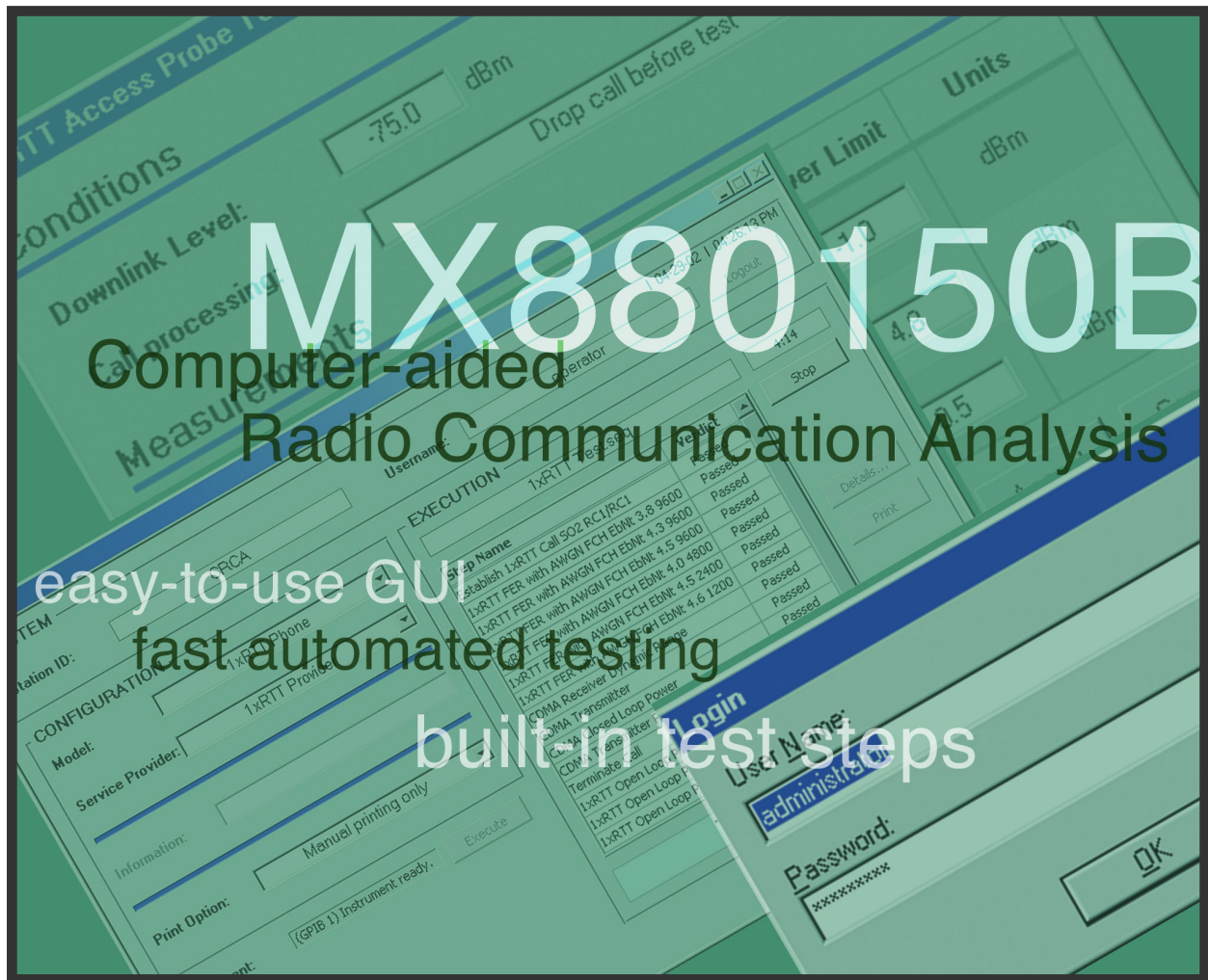# MX880150B

Computer-Aided Radio Communication Analysis

Anritsu

MX880150B
puter-aided
Radio Communication Analysis

-use GUI
automated testing
built-in test steps

MX880150B

The MX880150B Computer-aided Radio Communication Analysis (CRCA) software and an Anritsu Radio Communication Analyzer (MT8801C, MT8802A, or MT8801C1) form a single test solution for fast, automated testing of a majority of the world's wireless handsets. This test system works with phones based on IS-136, GSM, IS-95 and the new cdma2000 1xRTT. The CRCA software provides built-in test steps and an easy-to-use graphical user interface. CRCA greatly simplifies and speeds up the test setup and testing process that repair centers, R&D facilities, and manufacturers require to ensure their phones meet wireless standard specifications. The MX880150B version of CRCA adds support for cdma2000 1xRTT and is an upgrade to the prior CRCA versions (MX880150A and MX880151A); it replaces both prior versions.
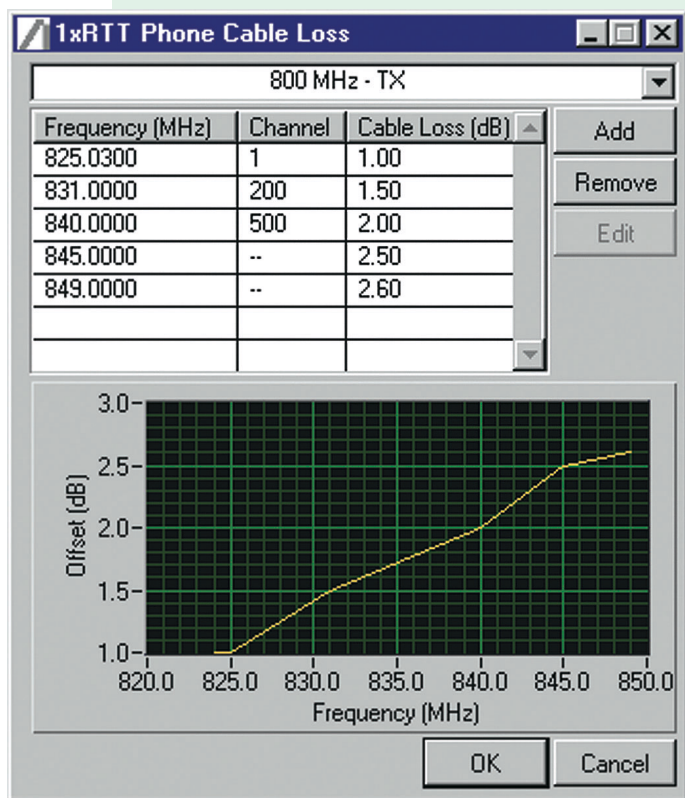
New R&D and Manufacturing Focused Features

New features have been added to CRCA to facilitate its use by manufacturers and R&D labs. The new features include:

• Go To Beginning test step for repeating a test sequence a configurable number of times.

