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Zündfolge



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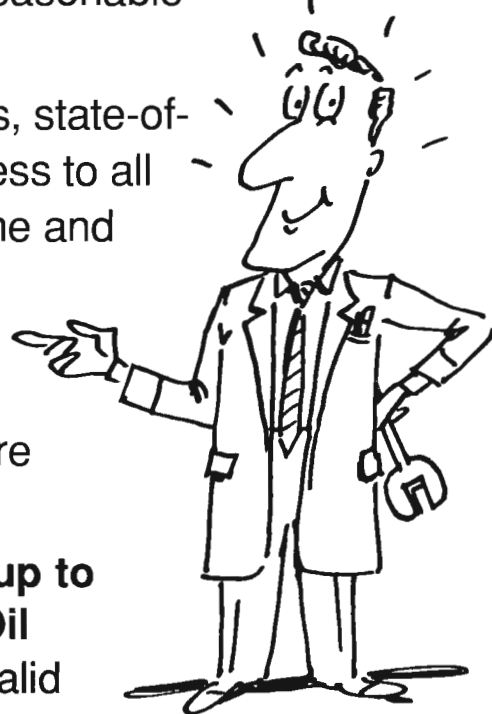
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BMW's virtual car.

Zündfolge

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Boilerplate

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Calendar

March 23	Video Night at Engine House 9 in Tacoma. This is a great place. Come join us for a fun evening of car videos.
March 24	Deadline for the April <i>Zündfolge</i> .
April 6	Board Meeting at the Heltons' home in Bellevue.
May 11	Lapping Day at Bremerton Raceway.
May 27	High Performance Driving School at Bremerton Raceway.
July 17-21	BMW CCA Oktoberfest in Breckenridge, Colorado.
July 30	Concours d'Elegance - tentative date.

BMW ACA events are partially supported by a generous grant from BMW of North America, Inc.

Board Sets Club Objectives

With the new year under way, I'd like to take a minute to share with you the goals the Board of Directors have chosen to pursue in 1995. Although we feel the past year was successful there are some things we'd like to see happen in the new year.

Our number one objective this year is to increase members' participation in the club's activities. We're lining up many more events this year and hope to see some new faces. If you've attended some of our events in the past you know they can be a lot of fun. If you haven't, plan on doing so and see what you've missed.

Secondly, we are planning to do an event to raise donations for a local charity. We have not yet decided on an event or a charity, but you can expect to see this happen this year.

With the number of track events we have scheduled this year, we feel it's important to have a strong base of qualified instructors. To meet that need we have set a goal to develop a program to train and certify our driving instructors. Our schools have a reputation of being among the best in the Northwest. We want to ensure that excellence continues.

One more objective we've set is to set up a club info Hot Line. This would be a number members can call to get current information on the club's activities and upcoming events.

The board members will be getting together to develop action plans to help us achieve these objectives. If you have any ideas or suggestions please contact myself or any board member to discuss your thoughts. We would appreciate your input.

Well, those are our goals for the new year. To stay informed on our progress towards accomplishing these goals watch future issues of *Zundfolge*.

—Gary Parr

Video Night

We're having one of our periodic Video Nights on March 23rd, Thursday. The place is Engine House No. 9 in Tacoma. This is a tavern/restaurant so you must be 21 to attend.

We will have the room upstairs to ourselves starting at 7:00 pm. You may want to plan to eat downstairs prior to the meeting; the food is good.

Driving directions: from Seattle go south on I-5 until just past the Tacoma Dome. Take the Highway 16 exit just

south of the Dome. Once on Highway 16, take the Sprague Ave. exit, which is the first exit, to the right. Follow Sprague to 6th Ave. and turn left on 6th. Get into the right lane and turn right on North Pine. It's the second building on the right.

The address is 611 North Pine St. The phone number is (206) 272-3435. If there are any questions, call Steve Niver at (206) 883-8577.

Ownership Change at BMW of Bellevue

BMW of Bellevue has been purchased by Al Monjezb. Al previously was part owner and general manager of Cunningham BMW in El Cajon, California. Cunningham has been known as one of the top dealerships in California.

Barbara Guinn had been looking to sell the store for some time. Mr. Monjezb was looking for his own store.

Al has been busy making changes. He especially hopes to improve the service department. He has also indicated his desire to maintain good relations with the club.

—David Lightfoot

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Stalls

By Thomas B. Nast

Sick Transit

On March 14th, I am going to the polls to vote for rapid mass transit. And thus I urge all of you to join me in voting against the so-called Light Rail plan.

The plan is as follows: For the sum of \$6.7 billion (yes, with a "b") dollars, three branches of light rail will be installed, a few bus routes will be added and a few heavy rail lines will be revived.

By the planners' own estimates, this will (1) cause no measurable impact on traffic, and (2) cost about \$350,000 in capital expense per commuter. But the planners dissemble, as they usually do. I state this because (1) they have never brought in a job on budget, save the West Seattle Bridge, (2) this is only phase one of an estimated \$15 billion project, and (3) it completely overlooks operating expenses, which will easily require an additional \$1 billion per year of subsidy by the time it's finished.

Our planners do not have a distinguished record in these matters. We have not forgotten WPPSS, a five-plant multi-billion dollar boondoggle with one sometimes-functioning plant to show for it. Or the Kingdome, a \$65 million building which just required \$55 in temporary repairs. Or the tiny Condone just south of it, a little-noticed multi-million dollar project which came in at twice budget, required a year of repair work after "completion," and has a lifetime of about eight years. I could point to a few score other such projects. There is no reason to think light rail would be any different. It may not be another Denver International Airport, but it's certainly cut from the same cloth.

Nor should we discuss taxes, because in Western Washington it is not PC to complain about annual increases which would cause revolution in Colonial America. In the last few years property taxes have increased about fivefold for most people; B&O taxes up 66% to 150%; vehicle licensing fees up about

300%; hefty increases in gasoline taxes, alcohol taxes, you name it. Plus the taxes called "fees" and "fines"; applied for a building or land use permit lately, or gotten a ticket? What do you think a transit system with a capital (never mind operating) budget about the size of the entire annual budget of the State is going to do? The only overcrowded roads will be the outbound lanes from the tri-counties region.

Never mind all that. The chief point is that we already have the best rapid mass transit system invented. It is called the automobile. This is a fact which the cretins who are appointed to do our thinking for us seem unable to grasp. Perhaps their mothers still do their shopping for them, for if they did their own they would notice that suits come in different sizes; one size does not fit all. Likewise, a bus or rail car which goes from A to B does little good for most people, who have spouses or children to collect and distribute, necessities to buy, meetings or rehearsals to attend, or unwieldy objects to transport. With the steady erosion of our standard of living (due in no little part to the sort of folks who want to bring us this rail system), fewer and fewer of us have the surplus time which A-to-B mass transit requires.

