

# NautoPilot® 5000 Series

Adaptive Heading Control System





# NautoPilot® 5000 Series

Autopilot systems developed and manufactured by Raytheon Anschutz are based on proven steering algorithms that have been well known by seafarers for outstanding steering performance and reliability for decades.

NautoPilot 5000 is our latest autopilot series which has been specially designed for all ships of 100 m length and above. NP 5000 provides heading control, and course control and is part of a track control system. It combines best steering performance

with lowest rudder activity for less fuel consumption. In addition it allows an intuitive operation and provides a perfect feedback about the steering performance.



## BENEFITS AT A GLANCE

- Precise steering – thanks to unique Anschutz steering algorithms
- Ease of use and intuitive handling
- Fuel-saving thanks to weather adaptivity
- Simple adjustment of autopilots parameters by use of heading and rudder plotter
- Cross acceleration monitor for identification of dangerous situations
- Course control mode for automatic drift compensation
- Approved as part of a track control system in combination with several ECDIS
- Approved for high speed crafts

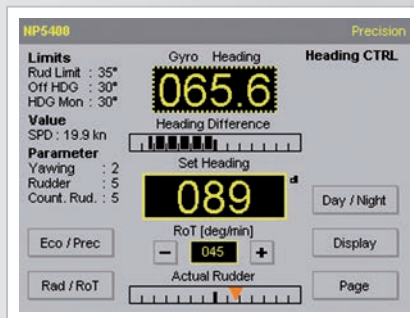




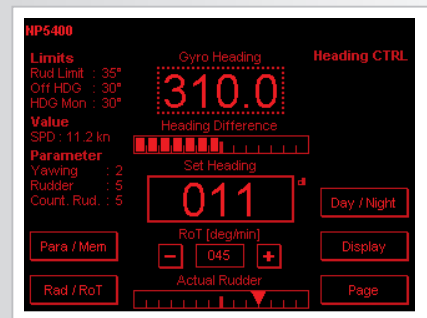
## THE HANDLING OF AN AUTOPILOT HAS NEVER BEEN EASIER!

- You will feel familiar with NP 5000 after a few minutes due to its intuitive operating philosophy.
- All main functions are operated via hard keys. To change the course you just turn and push the knob.
- All secondary functions are operated via soft keys on the

touch screen. The large 5.7" graphical touch display ensures a clearly arranged presentation of information. The menu structure is clear and transparent. All pages are available in day and night mode.



NautoPilot 5000 main screen with touch operation



Six different day and night modes ensure optimal readability under different ambient conditions

## AUTOPILOTS OF THE NP 5000 SERIES

### Track control

The NP 5000 series includes four different autopilots which are distinguished by functional range:

	Heading control	Course control	Weather adaptivity	Track control Category C	Cross Acceleration Monitor	High Precision Controller
NP 5100	✓					
NP 5300	✓	✓	✓			
NP 5400	✓	✓	✓	✓	✓	
NP 5500	✓	✓	✓	✓	✓	✓

NP 5500 is intended for use in areas where highest precision is required (such as archipelagos).

The Acceleration Monitor (available from NP 5400 up) monitors the cross acceleration of a ship and provides a warning if a user defined threshold is exceeded. Dangerous situations are avoided

due to this unique feature of NP 5400/5500, resulting in increased safety for life, ship and cargo.



## DO YOU CARE ABOUT FUEL CONSUMPTION?

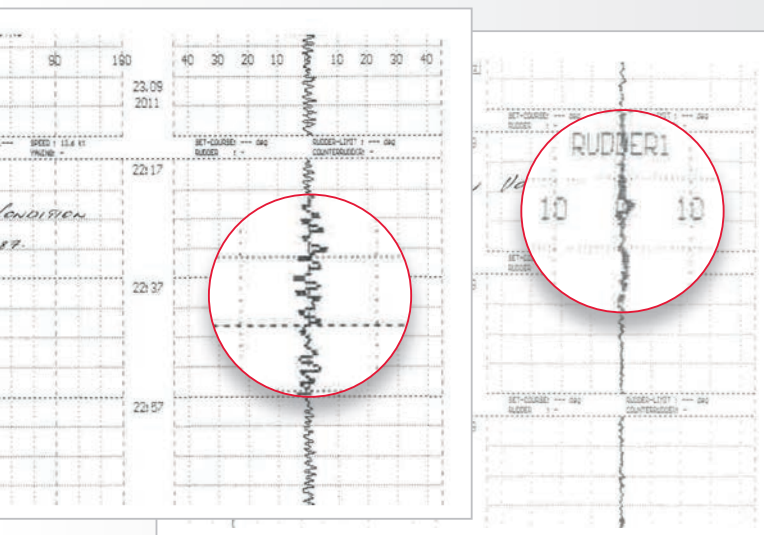
If yes, NP 5000 should be your autopilot of choice.