• Re-establish Dropped Calls option enables a sequence to continue even after a call drop.

• Expanded TX & RX Cal Factor Tables allow compensation for test fixture power loss at any number of user-defined frequencies within each band.

• New report options including user-defined test step names and test-specific details.

Expanded IS-98-D Test Coverage

Several new test steps have been added to support R&D and manufacturing needs when testing in accordance with 1xRTT's minimum performance standard IS-98-D. These new Test Steps enable engineers to quickly setup tests for ensuring that their phones comply with IS-98-D.

1xRTT FER with AWGN Test Configuration

Conditions

AWGN Level (Ioc)	-54.0	dBm
Downlink Relative to AWGN (Îor/Ioc)	-1.0	dB
Desired Eb/Nt	2.7	dB
Channel	Supplemental	
Data Rate	8x	1x not supported in Turbo encoding
Confidence Level	95.0	%
Number of Frames	1000	

Measurements

Measurement	Active?	Upper Limit	Lower Limit	Units
Frame Error Rate	✓	5.00		%
Actual Confidence Level	✓		95.00	%
Number of Frames	✓			
Number of Errors	✓			

1xRTT Code Domain Power Configuration

Conditions

Downlink Level	-75.0	dBm
Channel	Supplemental	
Data Rate	8x	1x not supported in Turbo encoding

Measurements

Channel	Active?	Upper Limit	Lower Limit	Units
Pilot	✓			
Fundamental		4.00	3.50	dB
Dedicated Control		4.00	3.50	dB
Supplemental	✓	9.25	8.75	dB