There is a reason the car is king. It works. In an historical context, it works better than anything else invented. Cars have speed, flexibility and carrying capacity unequalled by anything else. For the most part they are privately financed. The government's hubris in this rail proposal is exceeded only by its cost.

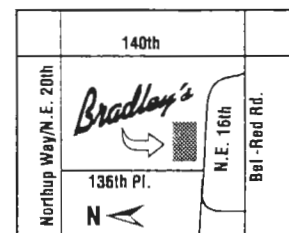
The principal cause of road congestion around here is accidents caused by poor driving, and breakdowns caused by poor maintenance. With just a couple of exceptions, the roads would flow well at current traffic levels if the rules of the road were observed and vehicles were kept in good running order. This should be the focus. Congestion occurs mostly during rush hour. Staggering working hours and distributing workplaces eases

it; current local governmental policy discourages both practices. Finally, I suggest that those who can't tolerate congestion (and we each have a different level of tolerance) will find other routes or means of travel, or other places to live or work, without spending the spending of tens of billions of our dollars.

I hope you will join me in voting for rapid mass transit, and against this travesty proposed by those who now spend more of the money we earn than we do.



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Track Events in Northern California

Our chapter has been invited to participate in a series of high performance driving schools sponsored by the Golden Gate Chapter of BMW CCA. The guys and gals from San Francisco have three schools planned, at three different tracks in 1995. And each is a two-day school, so it's worthwhile to make the trip south.

Here's the schedule:

Laguna Seca	May 13-14
Thunder Hill	Sep 23-24
Sears Point	Nov 18-19

Each school is \$260. If you register for all three schools, the discounted price is \$695.

The Laguna Seca school will probably be full by April 13th. So if you're interested, make your reservations now. The Golden Gate group is well organized and has an information packet and registration form available. You can get one from Jim Grinstead. Call him at 415-973-3255 (days) or 510-837-1417 (evenings).

1995 Track Events

Date	Event	Location
5/11	Lapping Day	Bremerton Raceway
5/27	Drivers' School	Bremerton Raceway
6/10	Lapping Day	Seattle Int'l Raceway
6/17	Alfa Romeo Club Time Trials	Seattle Int'l Raceway
7/5	Lapping Day	Bremerton Raceway
7/8	Driver's School	Bremerton Raceway
7/13	Corvette Club SIR Daze IV	Seattle Int'l Raceway
8/2	Lapping Day	Bremerton Raceway
9/2	Drivers' School	Bremerton Raceway
9/29	Lapping Day	Bremerton Raceway

All events are BMW ACA events except for the Alfa and Corvette Club events. We are invited to participate in these two events. For BMW ACA event information contact Dan Alvis, Driving Events Chairperson, at 206-582-0803. Events are subject to change or cancellation, so watch *Zundfolge* for updated information.

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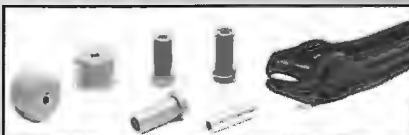
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Vintage Racing Motors

Our February 18th meeting at Vintage Racing Motors was a big hit. We had about 60 members attend. As someone said, "If everyone brought their wife, this would be bigger than the banquet!" Al Lancaster is currently planning to set up folding tables in VRM's shop and serve hot dogs for next year's banquet. Just kidding.

Byron Sanborn and Thor Thoreson spent over two hours giving us a detailed history of every car in the shop. They also put each car into historical context,

explaining what came before and after.

We saw the first McLaren formula 1 car, with a BRM V-12 engine. Actually, we heard it, too. Byron started the car for us. Music for the enthusiast's cars.

But the McLaren F1 was mild compared to the McLaren Can-Am car, with 800 hp, that Byron started. Damn that was loud! And fun!

If you missed it, we'll be returning some time in the future.

Thanks, Byron!

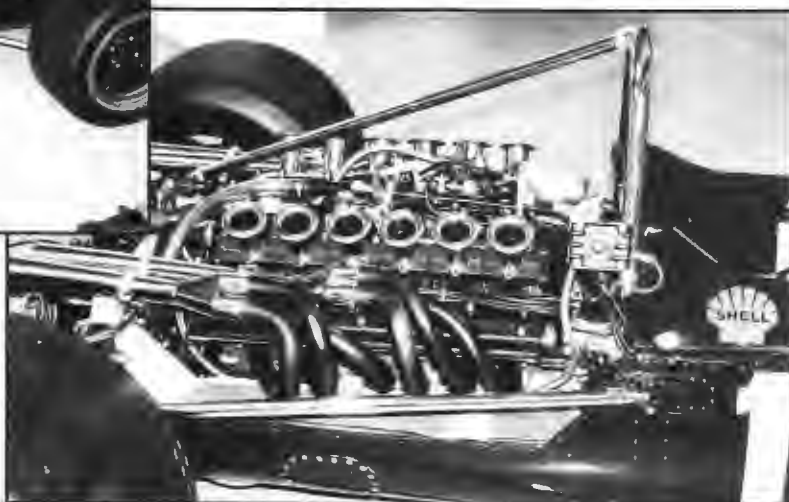
— David Lightfoot



Fittipaldi F1 car last year of full ground-effects.



McLaren BRM V12 F1 car - very rare.



BRM V12 sure sounded nice.

Byron plays with 800 horsepower.



No, David it's not your 300 SLR Mercedes.



BMW Car

An independent magazine about BMWs, called *BMW Car*, has been published in England since July 1994. It's 82 pages and all in color. It's got a very British bias, but it's still the best BMW magazine in the world. I wish we had something like this in North America. It's just very well done.

The magazine is available in the U.S. through EWA. This company brings a lot of English car magazines to the American market. They are also a great source of model cars.

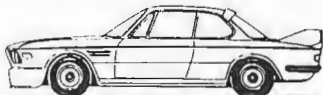
BMW Car is available through EWA for \$60 a year. It

sounds like a lot, but that's only \$5 an issue. You can also get a sample for \$5.

EWA has an ad in this issue of *Zundfolge*. (See below.) If you order the magazine, be sure to tell them you saw it in *Zundfolge*.

— David Lightfoot

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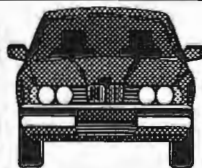
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BMW ACA New Car Rebate Program

BMW of North America has generously provided a special rebate program to BMW ACA members who have been club members for at least one year. The rebates are based on the purchase of selected new BMW models. See below for details.

