



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

March 3, 2008

1200 New Jersey Avenue, SE.  
Washington, DC 20590

In Reply Refer To: HSSD/CC-65C

Mr. Felipe Almanza  
Technical Engineering Director  
Mr. Jan D. Miller  
Business Development Manager  
TraFFix Devices, Inc.  
220 Calle Pintoresco  
San Clemente, CA 92672

Dear Messrs. Almanza and Miller:

Thank you for your letter of October 12, 2007, requesting Federal Highway Administration (FHWA) acceptance of your company's Scorpion Test Level 3 (TL-3) Trailer Attenuator (TA) for use on the National Highway System (NHS). Accompanying your letter was a report of crash testing conducted by KARCO Engineering and DVD video of the tests. You requested that we find the TA acceptable for use when attached to vehicles of any mass above 10,000 kg (22,046 pounds) on the NHS under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

### **Introduction**

The FHWA guidance on crash testing of roadside safety hardware is contained in a memorandum dated July 25, 1997, titled "INFORMATION: Identifying Acceptable Highway Safety Features."

A description of the device follows:

The TraFFix Devices Inc. Trailer Attenuator is a truck attached crash cushion which attaches directly to a host vehicle's pintle hook from a standard lunette eye on the attenuator. The overall dimensions are 36 inches x 96 inches x 209 inches (0.91 meters x 2.44 meters x 5.3 meters) and weighs approximately 1,900 pounds (860 kilograms) when fully assembled.

The main components are: a steel tongue section, an aluminum strut section, and a rear cartridge section with axle and tire assembly.

The steel tongue section is the attachment point for the trailer to the host vehicle and incorporates an anti-rotation feature that is activated in the event of an impact. The impact energy shears a steel shear pin, allowing the tongue's inner and outer tubes to slide forward relative to each other. Anti-rotation supports come into contact with the support truck's frame plate. This



contact acts as a positive stop to the trailer's rotation and can induce a reactive force counter to rotation, which prevents the attenuator from rotating. The complete tongue assembly including the pintle eye is 58 inches (1.47 meters) long, with a maximum width of 74 inches (1.88 meters). The complete tongue assembly weighs approximately 639 pounds (290 kilograms).

The aluminum strut section is comprised of a structural energy absorbing curved aluminum tube framework, and a single engineered aluminum crush module. The strut section is the same as that used in the NCHRP-350 approved Traffix Devices Inc., Scorpion Truck Mounted Attenuator (TMA). The strut section is 96 inches (2.44 meters) in width and 57.5 inches (1.46 meters) in length.

The aluminum cartridge section is comprised of a structural energy absorbing curved aluminum tube framework, with three engineered aluminum crush modules. Located at the cartridge is a steel diaphragm frame which provides a stable platform for the axle and wheel assembly. The width is a maximum of 96 inches (2.44 meters) at the wheels and fenders and the length is 24.625 inches (0.63 meters). The cartridge section is the same cartridge section that is currently used in the NCHRP-350 accepted Traffix Devices Inc., Scorpion TMA. The cartridge section is 96 inches (2.44 meters) in width and 96 inches (2.44 meters) in length.

### **Testing**

The Scorpion TA had been tested and found acceptable in FHWA acceptance letter CC-65B dated March 16, 2007. One additional full-scale crash test was conducted. The test was designated 3-51M because the test used a support vehicle that was blocked and prevented from moving. A drawing of the trailer attenuator and a copy of the Test Data Summary Sheet are enclosed for reference.

### **Findings**

The test vehicle impacted the device and came to a controlled stop with virtually no rotation. The occupant impact forces were within the limits specified by NCHRP Report 350. The results of the testing met FHWA requirements and, therefore, the Scorpion TA described above and detailed in the enclosed drawing is acceptable for use on NHS under the range of conditions tested, when permitted by a highway agency. Because the support vehicle was blocked to prevent roll-ahead, the Scorpion TA may be used with support vehicles of any mass greater than 10,000 kg (22,000 pounds). As the TL-3 Scorpion TA was also tested using a 4500 kg (9920 pounds) support vehicle, we concur that the TL-3 Scorpion TA may be used on any vehicle with a mass greater than 4500 kg with no upper weight limit.