Accept   Cancel

1xRTT Open Loop Power Range Test Configuration

Conditions

Downlink Level:	-93.5	dBm
Call processing:	Drop call before test	

Measurements

Measurement	Active?	Upper Limit	Lower Limit	Units
Mobile Output Power	✓	29.5	10.5	dBm

Defaults for Class III Phones (dBm)

Band	Downlink	Upper	Lower
D800	-25	-38.5	-57.5
D1900	-25	-41.5	-60.5
D800	-65	1.5	-17.5
D1900	-65	-1.5	-20.5
D800	-93.5	29.5	10.5
D1900	-91.3	24.5	5.5

Accept   Cancel

New tests include:

- **1xRTT FER with AWGN:**
  Allows direct entry of parameters like Eb/Nt and Pass/Fail limits for IS-98-D paragraph 3.4.1 Demodulation of Forward Traffic Channel in Additive White Gaussian Noise tests for simple and quick configuration of the tester.

- **1xRTT Code Channel Accuracy:**
  Quickly and easily configures the instrument for measuring IS-98-D 4.4.9.2.2 Code Channel Output Power for the Reverse Traffic Channel enabling quick testing of the MS Code Channel accuracy transmitter performance.

- **1xRTT Open Loop Power Range:**
  Uses Access Probes to perform the Range of Open Loop Power tests as called out in IS-98-D paragraph 4.4.1 for the Access Channel.

easy-to-use GUI
fast automated testing

1xRTT Access Probe Test Configuration

Conditions

Downlink Level: -75.0 dBm

Call processing: Drop call before test

Measurements

Measurement	Active?	Upper Limit	Lower Limit	Units
Probe Flatness	✓	1.0	-1.0	dBm
First Probe Deviation	✓	7.2	4.8	dBm
Probe Increment	✓	1.5	0.5	dBm

[Accept] [Cancel]

- **1xRTT Access Probe:**
  Implements the majority of IS-98-D 4.4.3 Access Probe Output Power tests for the Access Channel.

- **1xRTT Spurious Close to Carrier:**
  Implements IS-98-D 4.5.1 Conducted Spurious Emissions test for spurious frequencies close to the carrier.

- **1xRTT Gated Output Power:**
  Performs the necessary Gated Output Power measurement to demonstrate compliance with IS-98-D paragraph 4.4.7.

- **1xRTT Open Loop Time Response:**
  Provides for the ability to perform IS-98-D paragraph 4.4.2 Time Response of Open Loop Power Control.

Existing Test Steps include:

- CDMA Closed Loop Power: Provides for an automated method of testing IS-98-D paragraph 4.4.4 Range of Closed Loop Power Control.

- CDMA Receiver: Makes FER measurements needed to support IS-98-D paragraph 3.51 Receiver Sensitivity and Dynamic Range using SO2/SO9 FER for RC1-2 and TDSO FER for RC3 and higher.

- CDMA Transmitter: Automates the testing IS-98-D paragraph 4.1 Frequency Accuracy, paragraph 4.3.1 Time Reference without Fading, and paragraph 4.3.4 Waveform Quality and Frequency Accuracy.

- CDMA Transmitter Power: Supports IS-98-D paragraph 4.4.5 Maximum RF output power and paragraph 4.4.6 Minimum Controlled Output Power.

CRCA

SYSTEM | 04-29-02 | 04:26:13 PM

Station ID: CRCA   **Username:** operator   [Logout]

CONFIGURATION

Model: 1xRTT Phone

Service Provider: 1xRTT Provider

Information:

Print Option: Manual printing only

Instrument: ((GPIB 1) Instrument ready.   [Execute]

EXECUTION

1xRTT Test.seq   4:14   [Stop]

Step Name	Verdict
Establish 1xRTT Call SO2 RC1/RC1	Passed
1xRTT FER with AWGN FCH EbNt 3.8 9600	Passed
1xRTT FER with AWGN FCH EbNt 4.3 9600	Passed
1xRTT FER with AWGN FCH EbNt 4.5 9600	Passed
1xRTT FER with AWGN FCH EbNt 4.0 4800	Passed
1xRTT FER with AWGN FCH EbNt 4.5 2400	Passed
1xRTT FER with AWGN FCH EbNt 4.6 1200	Passed
CDMA Receiver Dynamic Range	Passed
CDMA Transmitter	Passed
CDMA Closed Loop Power	Passed
CDMA Transmitter Power	Passed
Terminate Call	Passed
1xRTT Open Loop Power Range -25 dBm	Passed
1xRTT Open Loop Power Range -65 dBm	Passed
1xRTT Open Loop Power Range -93.5 dBm	Passed

[Details...] [Print]

Testing...