Thanks BMW NA for this super deal!

Special Purchase Program Price List

As a member of the BMW ACA, you are eligible to receive the following allowance on your purchase or lease of a new BMW automobile or motorcycle. After purchase through an authorized BMW dealer, please submit your proof of purchase and Special Purchase Allowance Check Request Form to BMW of North America, Inc., Special Sales Programs, P.O. Box 1227, Westwood, NJ 07675-1227.

Allowances:

Automobiles

8-Series* (excludes 850CSi)	\$3000
7-Series (all)	\$2000
5-Series (all)	\$1500
3-Series (excludes M3)	
325i/is/iC	\$1000
318i/is/iC	\$ 500

Motorcycles

K 1100 Series	\$1000
K 100 Series	\$1000
R 1100 Series	\$1000
K 75 Series	\$ 500
R 100 Series	\$ 500

Eligibility

Individuals who have been members of the BMW ACA for a minimum of one (1) year are eligible to receive a special allowance on their purchase or lease of a new BMW automobile or motorcycle.

Financing

Financing will be available through BMW Financial Services. Approval for financing is based on the credit worthiness of the applicant. Incentive lease and retail programs can be used in conjunction with your purchase price negotiated with the dealer.

Procedures

You deal directly with the dealer of your choice. After negotiating the best deal you can with the dealer, submit proof of purchase to BMW of North America, Inc. with the Special Purchase Allowance Check Request. Once approved, the allowance check comes to you directly from BMW of North America, Inc., not the dealer. Your BMW dealer, however, will handle all ordering, financing and delivery.

Terms and Conditions

Program is subject to cancellation. Program is effective September 1, 1994 through December 31, 1995.



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BMW's Virtual Car

BMW's Virtual Car

The last few years, BMW has remained consistently profitable. This sounds simple, but it is actually much more revealing. After all, Europe has weathered a recession that has hurt financial results.

The automotive industry continues to reflect one of the world's most competitive markets. And Germany is home to the world's most highly compensated work force.

But the Bayerische Motoren Werke is an extremely resourceful company—one that outperformed its competitors financially in spite of heavy odds. It's natural to wonder why.

Well, we at Control Data Systems offer a theory. Most of it has to do with BMW's strategic direction and its ability to focus its energies accordingly.

As Dr. Heinz Leffler, department leader in BMW's Research and Development division, indicates, "BMW is committed to the proposition that it's possible to deliver a world-class car that combines high performance with driver and passenger safety . . . We're building our cars so personal safety does not depend entirely on the driver's ability, but rather on the automobile's ability to control events by itself."

No single example illustrates this commitment more explicitly than BMW's implementation of the Antilock Brake System (ABS) that BMW delivers as standard equipment on all its car models.

Today, BMW tests and optimizes its ABS designs in a real-time simulation facility located within the company's Research and Development Center in Munich. The facility is unique within the automotive industry.

Most importantly, the facility, and the real-time simulation solution it provides, illustrate how concepts like rapid prototyping, concurrent engineering, and team management can be adopted in real-life projects that directly contribute to the realization of highly complex products—like world-class passenger cars.

Essentially, the ABS simulation facility provides BMW with a virtual car. This technological solution enables BMW engineers to design, test, redesign, retest, and even (to a limited ex-



tent) fine tune the ABS system, its components, and related automotive subsystems on the fly.

As you might expect, the solution requires the implementation of an extremely complex simulation model. The model has to analyze how suggested *improvements* to the ABS design will react to a whole spectrum of driving conditions. It has to determine how changes in the design of *other* BMW mechanical or electronic subsystems will affect the ABS. And, it has to simulate a finished automobile *before* the product is physically built.

A Quick Introduction to ABS

In very general terms, ABS is a sensor-based braking system that tries to prevent a car's wheels from locking under adverse driving conditions.

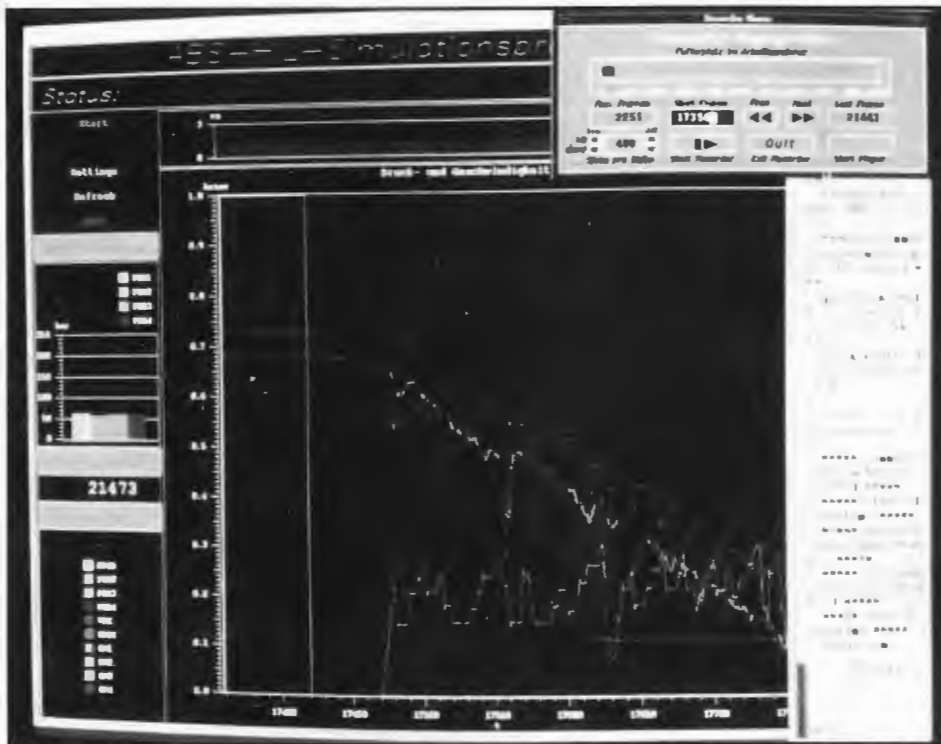
Suppose you're driving along a curving freeway at high speed. Suddenly, another slower moving car pulls in front of you from a right-hand lane. You hit the brake to avoid the oncoming vehicle. But your car has a conventional braking system and you've pressed the brake pedal too hard. You've inadvertently locked your wheels and are no longer able to steer your car. You're skidding out of control and there's nothing you can do.

Anti-lock Brake Systems are designed to counteract that sense of helplessness—to give the driver a chance to correct the dilemma at hand. Basically, they consist of two parts and work something like this:

- A hydraulic subsystem is built into the car's brakes and modulates the brake pressure that's applied to each of the four wheels by switching between three states (constant pressure, an increase in pressure, and a reduction in pressure).