Please note the following standard provisions that apply to the FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.

- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number CC-65C, shall not be reproduced except in full. This letter and the test documentation upon which this letter is based are public information. All such letters and documentation may be reviewed at our office upon request.
- The Scorpion Trailer Attenuator is a patented device and is considered "proprietary". The use of proprietary devices *specified by a highway agency* for use on Federal-aid projects must meet one of the following criteria: (a) it must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that it is essential for synchronization with existing highway facilities or that no equally suitable alternative exists; or (c) it must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

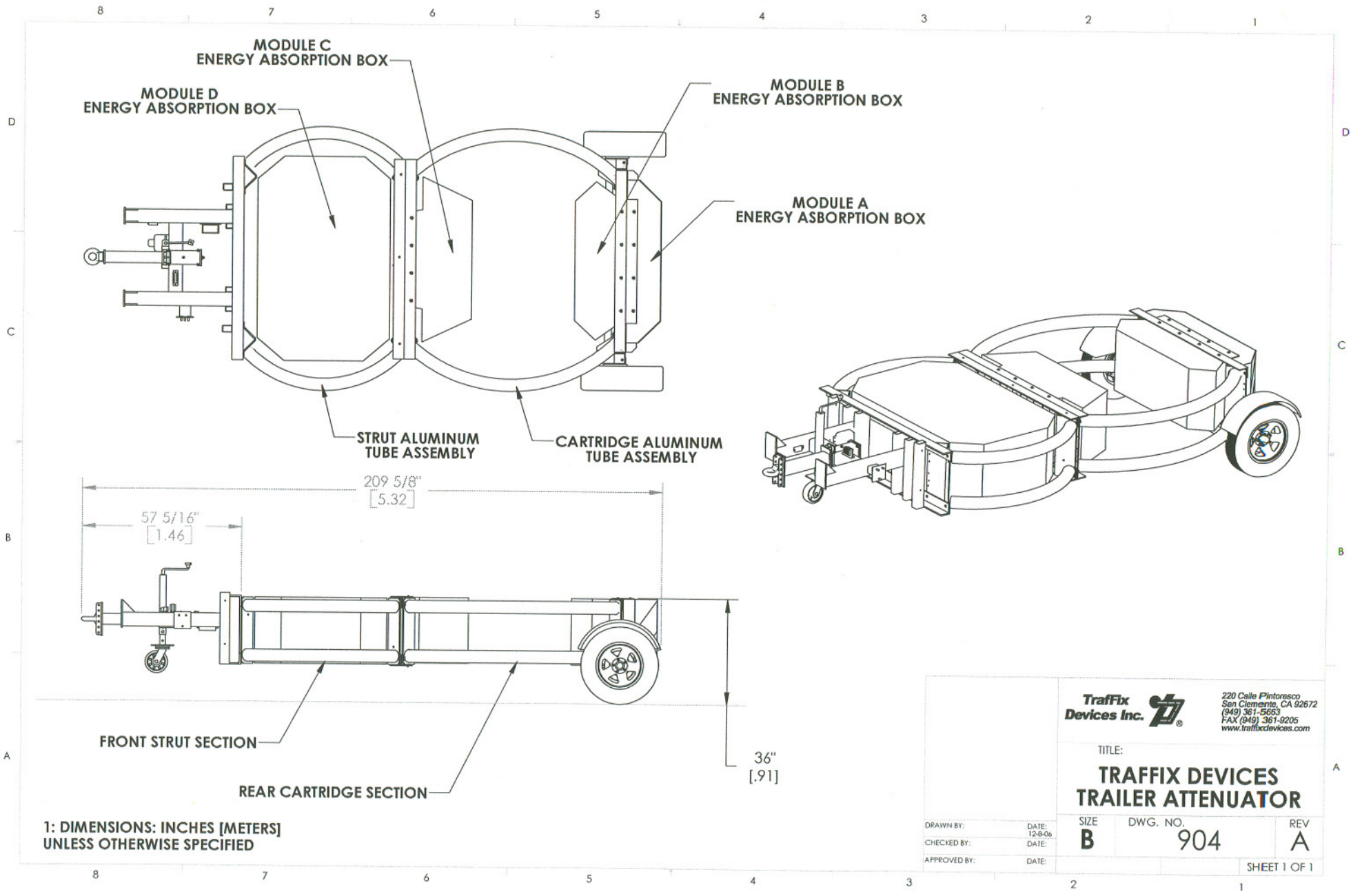
Sincerely yours,

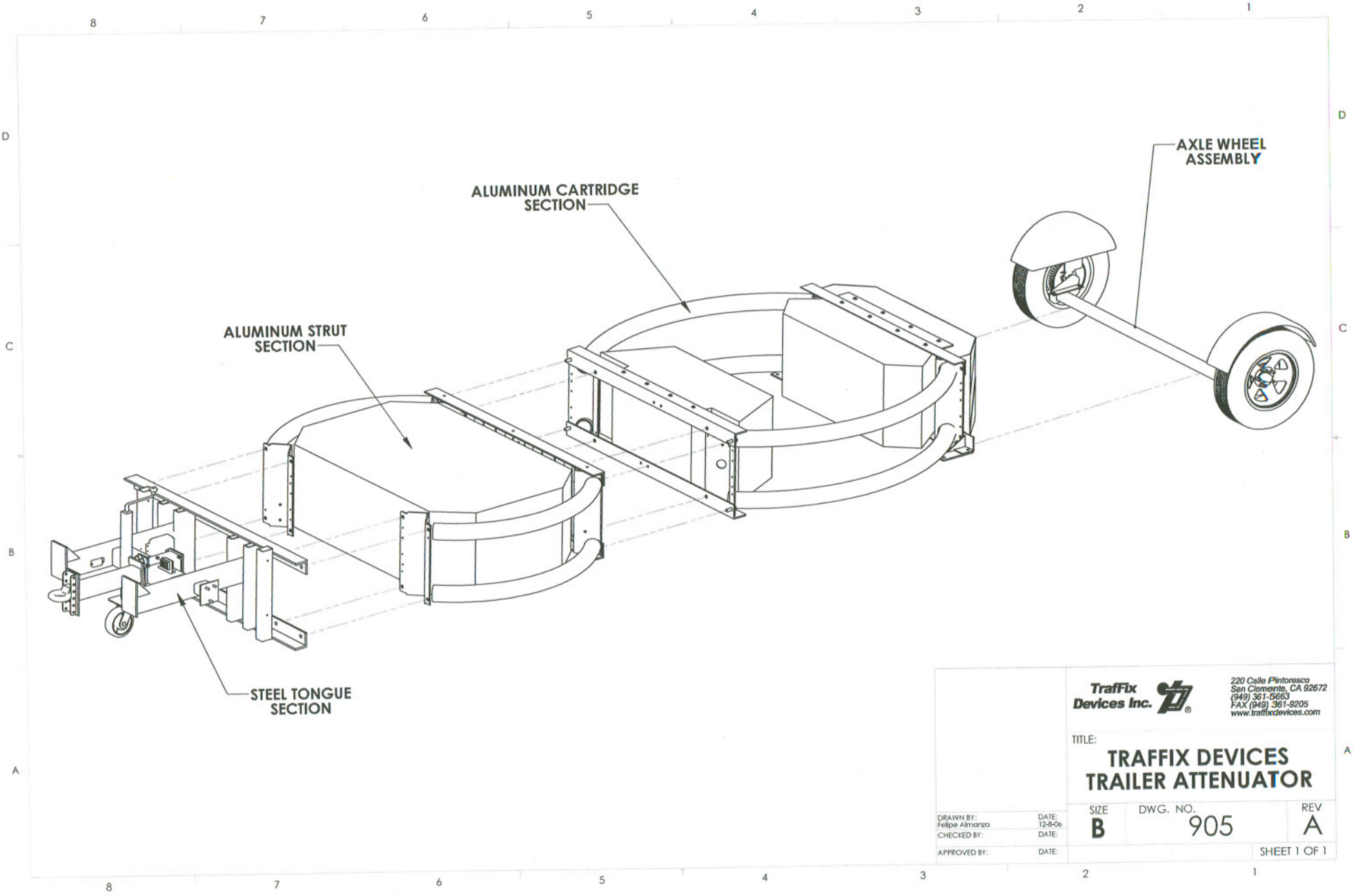


for

David A. Nicol, P.E.  
Director, Office of Safety Design  
Office of Safety

Enclosures





ALUMINUM STRUT SECTION

ALUMINUM CARTRIDGE SECTION

AXLE WHEEL ASSEMBLY

STEEL TONGUE SECTION

		220 Calle Pintoresco San Clemente, CA 92672 (949) 361-5663 FAX (949) 361-9205 www.traffixdevices.com		
		TITLE: <b>TRAFFIX DEVICES TRAILER ATTENUATOR</b>		
DRAWN BY: Felipe Almanza	DATE: 12-8-06	SIZE <b>B</b>	DWG. NO. <b>905</b>	REV <b>A</b>
CHECKED BY:	DATE:	APPROVED BY:		DATE:
			SHEET 1 OF 1	



DATA SHEET NO. 2

SUMMARY OF RESULTS FOR TEST NO. 3-51M



GENERAL INFORMATION		OCCUPANT RISK VALUES	
TEST AGENCY	KARCO ENGINEERING, LLC	FLAIL SPACE VELOCITY (m/sec)	
TEST NO.	3-51M	X-DIRECTION	9.5
DATE	9/26/07	Y-DIRECTION	0.1