[Re-Test] [Next Phone] [Exit]

Operator Interface

The operator interface provides a simple and intuitive method for wireless phone testing. The operator merely selects the phone model to be tested and the corresponding service provider, then clicks the Execute button. Other information, such as customer name, may be input and printed on the results report. User intervention is very simple and only required on a few tests, thus operator training is minimized and productivity is enhanced.
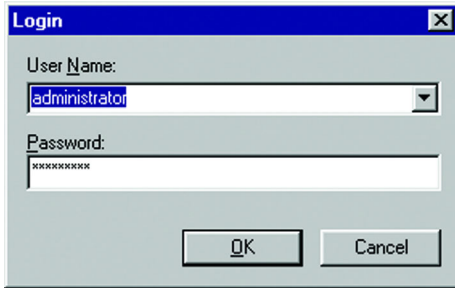
Security Levels

CRCA is password-protected. Users are designated as "operators" or "administrators" and are required to login when the program is booted. The login process protects the integrity of the test parameters as configured by the administrator.
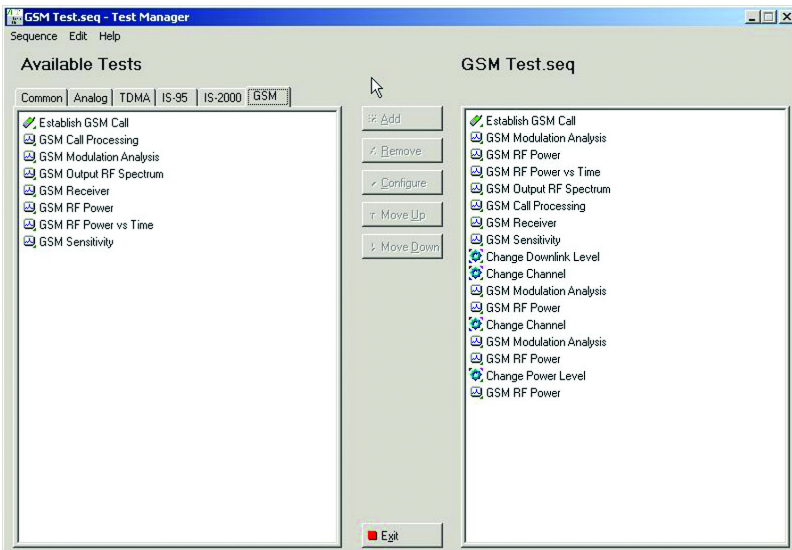
Test Manager

Test Manager creates and configures test sequences. To test a phone, a test sequence must be created and associated with that phone. The administrator selects from available test steps in Test Manager and determines the order in which the steps will be executed. Each phone and service provider pair has an associated test sequence assigned by the test administrator. When an operator selects the phone and corresponding service provider to be tested, a single test sequence is identified by CRCA.
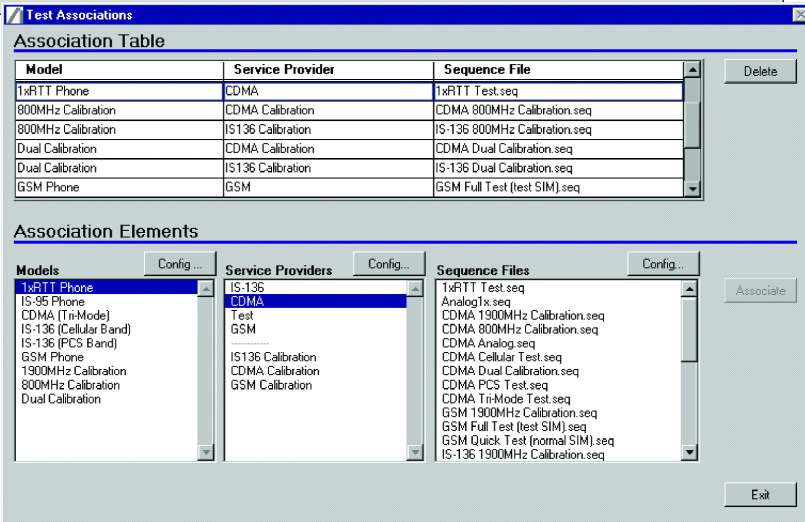
Test Associations

In order for a test sequence to be used, it must be registered and associated with a specific phone model and service provider. The Test Association configuration screen allows a phone model and service provider pair to be associated with a particular test sequence. An unlimited number of phone models, service providers and associations can be defined.

