lining and specific zones of rumble strips on key corners. The road course and VDA are available for preview and evaluation by industry users and clients—please contact Simon Cobb to make an appointment:

+ (1) 252-678-2174,  
simon.cobb@nccar.us



The proud and skilled workers of Rose Brothers

**Commercial location zones adjacent to NCCAR...**



**“There isn’t a better place to locate”**

**Architecture of the NCCAR campus...**

Tim Kurmaskie of AKTAL, Raleigh, is leading the design and construction management of the first buildings at NCCAR.

Considerable thought and review has gone into defining the style and themes of our buildings, in addition to the essential form and function aspects.

Distinctive design is immediately apparent on entry to the NCCAR campus where the security kiosk is based on a smooth “dynamic” double aerofoil section with novel lighting and ease of ingress/ egress for clients.

As visitors move further into the campus, the Engi-

neering and Operations building presents a dramatic first impression. The double story masonry, metal and glass frontage framed by peripheral wing walls clearly define the building. A large curved wall leads visitors to the central entrance point; the wing walls representing the datum or transition between public access and private secure activities.

Both buildings have carefully selected brick colors with matching mortars complemented by bright trimlines that gives a “pin stripe” effect to the flanks of the structure. Higher level trim

lines connect the lines of the windows and sun shields.

NCCAR may be new, but our buildings have an underlying principle of permanence and symmetry intermixed with detail asymmetries.

Internally, the buildings are carefully specified to provide ease of use for clients and staff, while maintaining high levels of comfort and confidentiality.

Particular thanks go to Dave Tait, Chairman of the Hethel Engineering Centre in the UK (a high-tech incubator), for his advice on best design practices.



North Carolina's northeast region...

NCCAR is located in North Carolina's Northeast (NE) Economic Development Region, one of seven such regions in the state. North Carolina's Northeast Region is the home of important economic developments that will change the economic landscape in years to come. Primary areas of focus are plant-biotech, aerospace automotive, marine and tourism.

On bio-tech, North Carolina has a fine reputation, especially in the Research Triangle Park (RTP). The eastern part of the state provides the fertile productive region ideally suited to growing the newly developed feed stocks and crops. Through support of state-wide organizations, funding has been obtained for a Preliminary Design and Location Analysis of a Pilot Scale Extraction Facility.

Funds from the NC Biotechnology Center and the NC Tobacco Trust Fund covered the cost of the architectural and engineering study that provided an objective analysis of the best location for the extraction facility. This facility will attract companies that are ready to test botanical extractions at the pilot-scale level before moving into commercial production.

North Carolina's northeast is home to fertile blackland farms that grow high yield grains as well as the more sandy soils needed for peanuts and tobacco. By attracting companies based in value-added crops and functional foods to the pilot extraction facility, regional wealth increases for all stages of agriculture.

Further funding was received from the Golden LEAF Foundation to establish standards for growing and producing biotechnology crops. This project is to begin next fiscal year in cooperation with the NC State University Vernon G. James Research and Extension Center in Plymouth and will further establish NC's Northeast as the center for agricultural biotechnology.

Aerospace continues to build a presence in North Carolina's Northeast as the Aviation Science program at Elizabeth City State University grows and begins to graduate students. DRS Technical Services, Inc., whose main business is to service helicopters for the US Coast Guard, expanded their business in Elizabeth City and announced plans to add 100 jobs during the next two years. Also, the arrival of Spirit Aerospace in Kinston and Honda Jet headquartered in Greensboro, NC

will have a significant ripple effects to the aerospace supply industry across the region and state

The region's marine trades have struggled through the year as nationwide boat purchases slowed. This is a well established and historically strong industry with well trained employees, and so they are poised to make a strong comeback once purchases strengthen again.

On the tourism front, this year, the NE has established a regional 'Hub and Spoke' group tour marketing initiative, supported by a grant from the NC Rural Economic Development Center. These funds provided marketing materials and Familiarization (FAM) Tours throughout the region with group tour operators. The FAM tours and a continued presence at group tour marketing conferences are bringing more widespread knowledge of the tourism assets and availability within North Carolina's northeast.