- An electronic controller relies on four sensors to detect the speed of each wheel and vary each wheel's brake pressure as the wheel is about to lock. The controller is especially cognizant of each wheel's slip condition and tries to keep the slip at a desired value while simultaneously trying to maintain the stability of the entire vehicle.

Beyond this, ABS has to be able to account for a variety of automotive-related conditions as it performs this task. Most notably, these systems have to consider such factors as the speed at which the car is moving, road conditions (dry, wet, icy, rough, smooth), the car's position (moving straight ahead in contrast with making a turn or taking a curve), and the car's physical structure (including different chassis types,



suspension systems, and types of tires).

BMW implemented a real-time simulation facility to improve ABS capabilities and quality in a cost effective manner. BMW was especially interested in enabling ABS to function effectively under complicated, sometimes dangerous, driving conditions that cannot always be precisely reproduced on live test tracks.

A Real-Time Simulation Solution

As a matter of practicality, BMW's Research and Development test engi-

neers did not believe that the classical method of improving control systems would work effectively for their ABS project. Traditionally, BMW has tested design improvements by subjecting prototypes to live testing that company engineers can measure. Then, project participants recommend additional improvements, develop another prototype, perform another live test, and generally proceed in an interactive step-by-step fashion.

But ABS presented BMW engineers with several atypical situations. For one thing, it is very difficult to accurately duplicate reproducible test conditions on

a test track when you are talking about variables like icy roads, or wet roads, or rough surfaces.

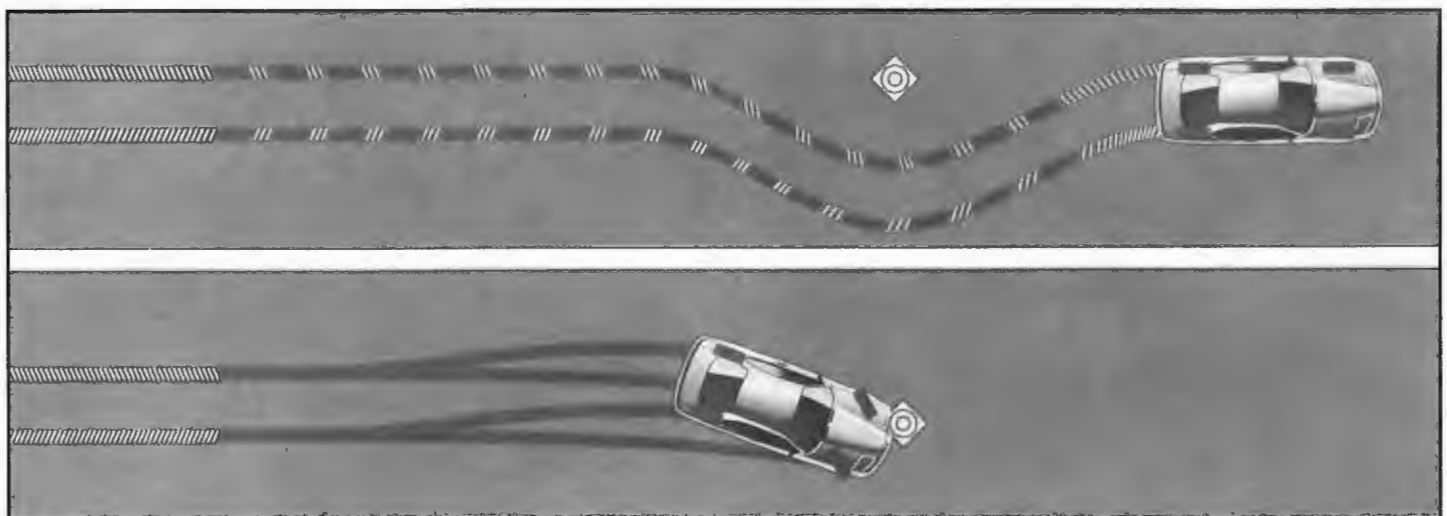
In addition, as all automakers know, road tests are expensive. It takes lots of time to conduct them, and the testing group has to have a complete car before they can begin their work.

All of which convinced BMW to combine a simulation solution with live track testing as it continued the ABS program. As Dr. Leffler explains, "We wanted to optimize our ABS logic capabilities for critical driving situations, while at the same time, enabling our test engineers to perform their responsibilities more cost effectively."

To build a simulation solution that could accommodate these objectives, BMW contacted Control Data Germany, which functioned as the system integrator for this real-time project. BMW began by setting a series of requirements the solution had to meet.

For starters, BMW's solution had to adapt to both off-line and real-time simulation. The test group needed hardware and software measurement tools they could use both in a lab and at the company's test track. Most importantly, BMW's simulation results had to accurately correspond to its live test results. It was also important for everything in the BMW simulation model to be parameterized.

Company test engineers wanted a modular system where they could examine the impact of specific changes, such as variations in tire stiffness, powertrain design, new electronic subsystems, road conditions, and a whole variety of other factors. Most impor-



Standard on all BMWs: a four-sensor anti-lock braking system (ABS) prevents wheel lock-up under hard braking. This provides the driver with more steering control that he or she can use to avoid collisions.

Basic Elements in the ABS Simulation Solution

REAL-TIME COMPUTER SYSTEM

BMW'S ABS simulation starts with a real-time computer system (the Control Data 4680 running under the EP/LX real-time implementation of UNIX) which functions in conjunction with a mathematical model and its related application software. This model simulates the dynamic behavior of an automobile under an exhaustive range of road conditions and driving maneuvers and sends this input to a function generator.

FUNCTION GENERATOR

The ABS function generator receives signals from the simulation model that represent the rotational speed of the car's wheels. In turn, the function generator produces arbitrary waves (e.g., sine waves) and passes them on to the ABS controller-in-the-loop. In essence, this process simulates the operation of the ABS electronic wheel-speed sensors.

ABS-IN-THE- LOOP

The solution's "hardware-in-the-loop" component consists of a physical car complete with a fully functioning ABS whose braking operations can be physically initiated by a driver both in a laboratory environment and on a test track.

SIMULATOR INTERFACE

The solution also includes AD/DA/DIO lines which provide an interface between the physical car-in-the-loop and the simulation model that runs in the real-time computer. This interface enables the simulation model to read the brake pressures, modulate the ABS, and complete the loop by generating appropriate wheel rotation speeds.

RESULTS DISPLAY

A graphical display system interfaces with the real-time computer and records / displays the performance of the ABS subsystem as it responds to the changes in various test conditions.