In Economy mode the intelligent adaptivity of NP 5000 analyses the yawing movements of the vessel. Periodical movement will be identified and the controller reduces its sensitivity to such movements. Subsequently less rudder action is required, which leads to lower levels of speed reduction and thus less fuel consumption – automatically and continuously.



Rudder activity and heading changes are displayed. Autopilot settings can directly be changed.

In addition NP 5000 is equipped with an integrated heading and rudder plotter, which provides a graphical indication of heading changes and rudder activity. This indication instantaneously indicates the steering performance of the autopilot due to the effects of changes to parameter settings such as rudder, counter rudder and yawing. The operator benefits from simple adjustments of the autopilot's settings to gain optimized steering performance, which results in minimal rudder action and thus again reduced fuel consumption.



Comparison of heading and rudder plots: old autopilot (left), NP 5000 (right)

The actual effect of NP 5000 on rudder steering can be seen when comparing the heading and rudder plot of two voyages of an oil tanker between Skagen and New York. Similar weather conditions were observed during both voyages.

The left print-out shows the results of the vessel's last voyage before retrofitting the old autopilot system with NP 5000. The right print-out shows results of the following voyage with NP 5000.

It becomes obvious that rudder movement is more economic and gentle with NP 5000. Less rudder movements means less fuel consumption and more efficient ship operation.



## CHOOSE FROM THREE OPERATION MODES

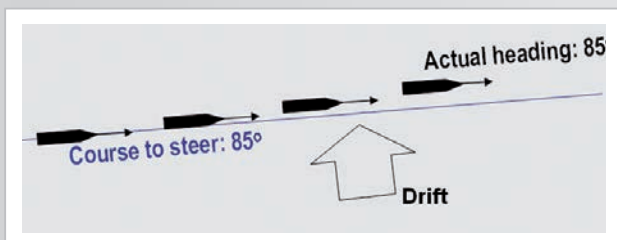
NP 5000 can be operated in classic heading control mode, but also offers course control and track control modes.

### Course control

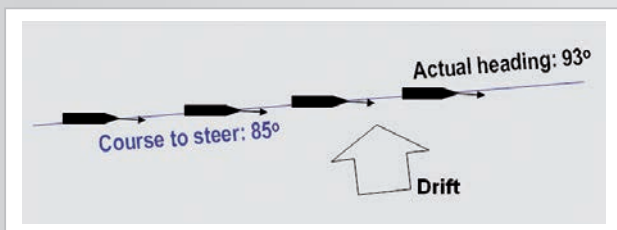
Often heading control and course control are used synonymously. But in fact it is a significant difference for navigation. In heading control it is necessary to compensate for drift manually.

To overcome this disadvantage Raytheon Anschutz introduces the course control mode. No manual drift corrections are required as the NP 5000 steers the vessel on a course over ground line.

This leads to a more precise steering as NP 5000 compensates for any drift deviations automatically.



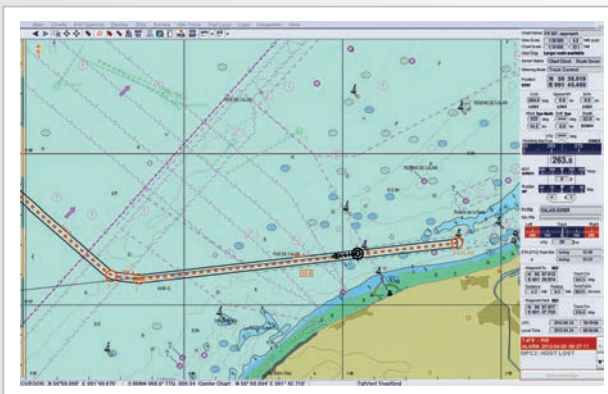
In heading control the course over ground line of the vessel is affected by drift and wind