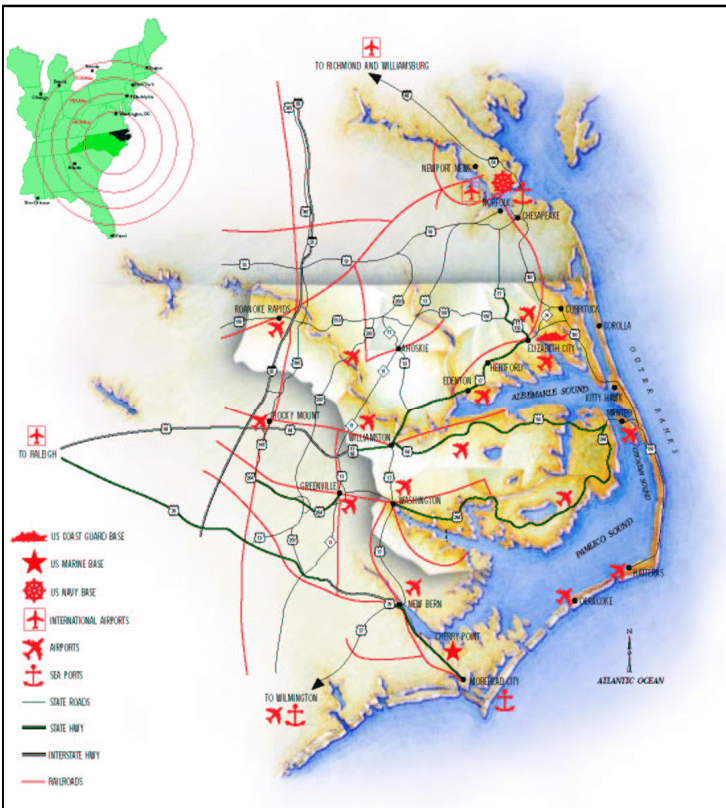
This region has many small towns that are gems to be found by the traveler willing to leave the interstate highways. By marketing 'Hub and Spoke' Tourism, travelers and bus tours are encouraged to stay in the larger towns and take day trips into the smaller towns to experience colonial history, Civil War history and unspoiled nature.

NC's Northeast Commission will continue to build collaborations and develop a new economic presence that will empower new companies to locate and succeed in North Carolina's Northeast.

Please call for relocation and new business information: +(1) 888-872-8562 or info@ncnortheast.com.



- ◇ Top - Lake Gaston
- ◇ Above - Cape Hatteras Lighthouse, Outer Banks
- ◇ Below - the Northeast region



Applied automotive research at NJIT by Dr. Timothy Chang

**NCCAR:** What research in your department at New Jersey Institute of Technology (NJIT) relates to automotive and transportation industries?

**TC:** We have quite a wide variety of research taking place in my department. This includes control systems relating to system dynamics, network control, and instrumentation. We also do considerable work on wireless communication for ad hoc sensor networks and mobile data systems.

**NCCAR:** How do intelligent traffic control systems and virtually connected vehicles help society?

**TC:** This is a key area for societal improvements relating to transportation efficiency and safety. By careful design and implementation of intelligent systems we can improve safety, flow rate, fuel efficiency, and vehicle operating life, whilst reducing harmful emissions and noise. A valuable by-product of these technologies is the integration of data into commuting lifestyles. It will also allow the gathering of data for long term planning and traffic flow management activities.

**NCCAR:** Can technology realistically improve the quality of driving and safety?

**TC:** We know this is true. There is a mass of traffic accident data that proves driver error is a major factor in a high proportion of road traffic accidents, especially for younger and elderly drivers with impaired physical/mental capabilities. Estimates on the real cost of traffic accidents are around \$400 billion annually in the USA! NJIT, NC State Uni-

versity, Lotus Engineering & NCCAR are currently working on a National Science Foundation funded project to develop driver assist technologies for impaired drivers.

**NCCAR:** How do you think technology will significantly change the transportation industry?

**TC:** The automotive industry is reeling globally with the current economic circumstances. The result is that for the short term, survival is the primary mission for most OEM's. The consequence is a tight focus on a few essential technologies, namely, higher fuel efficiency. Once the market shows signs of improvement, I believe that automakers will move swiftly to increase technology content in vehicles, if for no other reason than it differentiates products and buyers like it! Longer term, tele-presence translates into less need to drive for business meetings!

**NCCAR:** Are there key enabling technologies that offer great promise for the automobile / driver /passengers?

**TC:** GPS, high speed communication, and embedded computing all offer dramatic potential for feature enhancements such as real-time dynamic routing and vehicle control.