PATCH PANEL

A patch panel enables the test crew to vary what input comes from the simulation model and what input comes from the physical car. This software-configurable panel lets test engineers "listen" to the communications that take place between the controller and the car and focus on specific test factors.

tantly, BMW needed to be able to describe its test car *precisely*.

Beyond this, the company's test group required a computer that was capable of keeping up with the ABS electronic controller.

Because the current generation of ABS performs a new computation every millisecond, BMW's real-time solution had to process input and output, perform an actual computation, and provide a response—all within one millisecond.

As BMW was fully aware, this is a difficult requirement for many computer systems.

In addition, the solution had to meet BMW corporate standards for open systems, as well as avoid the high implementation costs typically required by customized solutions that rely on proprietary real-time technology.

The table on page 30 summarizes the company's solution requirements in more detail. Because this test equipment is technically challenging and reflects a high level of complexity, BMW had to have a technology partner whose credentials included fundamental knowledge in HIL (hardware-in-the-loop) simulation applications. This is one of the main reasons BMW decided to ally itself with Control Data Systems on this project.

Based on these requirements, Control Data and BMW collaborated in jointly implementing the hardware-in-the-loop simulation solution described in the accompanying diagram and detailed the overall solution, while BMW developed the simulation model that runs in the solution's main computer.

BMW and Control Data instituted a hardware-in-the-loop approach be-

cause it enables test engineers to focus their analysis on a single element in the car's overall environment, investigate changes in its behavior, but keep all of the other elements in the environmental model constant.

Advantages Gained

With BMW's specific requirements and Control Data's design in hand, work began on the ABS real-time simulation project in 1992. BMW itself developed the simulation model and its related software.

Developers utilized ACSL as the simulation language for the modeling concept and NUBEMM (a program for performing Numerical Computation of Mechanical Multibody Systems) to derive the equations of motion for the model's mechanical systems.

Control Data was the prime contrac-

tor for the overall project. In this capacity, it supervised the work of various subcontractors, delivered the main real-time computer, and integrated/tested all of the project's various components once they were assembled into a single solution.

As Dr. Josef Weigl, analyst with Control Data Germany's Real-Time Competency Center, indicates, "This project has been a major achievement. Most people may not know it, but it is more difficult to model a car precisely enough to perform ABS tests than it is to simulate an airplane's overall behavior. That's why BMW's ABS simulator is virtually unique in the auto industry."

Today, the ABS simulation facility is fully operational and BMW engineers are proceeding full-speed ahead with tests to determine what enhancements in the ABS logic design will enable this subsystem to handle hazardous driving conditions most effectively.

The advanced engineering aspects of the simulation solution have proven especially successful. Here, test engineers are able to perform hundreds of tests in the lab every day (in contrast with the dozen or so live tests they can perform at a test track during the same period of time).

In essence, the simulator enables BMW to adopt a much *more efficient test process*—one where a major design step can be quickly evaluated pro or con in the lab while the more costly resources at the company's test track concentrate on fine tuning.

In addition, the ABS simulator provides BMW with a *concurrent engineering* tool that it did not possess previously. The simulator lets BMW engineers test multiple design concepts in parallel, as they are able to model proposed subsystems or components before prototype construction actually begins. It is here that the simulator fulfills its function as a virtual car.

For example, the test group can study the impact of components still under development by outside suppliers or it can simulate BMW's own designs for new electronic control systems during the earliest stages of the product realization process.

As a matter of fact, BMW's real-time simulation solution enables the company's test engineers to work with models that will not be physically available for another three or four years.

Another major advantage comes from the solution's flexible design. Because testing can be performed both in the lab and at the track, BMW is able to more closely coordinate the working relationship between the lab test group and its track test counterpart.

All participants in the lab simulation also drive on the test track. This is especially important because it gives the simulation specialists a more realistic understanding of the issues they're trying to resolve. This dovetails nicely with BMW's emphasis on *team management*.

At a more global level, Dr. Leffler sums up the simulation facility's over-



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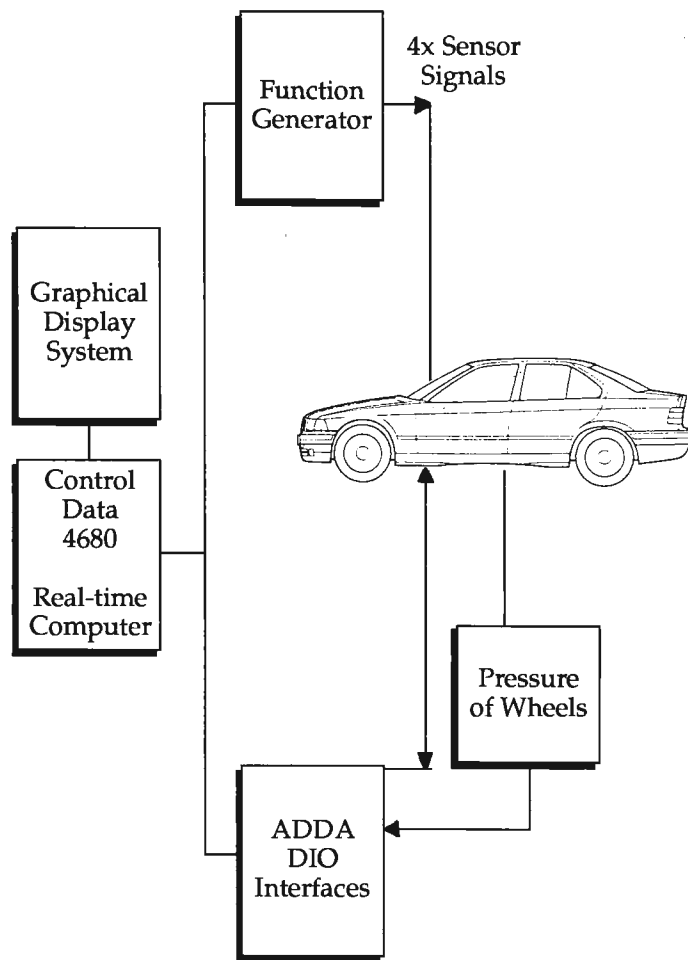
all advantage to BMW by saying, "We're always looking for ways to respond to the marketplace faster. This project's biggest objective is to contribute to auto safety and provide enhanced products to our customers so we can transform this goal into reality."



(This article originally appeared in *Milestones*, a publication of Control Data Corporation. It is reprinted here with the permission of Control Data Corporation.)