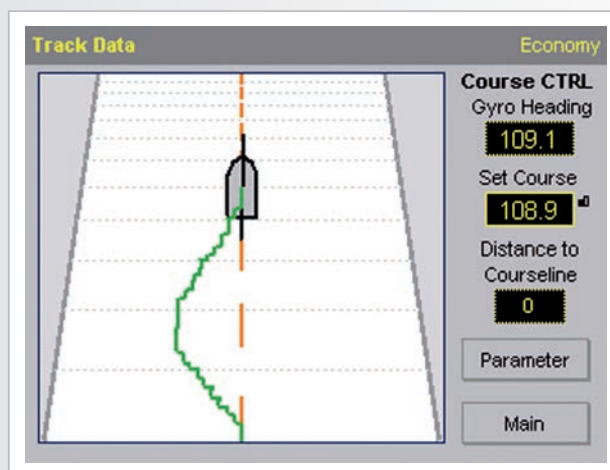
In course control the vessel stays on its course over ground line independently of drift and wind

### Track control

NP 5000 is also approved as a track control system (in the best category C) in combination with Raytheon Anschutz ECDIS as well as several other ECDIS of different manufacturers. A route (consisting of one or more tracks) is planned in the ECDIS and NP 5000 steers the vessel automatically and accurately on that route.



Route planning is done on ECDIS and NP 5000 ensures accurate track steering



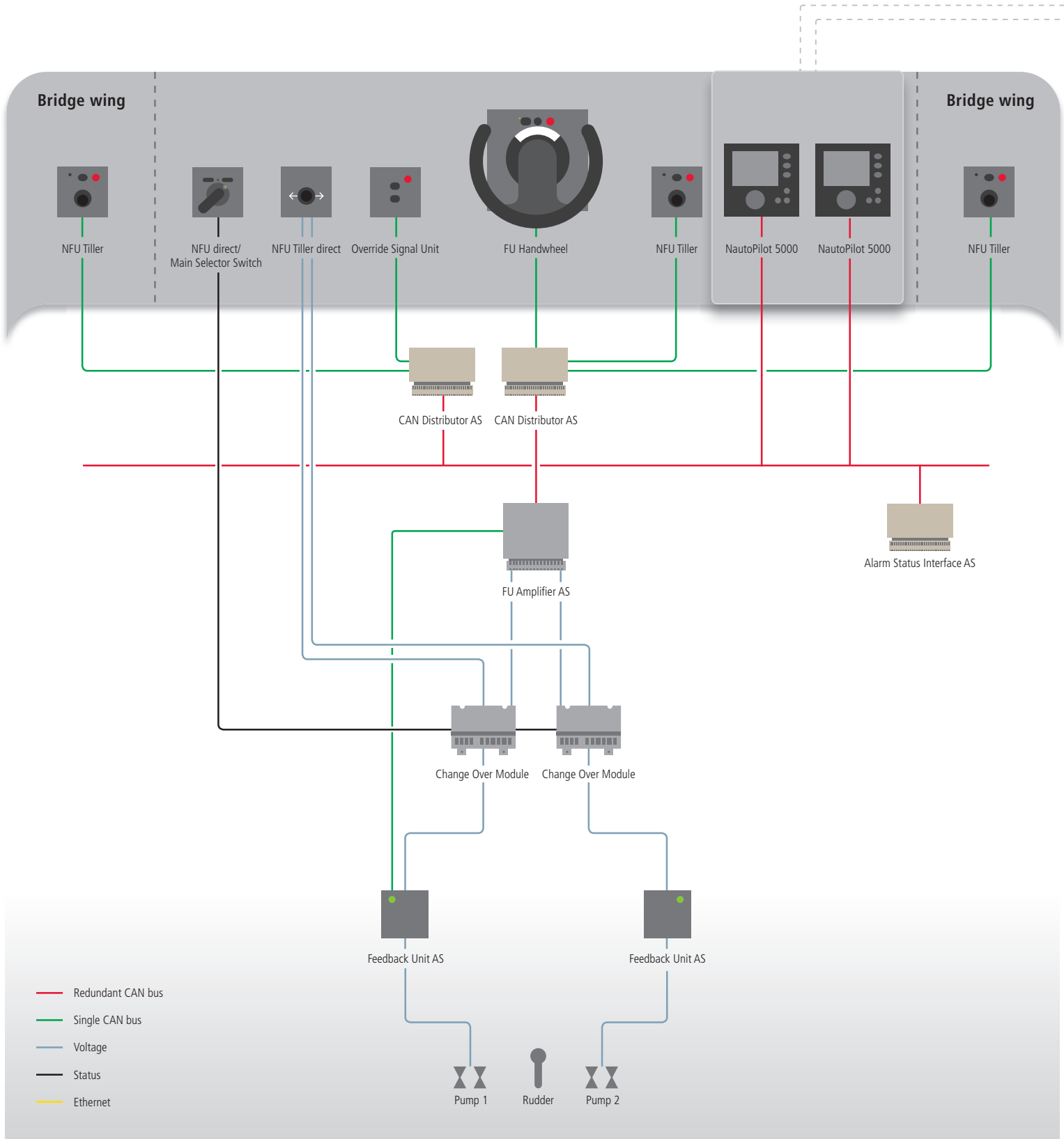
NautoPilot 5000 illustrates graphically any deviations from the course over ground line