**NCCAR:** How do you foresee the growth of semiconductor applications in cars/trucks?

**TC:** Yes, maybe Moore's law also applies here. Interestingly, there has been criticism of the auto industry for its inability to reduce costs and increase feature content as the electronics industry has achieved. However, the level of legislation and prod-

uct demands has limited this potential. These factors will equally apply to safety critical applications of semiconductors. Conversely, infotainment systems are not constrained in this way and hence have great potential.

**NCCAR:** Is NJIT a significant player in these fields?

**TC:** Yes, we have three transportation engineering centers at NJIT: National Center for Transportation and Industrial Productivity, International Intermodal Transportation Center, and Transportation Economic Land Use System. Many faculty members in Engineering, Computer Sciences, and Mathematics are also engaged in related research. Our annual research budget in these areas is several millions dollars.

**NCCAR:** What is your proudest career achievement?

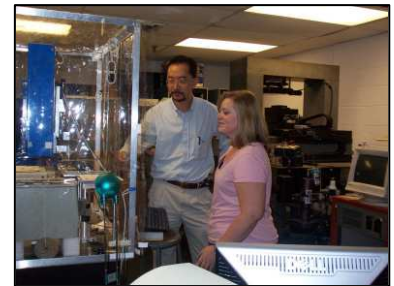
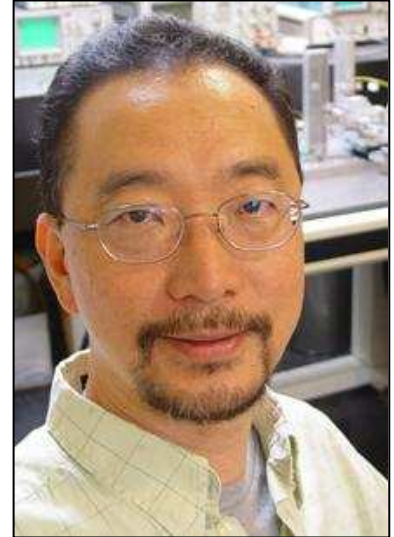
**TC:** Being recognized by the NJIT Alumni Association with the Robert Van Houten Award in 2008 for Excellence in Education and the Thomas Alva Edison Patent Award from the NJ Research Council in 2007.

**NCCAR:** What is/was your favorite personal car and why?

**TC:** Hyundai Elantra: a solid sedan for \$12,000 and with good fuel efficiency.

**NCCAR:** How can NCCAR help researchers?

**TC:** NCCAR provides an independent user-friendly center with great test facilities for the safe evaluation of future transport related technologies. I think it will also promote a forum for discussions and coordinated research especially between academia and industry. In particular, it will raise the visibility of automotive research to students.



- ◇ Dr. Timothy Chang
- ◇ NJIT Highlander DARPA Grand Challenge Vehicle
- ◇ "SmartPin" self sensing liquid dispenser
- ◇ Working with the students

### An Interview with NCCAR Board Member Dr. Steve Margolis, Distinguished Professor of Economics at NC State University...

**NCCAR:** How did a renowned economics professor get involved with NCCAR?

**SM:** I've known Fred Gallasch for a number of years. He's an NC State Ph.D. and he's kept in touch with us over the years. Fred recruited me, but it wasn't hard. NCCAR is a very good fit. It combines my professional interest, economics, and my recreational interests, which run to most things automotive.

**NCCAR:** Give our readers an insight into your automotive interests?

**SM:** I'm enthusiastic about all sorts of cars and most kinds of motorsports. My main involvement has been with Alfa Romeos. I've owned six of them over the years and been a member of the Mid Atlantic chapter of the Alfa club for over twenty years.

**NCCAR:** What is your favorite vehicle and why?

**SM:** Of the cars I own now, I suppose my favourite is my '73 Alfa Junior Zagato. It's slow by today's standards, with a 1.6 litre eight valve motor, but it's light and agile and it doesn't keep any secrets.

**NCCAR:** How will the current industry issues (financial, technical, "cash for clunkers") affect the global auto industries differently from the domestic US market?

**SM:** We face a bigger adjustment here in meeting new demands for efficiency, given that our cars are bigger and more powerful than those in much of the world. GM now has some breathing room to develop new products and already has some promising things in the pipeline. We hear less from Chrysler so far, but new Fiats should be showing up soon. The likely sharing of platforms and engine technologies ought to give us some very appealing products.