Solution Requirements

Attribute	Requirement
High floating point performance by the simulation processor's CPU	Less than or equal to 1 msec
High I/O performance	I/O time included in total response time requirement of 1msec
Use of standard products	ACSL simulation language Real-time UNIX operating system VMEbus system SCSI peripheral device interfaces
Real-time UNIX attributes	Less than 80 microsec for context switching Constant framing
Real-time data recording	On disk
Flexible configuration	Expandable I/O channels Expandable CPU performance Expandable memory Expandable disk capacity
Legacy integration	Integrate BMW's UNIX-based CAE workstations
Special integration	Enable simulation computer & actual car to exchange test data



BMW's HIL Real-Time Simulation

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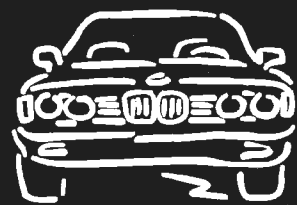


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Charles & Joanne Little	Tom Cox	'83 633CSi
George Willet	Dan Alvis	
John Stegeman	BMW Seattle	'73 2002tii
Christopher Ferris		
Richard & Diane Ottosen		'95 530i
David Jacobi	Wollenbergs	'95 M3
Greg Haapla		'73 3.0CS
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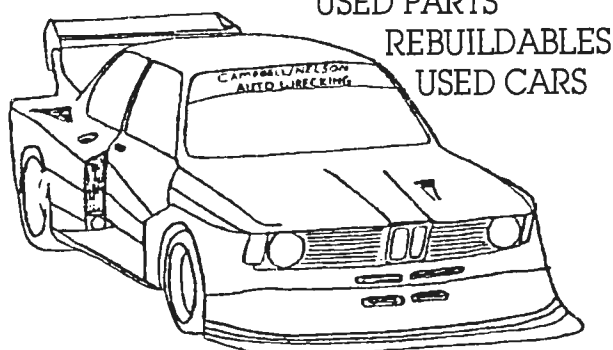
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BMW's sales were up 10 percent in 1994. Combined with Rover's output of 478,000, total sales for the group were 942,400 vehicles. But the costs of the Rover acquisition wiped out profits. BMW corporate profits were virtually unchanged from 1993. (AutoWeek)

BMW M3 Lightweight in Limited Production

BMW of North America will make available a limited number of M3 models, targeted primarily for motorsport and performance enthusiasts. The M3 Lightweight will be a street-legal version of the current M3, which is modified and specially equipped to provide the base production car for drivers and teams competing in motorsports. All unnecessary comfort and convenience equipment will be deleted from the standard M3 and a number of performance upgrades will be added.

The M3 Lightweight can be distinguished by its standard forged alloy, double-spoke wheels, measuring 7.5 x 17-inch in front and 8.5 x 17-inch in the rear. These wheels are lighter and more rigid than the cast wheels of the standard M3. In addition to the standard M3 rear wing, the M3 GT rear wing is included as standard equipment on the lightweight model. It features height adjustment and an additional adjustable rubber lip. A GT-style front spoiler with extendable splitter and an aerodynamic underbody panel reduce drag and lift at the front of the car.

Weight reduction is achieved through the deletion of such features as air conditioning, sunroof, audio system, tool kit, noise reduction mats, engine compartment and underhood insulation and trunk panels. Lightweight aluminum doors

and special carpeting provide further weight reduction. Weight savings on the M3 lightweight are approximately 200 pounds versus the standard M3.

The M3 Lightweight incorporates a stiff sport suspension and a revised rear axle ratio of 3.23:1, versus 3.15:1 on the standard M3. An M3 GT oilpan provides secure oil pick-up, even when driven with race tires. A strut brace and an underbody cross brace provide increased torsional stiffness to the front end of the car. Acceleration and braking times are improved, as is overall handling, due to the lower weight.

All M3 Lightweight models will be painted Alpine White with the red, blue and purple BMW Motorsport colors in the checkered flag pattern diagonally across the front and rear corners of the car. The BMW Motorsport International logo will adorn the door sills, side protection strip and a plaque on the glovebox.

Inside, the M3 Lightweight will be distinguished by its special materials and colors. The all-black interior features lighter BMW sport seats with anthracite and red M cloth and anthracite lateral supports and headrests. Carbon fiber elements include the center console, door sills and a cover above the glove compartment.

Approximately 85 units will be produced in 1995 at a base price of \$45,000. (BMW NA Press Release)

BMW at Daytona

BMW fielded a team of two M3s in the IMSA GTS-2 class in the Daytona 24-Hour Race. The M3s are production-based with engines modified to produce 350 hp. The removal of normal street equipment leaves a weight of 2450 pounds.

Although testing went well, the cars were evidently not ready to do a 24-hour race. The winning Porsche covered 690 laps. The best BMW finish was the M3 driven by Dieter Quester, David Donohue, John Paul, Jr. and Pete Halsmar. It covered 221 laps and finished 58th out of 74 starters. The other M3 was driven by Boris Said, Justin Bell, Ronny Meixner and T. Schweitz, covered only 60 laps and finished 69th. (BMW NA Press Release and AutoWeek)



Dave Barry on Drivers

Virtually everybody who drives in front of me is an idiot. I constantly find myself behind drivers who are startled and baffled by virtually everything they encounter, as though they've never been outdoors before. They'll see, for example, a tree, and immediately they hit their brakes, as if they expect the tree to leap into the middle of the road. They also brake for mailboxes, buildings and their own rearview mirrors. But above all they brake for the most disturbing and mysterious of all earthly phenomena, a green traffic light, which causes them to come to a virtual standstill, paralyzed, until the light turns yellow and then red, at which point they accelerate to 275 miles per hour and shoot through the intersection, leaving me stuck at the light, shouting until spittle covers the dashboard. (Seattle Times)

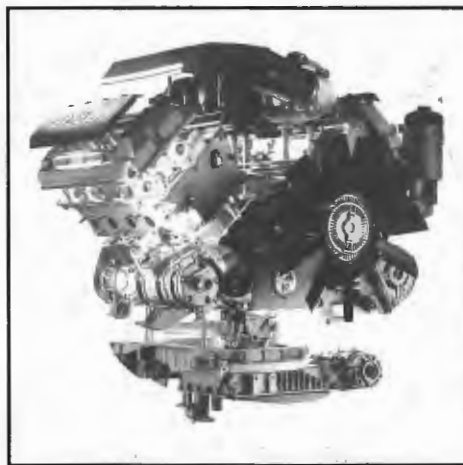
BMW has set aside several million dollars to deal with premature corrosion in some 3-series models. Cars made before autumn '92 are thought to be suffering from low quality steel and inadequate corrosion protection. (Car)