# EASY INTEGRATION INTO STEERING GEAR CONTROL SYSTEMS

NP 5000 can be used in different system environments

In combination with NautoSteer AS, NP 5000 is connected directly to the redundant CAN bus of NautoSteer AS. The automatic control is simply activated by pushing the heading control button.

If required, more than one NP 5000 can be connected directly to the CAN bus. If it needs multiple operation units, Raytheon Anschutz can offer two solution:

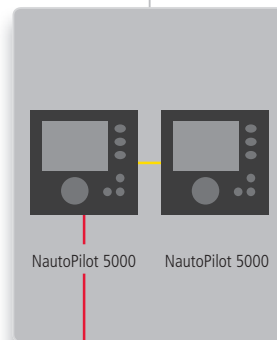




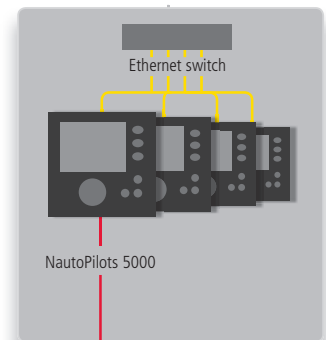
### Solution 1

Several NP 5000 are connected to the redundant CAN bus. The number of NP 5000 is actually only limited by the total number of CAN bus addresses. These autopilots are independent of each other: each one uses its own controller but also parameters like rudder, counter rudder, yawing, limits, parameter sets, etc. The autopilots are activated via take-over by pushing the heading control button. Track control can be done with more than one NP 5000 by switching the communication with ECDIS.

### Solution 2



### Solution 3

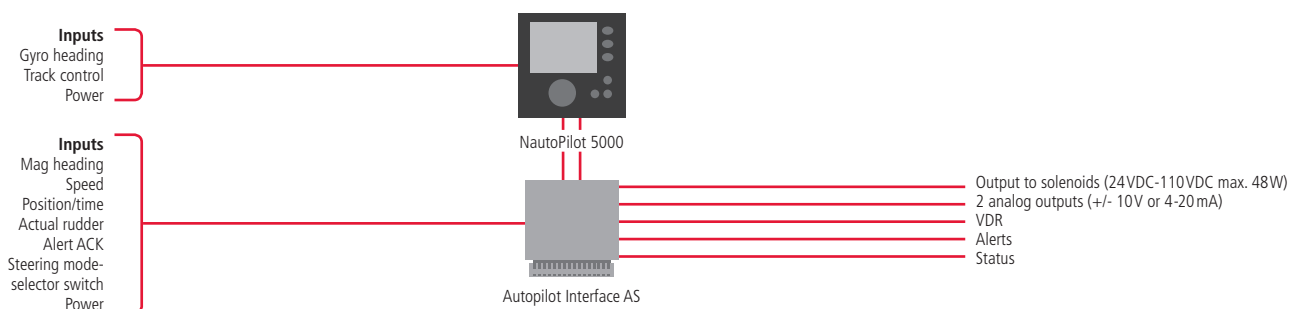


One operator unit (master NP 5000) is connected to the redundant CAN bus. Up to seven NP 5000 operator units can be used in this configuration. The other operator units allow remote operation of the master NP 5000 but all use the same parameters such as rudder, counter rudder, yawing, limits, parameter sets, etc. The master NP 5000 determines the variant (e.g. NP 5400). The autopilots are activated via take-over by pushing the heading control button. Track control can only be done with the master NP 5000.