**NCCAR:** How will the global auto industry consolidate and possibly stabilize?

**SM:** We've already seen a wave of consolidation. I expect that will continue for a while, perhaps most significantly through alliances that link Chinese and Indian firms with American and European marques.

I think we'll also see a different kind of structural change in the coming decade. Periods of radical technological change tend to result initially in a proliferation of firms—think of the U.S. auto industry in the first half of the twentieth century, and the computer industry in the second half. In such times, the comparative advantages of incumbent firms erode and new leaders come to the fore. As the technology stabilizes, industries become more concentrated again.

Historically, automobile manufacturing has been highly vertically integrated. The extreme was Henry Ford's Rouge River plant which took in raw materials and turned out finished cars. We've moved gradually away from that, of course, but we remain quite integrated.

In the next decade, innovations in batteries, electric motors and control systems are unlikely to occur all at the same place. We will see some licensing of technology, as with Toyota's hybrid systems, but we will also see more of the key components of a vehicle being bought, rather than made, by the company that puts its logo on the trunk lid.

At the opposite extreme from the Rouge River plant is the approach that Fisker Automotive is taking to develop its plug-in hybrid. Fisker is

working closely with component suppliers to develop its car, which will be assembled by a contract builder in Finland. Fisker's contribution will be design, engineering and organization. This may be the wave of the future. While I don't expect the auto industry ever to be as un-integrated as the PC industry, I expect we'll see movement in that direction.

**NCCAR:** How can suppliers survive these challenging times?

**SM:** Speed, flexibility, and openness. For current products, cost pressures will likely continue to intensify. But there will be important new opportunities that open up as production becomes less vertically integrated.

**NCCAR:** What are realistic outcomes for the drive towards reduced dependency on foreign fossil fuels and batteries to the USA?

**SM:** Fossil fuels are likely to remain the lion's share of our energy consumption. Nuclear power and domestic oil development face major regulatory obstacles. Wind and solar power will grow but will still be a small part of total consumption. Perhaps the best prospect is more use of natural gas. Overall, I expect that oil imports will not decline by much, if at all.

The prospects for batteries are better. At the moment, foreign suppliers seem to be a bit ahead of us, but there is a lot of research and development going on in the U.S. NC State has a promising nanotechnology project in this area.

**NCCAR:** Can you predict how the private transportation market will change over the next ten years?

**SM:** Just a couple of years ago, in my neighbourhood,



"I've been amazed to see how fast people have switched ... I expect the household fleet will evolve...."



many families had a Suburban as the first car and an older Suburban as the second car. I've been amazed to see how fast people have switched to owning one big vehicle and one small one. I expect the household fleet will evolve towards even more variety; perhaps a very light duty electric for in-town use, a small sedan for most everything else, and a lightly used and maybe nicely aged truck or SUV for heavy lifting.

## The NCCAR Story - The Next Steps...

Phase 1A of the NCCAR project is almost complete and we will become operational in December 2009. Having said that, NCCAR is already working on five projects with clients for immediate research programs.

Three are public:

The National Science Foundation GOALI collaborative program to develop driver assistance tools for impaired/elderly drivers (NS State University, New Jersey Institute of Technology, Lotus & NCCAR).

The second project is the implementation of an advanced IT infrastructure across the NCCAR campus.

Thirdly, the National Institute of Standards and Technology application for the construction of a "PACE" Chamber—more details to follow in the next edition.

The remaining two projects are client confidential.

With regards to the official opening and precise timing of events, these details are yet to be formally defined. However, needless to say, it will certainly include some interesting vehicles!

For clients wishing to take a first hand look around NCCAR, please just make contact with Simon Cobb. We will be delighted to demonstrate what is on offer and

how we can help you.

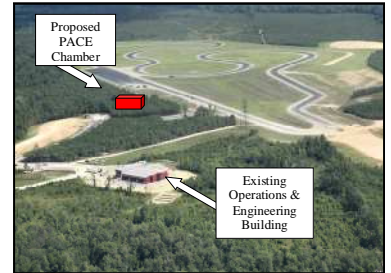
Contact: Simon Cobb,  
Chief Operating Officer.

Phone: + (1) 252-678-2174

Email: [simon.cobb@nccar.us](mailto:simon.cobb@nccar.us)

Keep watching the NCCAR website for updates— a new format (compatible with all browsers) will be launched in the very near future!

[www.nccar.us](http://www.nccar.us)



“This is the newest location for vehicle development in mainland USA”

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