THE BRANDS HATCH RACE TRACK IN ENGLAND HAS ANNOUNCED THE LAUNCH OF THE NIGEL MANSELL RACING SCHOOL. BMW GB LTD. WILL SUPPLY THE SCHOOL WITH 40 318iSE SEDANS. THE SE STANDS FOR SPECIAL EDITION, A UK-ONLY UPGRADE PACKAGE. (BMW CAR)



Reports from Europe indicate that the V6 program at BMW is not dead after all. Evidently, the V6s will supplement, not replace, the inline six-cylinder engines. (Roundel)

Rolls-Royce's plan to use BMW engines will save \$60 million, which will be plowed into body and chassis development for a new line of cars. BMW will supply other components, but will not take an equity interest. However, if Vickers, the British armaments company that owns Rolls, decides to sell, BMW would be first in line to pick up the most prestigious name in the car industry. (Automotive Industries)



The Bentley Java will be built on a BMW floorpan, probably the new 5-series. The recently announced collaboration will mean the use of BMW engines in Rolls-Royce and Bentley models starting in 1999. Bentleys will get a turbo-charged version of the 4.0-liter BMW V-8. A new series of Rolls-Royce will get a version of the BMW V-12. The Bentley turbo will be engineered by Cosworth. (Car & Driver)

BMW Seattle owner Steve Norman's latest venture is funding a re-creation of the Cunningham C4R. The C4R was raced at LeMans in the early 1950s by Briggs Cunningham. The first prototype has been run at SIR. And Steve's looking to be bought out of the project. (AutoWeek)

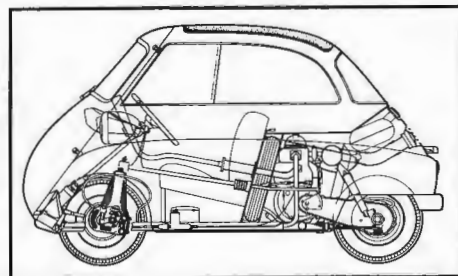
Many of the world's car makers have entered the competition to build a family car for the Chinese masses. Proposals even came from Mercedes-Benz and Porsche. Conspicuous by its absence in Beijing was BMW. BMW's Bernd Pischetsrieder thinks the winner will lose money building cars in China. (Car & Driver)

BMW opened a new assembly plant in Manila in October. The plant will assemble 3-series sedans for the local market from completely knocked-down (CKD) kits. (Roundel)

The Top 10 Engines of 1995 include two BMW motors. The U.S. M3 engine, an inline six-cylinder of 3.0-liters was called "a benchmark" by Ward's Auto World. The 4.0-liter V-8 was the other winner.

Isetta Turns 40

BMW Club Europa will hold its annual meeting in Munich May 24-29. A special celebration of the 40th anniversary of the Isetta will be held. (Roundel)

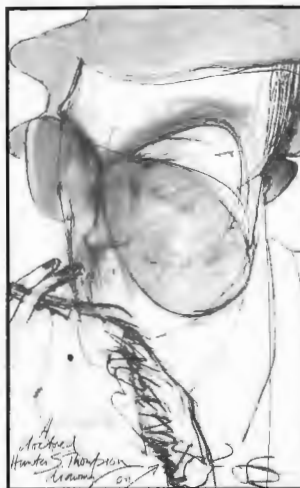


328i

The 3-series is still the standard by which all others are measured in its class. But the Mercedes C-class and the new Audi A4 are selling well, so BMW has freshened the 3-series by introducing a 2.8-liter engine. Compared to the old 2.5-liter six, the new engine has an increase of 299cc, to 2793cc. The perfectly square engine has six combustion chambers measuring 84mm x 84mm.

Lightweight engine parts mean 69 fewer pounds. Peak horsepower is up by one, to 193. More significantly, the new engine has 206 lb. ft. of torque, an increase of 26. The result is a 0-62 mph time of 7.3 seconds, 0.7 less than the 325i.

And all this was adverted while improving fuel economy. The German-market 328i achieves 33.2 mpg for the combined city/highway cycle. (AutoWeek)



Gonzo Beamers

"I'm a BMW man, myself - but what the hell? I gave up riding in gangs a long time ago, and anything that you can drive with one hand at night on a two-lane road at 90 miles an hour in fourth gear is about as fast as I need, these days." (Hunter Thompson in *Better Than Sex: Confessions of a Political Junkie* [Gonzo Papers Vol. 4] via Roundel)

Model Proliferation

BMW continues to plan new model variations. The coming Z3 roadster is supposed to spawn a 3-door hatchback model and possibly a six-cylinder version. An M3 version of the Compact (318ti in America) is also coming, using the old M3 four-cylinder engine. A 3-series Touring will debut in Europe this summer, and an M3 Touring will probably be built for Europe. (Sports Car International)

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➤➤➤ Going on sale this summer in Canada will be the M540i. It's essentially an M5 without the motor. Or put another way, a 540i six-speed with suspension upgrades from the M5.

In September, the U.S. will get a similar model. Only 300 will be imported, with 100 having automatic transmissions. The price will be under \$60,000. (AutoWeek)

BMW sales in the U.S. for 1994 were:

3-series	46,301
M3	2,954
5-series	24,163
M5	10
6-series	4
7-series	10,022
8-series	1,047
TOTAL	84,501

BMW was the best selling European car in the U.S. for the second year in a row. Those were some well-seasoned 6-series they sold. (Whispering Bomb)



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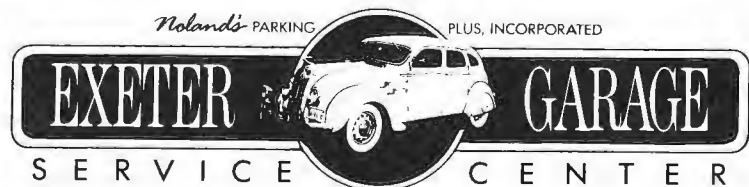
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"The worst listener in the world"

The Fall 1993 (Volume 32, Number 2) issue of *Automobile Quarterly* had a wonderful article on Ken Purdy, the finest automotive journalist ever. One passage deals with Purdy and the legendary Max Hoffman:

Consider Max Hoffman, at one time or another the importer of practically every foreign car to reach these shores. He was the United States purveyor for BMW when Ken was informed he would not be allowed to drive the new 2800 model until Max had taken him for a ride to show him how. Moreover, aware that Ken was afraid to ride with him, Max promised not to exceed 60 mph. Saying this to someone who had been in the fast company of the world's greatest race drivers and who had himself driven countless cars of every species and vintage was simply stupid, and incredibly insulting. But Ken let Hoffman say it four times before "I blew my wig." The next morning Ken wrote a two-page letter which he signed "affectionately" and in which he explained why he had been angry and implored Max to avoid always being "the worst listener in the world." There were those who wouldn't give the imperious Hoffman the time of day, let alone tender counsel. But Maxie was a character and Ken liked him. Lucy (Purdy's wife), remembers one dinner at the Hoffman's Frank Lloyd Wright-designed house in Rye where the butler attended to his master's every whim with an almost comical slavish piety. "Maxie," Ken finally said, "you didn't hire him, you invented him."