User Manager

An administrator creates users and passwords in User Manager. The level of privilege ("administrator" or "operator") is defined when a user is created. Administrators have greater privileges with access to all configuration screens, while operators may only select and run test sequences.
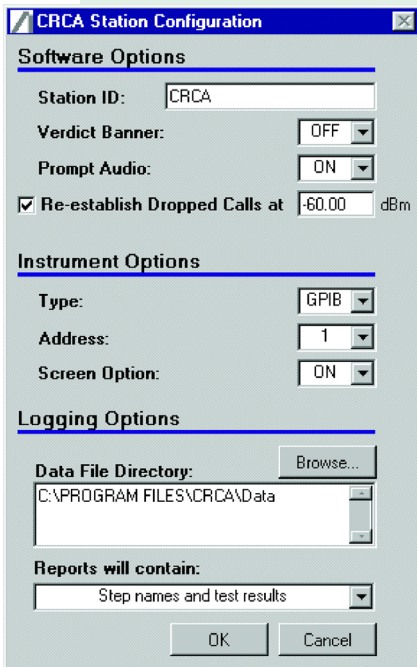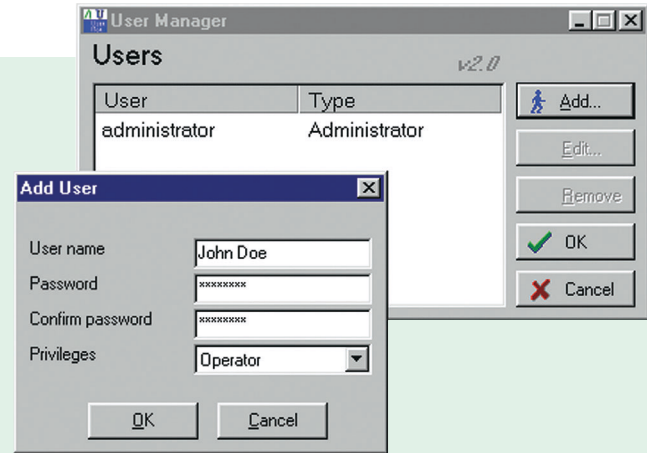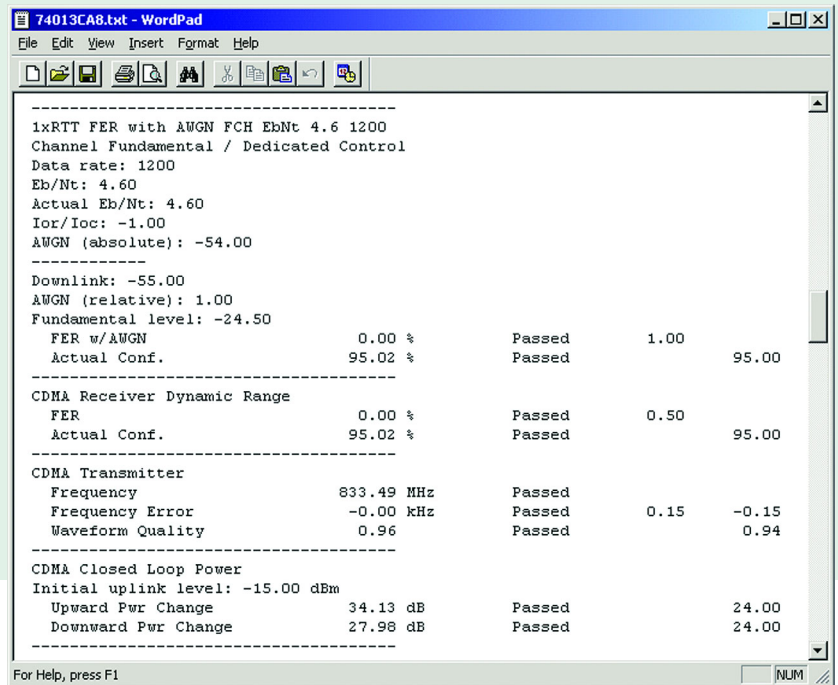
Station Configuration