## STAND-ALONE INSTALLATION AND RETROFIT

In combination with other steering gear control systems than NautoSteer AS or for retrofitting old autopilots: In this case an interface unit is added to NP 5000. This interface unit provides the interfaces to the steering gear control system or directly to

the steering gear. NP 5000 is activated via a steering mode selector switch. Due to its multitude of interfaces NP 5000 is the best choice for retrofitting old autopilots.



## TECHNICAL DATA

### Supply voltage & power consumption

- 24 V DC (18-36 V DC)
- Approx. 25 W

### Signal inputs

Gyro compass, satellite compass

- Course Bus or NMEA telegrams HEHDT, HETHS, GPHDT, GPTHS

Magnetic compass / fluxgate

- Course Bus or NMEA telegrams HCHDT, IIHDM, HCHDG, HCTHS
- With magnetic compass sonde 108-010

Speed log

- Course Bus or NMEA telegrams VTG, VHW, VBW  
(with talker identifier VD, VM, VW, GP)
- 200 pulses/nm

Position receiver

- NMEA telegrams GPGLL, GPGGA

ECDIS

- according to IEC 62065 (track control system)
- NMEA telegram APB (waypoint steering for NP 5100 and NP 5300)

### Signal outputs to steering gear

- 2 switching outputs (24V DC – 110V DC, max. 48 W)
- 2 analog outputs (+/- 10 V DC, max. 5 mA, or 4–20 mA)

### Status/alarm outputs

- Off-heading
- Heading monitor
- Steering failure
- System failure
- Bi-directional central alarm reset
- Autopilot on

In accordance with

- ISO 11674
- IEC 62065 (in combination with Raytheon Anschutz ECDIS)
- NMEA according to EN/IEC 61162-1 and EN/IEC 61162-2
- EN/IEC 60945
- ISO 16329
- A.342(IX), A.694(17), MSC.64(67) Annex 3, A.822(19)

For details refer to EC-type examination certificate.

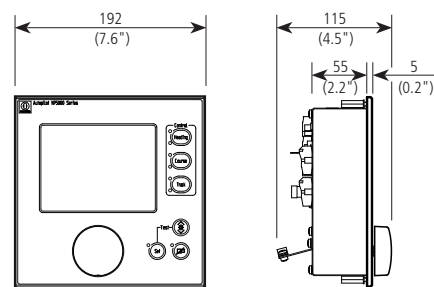
### Type of enclosure acc. to IEC/EN 60529

- Autopilot operator unit: IP23 / IP56 (front side)
- Autopilot interface: IP 12

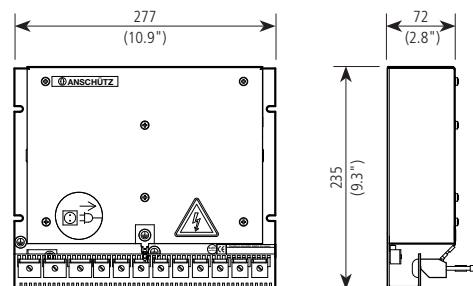
### Temperature range

- Operation: -25°C to + 55°C (autopilot operator unit)  
-15°C to + 55°C (autopilot interface)
- Storage: -40°C to + 70°C

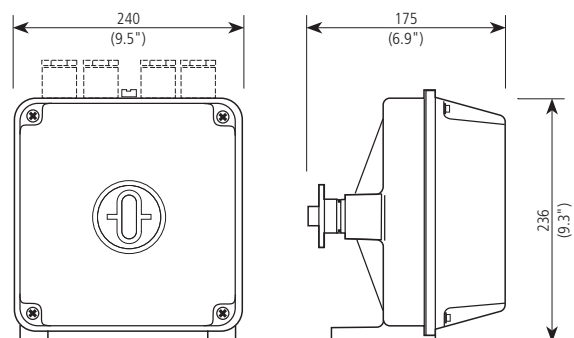
### NP 5000 Operator Unit 1.5 kg



### Autopilot Interface AS 3 kg



### Feedback Unit 4 kg



Subject to change due to technical developments without notice.

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