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Stability Control

BMW has offered Dynamic Stability Control (DSC) on the 850 since 1992. BMW, Bosch, and others, are working on further refinements. The systems are a natural evolution of ABS and traction control systems.

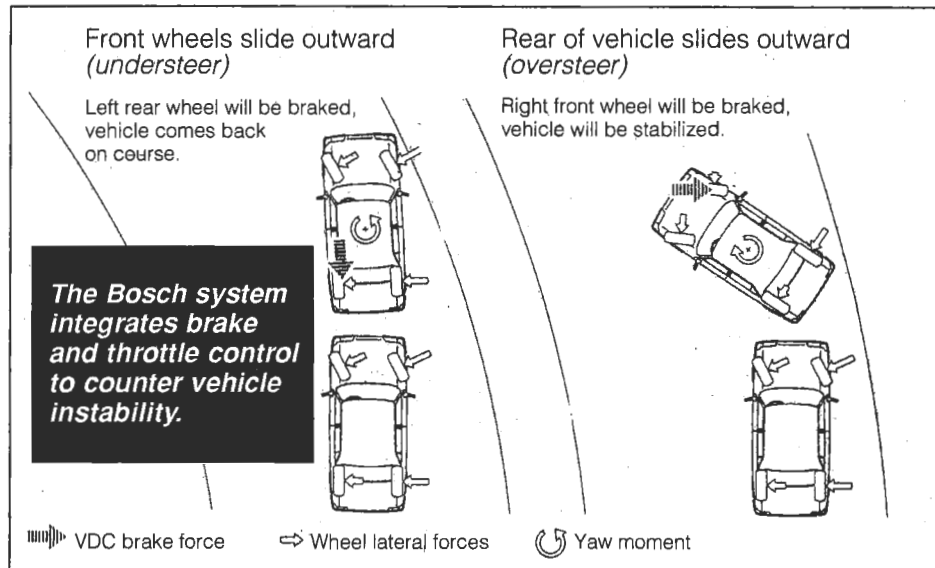
These systems compare individual wheel speeds, yaw, steering angle and lateral acceleration rates against a pre-set algorithm. By looking for deviations that signal the onset of instability, the system can intervene by applying the brakes and/or reducing engine torque to bring the vehicle back into line.

For example, an oversteer condition, would require braking the outside wheels, perhaps coupled with a reduction in engine torque.

Depending on need, engine power could be reduced, a single wheel braked, or any combination. Also, all four wheels can be braked with different forces.

Besides the existing ABS and traction control hardware, a yaw angle sensor, a steering angle sensor and a lateral accelerometer would be added. More advanced systems would add sensors measuring shock absorber displacement to the loop.

These systems will not be generic. Each manufacturer will tailor their systems to the desired vehicle character and dynamics. BMW has already indicated their intent to use the system to enhance the enthusiast-nature of their cars. (*Automotive Industries*)



Not P.C.

Automobile magazine recently featured a comparison of gas guzzlers. This politically incorrect group included a Suburban, a Viper, a Ferrari 512TR, a Ford F-150 Lightning, a Jaguar XJ12, a Mercedes-Benz S600 and a Rolls-Royce Silver Spur III. Not a BMW in sight, but we couldn't resist author P.J. O'Rourke's conclusion:

"I loved this car. I loved the other cars. I love all cars, if the truth be known. We're told cars are dangerous. It's safer to drive through south central Los Angeles than to walk there. We're told cars are wasteful. Wasteful of what? Oil did a lot of good sitting in the ground for millions of years. We're told cars should be replaced with mass transportation. But it's hard to reach the drive-through window at McDonald's from a speeding train. And we're told cars cause pollution. A hundred years ago, the city streets were ankle deep in horse excrement. What kind of pollution do you want? Would you rather die of cancer at eighty or typhoid fever at nine? Cars have made us richer, freer, happier people. Life is better because of cars. Cars are good. If you don't think so, try making out in a country lane on Rollerblades, you eco-weenie."

Charleston, South Carolina, became a new port of entry for BMW NA. Why Charleston? Because next year it will also be a port of exit for BMWs built in South Carolina. As many as 60,000 U.S.-built BMWs will be exported to worldwide destinations, once production is up to capacity. (*BMW Magazine*)

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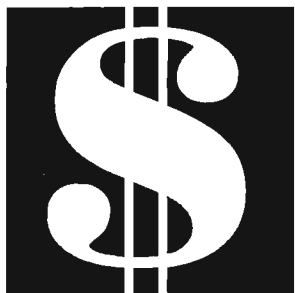
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1976 3.0Si 168K miles, reliable, needs body work. Kenwood stereo/cassette, sheepskins. BMW factory repair manuals. \$1,000. (206) 723-2279.

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1600 / 2002 / 320 parts: 82 320i engine, good compression, \$375; 320i front discs and calipers, \$100; 320i (3.90) differential, \$100; 1600/2002 (4.11) longneck differential, \$75; 1600/2002 transmission, \$150; Weber 2 barrel downdraft manifold off 2002 \$50. Also many parts from 1600 and 80 320i, including 1600 engine, 320 body parts, etc. Ted Rodgers (206) 230-9006 eves, weekends.

Wanted

Driving and events partner(s) for Oktoberfest in Colorado. I'll be driving my 1990 535i to Breckenridge and would like to invite one or two people to share the drive and expenses. I'll also be entering my car in the driving events and tours and need a partner for these events. Call Jeff at 689-3452 (days) and let's talk about doing the trip together.

Parts Wanted

Set of 4 BMW "Starspoke" wheels for 4-bolt 3 series BMW. Condition of paint is not important, but wheels need to be straight and true. Call David at (206) 771-7830 (w) 9 am to 4 pm, Mon-Thur., or leave message on answering machine.

2002 Parts in good to excellent condition: 40 DCOE manifolds, Schrick 292 or 304 cam, tii distributor, tii trailing arms. Purchase or trade (see other ad). Ted Rodgers (206) 230-9006 eves, weekends.

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1980/81 528i 5 speed. Must be straight, clean, rust free, bondo free. Prefer low mileage, but lets talk if it's mechanically sound. Terry (503) 240-5279 (OR)

Isetta. Want any info on car or parts. Call me (206) 582-0803.

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