The Station Configuration screen allows each test station to be customized. On this screen, each station may be given a unique ID to distinguish it from all other test stations. Other items that can be configured are the verdict banner (determines whether a large PASS/FAIL splash screen is displayed at the completion of a test sequence), the instrument GPIB address, screen option (turns the instrument screen ON or OFF) and the directory in which the data files will be saved.

Data Files

When a phone is tested, a data file of test results is automatically saved. The data files are saved with a file extension of "dat". Each data file created has a unique name. Because the file is in tab-delimited format, the file can easily be imported into a spreadsheet and data can easily be extracted to run reports and track test results.

Test Reports

Following a test, a text file is created that provides details of the test and results. The operator or administrator can select to view this file from the operator interface. The information displayed in this text file is identical to that in the data file, but it is formatted for easier reading by the user.

```
1xRTT FER with AWGN FCH EbNt 4.6 1200
Channel Fundamental / Dedicated Control
Data rate: 1200
Eb/Nt: 4.60
Actual Eb/Nt: 4.60
Ior/Ioc: -1.00
AWGN (absolute): -54.00
------------
Downlink: -55.00
AWGN (relative): 1.00
Fundamental level: -24.50
   FER w/AWGN              0.00 %        Passed       1.00
   Actual Conf.          95.02 %        Passed               95.00
-------------------------------------
CDMA Receiver Dynamic Range
   FER                    0.00 %        Passed       0.50
   Actual Conf.          95.02 %        Passed               95.00
-------------------------------------
CDMA Transmitter
   Frequency            833.49 MHz       Passed
   Frequency Error       -0.00 kHz       Passed       0.15      -0.15
   Waveform Quality       0.96           Passed                 0.94
-------------------------------------
CDMA Closed Loop Power
Initial uplink level: -15.00 dBm
   Upward Pwr Change     34.13 dB        Passed               24.00
   Downward Pwr Change   27.98 dB        Passed               24.00
-------------------------------------
```

Tests Supported

1xRTT

Transmitter Tests	Receiver Tests
Frequency and Frequency Error	Sensitivity & Dynamic Range
Waveform Quality	Demodulation of Traffic Channel in AWGN
Timing Error	
Magnitude and Phase Error	
Origin Offset	
Power Measurements: Transmit Power	
Range of Closed Loop Power	
Range of Open Loop Power	
Open Loop Time Response	
Gated Output Power	
Conducted Spurious Emissions	
Access Probe Tests	
Code Channel Output Accuracy	

TDMA

Transmitter Tests	Receiver Tests
Frequency and Frequency Error	Reported RSSI and BER
Vector Error (RMS, First 10-symbol and Peak)	
Magnitude and Phase Error	
Origin Offset	
Droop Factor	
Bit Rate Error	
Power Measurements: Transmit Power, Carrier Off	
Power, On/Off Ratio, Burst Timing, Rising/Falling	
Time and Template Pass/Fail	
Occupied Bandwidth	
Adjacent Channel Power	

CDMA

Transmitter Tests	Receiver Tests
Frequency and Frequency Error	Frame Error Rate
Waveform Quality	
Timing Error	
Magnitude and Phase Error	
Origin Offset	
Power Measurements: Transmit Power	
and Range of Open and Closed Loop Power	

GSM

Transmitter Tests	Receiver Tests
Frequency and Frequency Error	BER/FER
RMS/Peak Phase Error	
Magnitude Error	
Power Measurements: Transmit Power, Carrier Off Power,	
On/Off Ratio, Max/Min Power, Time Alignment,	
Power Template Pass/Fail	
Power vs Time Template	
Output RF Spectrum	
Sensitivity	

AMPS

Transmitter Tests	Receiver Tests
Frequency Error	Residual Deviation
Transmitter Power	SAT Frequency Error and SAT Peak
Deviation	
Residual Deviation	

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