TEST ARTICLE	TRAFFIX DEVICES	THIV (optional)	
TYPE	TRAILER ATTENUATOR	RIDEDOWN ACCELERATION (g's)	
INSTALLATION LENGTH (meters)	0.91 (36 in.) X 2.44 (96 in.) X 5.3 (208 in.)	X-DIRECTION	-18.7
SIZE AND/OR DIMENSION OF KEY ELEMENTS		Y-DIRECTION	3.2
SOIL TYPE AND CONDITION	CONCRETE	PHD (optional)	
TEST VEHICLE	2000P	ASI (optional)	1.21
TYPE	PRODUCTION	TEST ARTICLE DEFLECTIONS	
DESIGNATION	PICKUP TRUCK	DYNAMIC	
MODEL	CHEVROLET 2500	PERMANENT	
MASS (CURB)	4846 lbs (2198 kg)	VEHICLE DAMAGE	
MASS (TEST INERTIAL)	4458 lbs (2022 kg)	EXTERIOR	
GROSS STATIC WEIGHT	4458 lbs (2022 kg)	VDS	12-FD-2
IMPACT CONDITIONS		CDC	01FCHW7
SPEED (km/h)	99.84 (62.05 mph)	INTERIOR	
ANGLE (Deg.)	0	OCDI	FS0000000
IMPACT SEVERITY (kJ)	777.9	POST-IMPACT VEHICULAR BEHAVIOR	
EXIT CONDITIONS		MAXIMUM ROLL ANGLE (Deg.)	-0.9
SPEED (km/h)		MAXIMUM PITCH ANGLE (Deg.)	6.4
ANGLE (Deg.)		MAXIMUM YAW ANGLE (Deg.)	2.7