

Marine & Offshore 船舶和海洋工程
Dynamic Positioning Systems 动力定位系统

April 2009
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DP Control Modes

DP 控制模式

INTRODUCTION

- **Basic Principles** 基本原理
- **Class Rules** 船级社规范
- **Sensors** 传感器
- **Position Measurement Equipment (PME)** 位置测量装置
- **Control Modes** 控制模式
- **Operator Interface** 操作员界面
- **Basic Hardwired Interface** 基本接口界面

Basic DP Control Modes 基本DP控制模式

- Joystick Manual Heading 操纵手柄手动定向
- Joystick Auto Heading 操纵手柄自动定向
- Auto Position or Dynamic Positioning 动力定位
- Minmum Power 最小功率
- Trackfollow 轨迹追踪
- Autopilot 自动舵
- Autosail 自动航行
- Model Control 模型控制

Control Modes - JSMH (Joystick Manual Heading)

控制模式—JSMH（操纵手柄手动定向）

Manual manoeuvring of vessel

手动操纵船舶

Uses whatever thrust is available

用任何的推进器均可行



Control Modes - JSAH (Joystick Auto Heading)

控制方式—JSAH（操纵手柄自动定向）

**Manual manoeuvring on fore/aft,
port/stbd axes**

在前/后，左/右轴向上手动操纵

Automatic heading control

自动航向控制

Requires Bow and Stern thrust

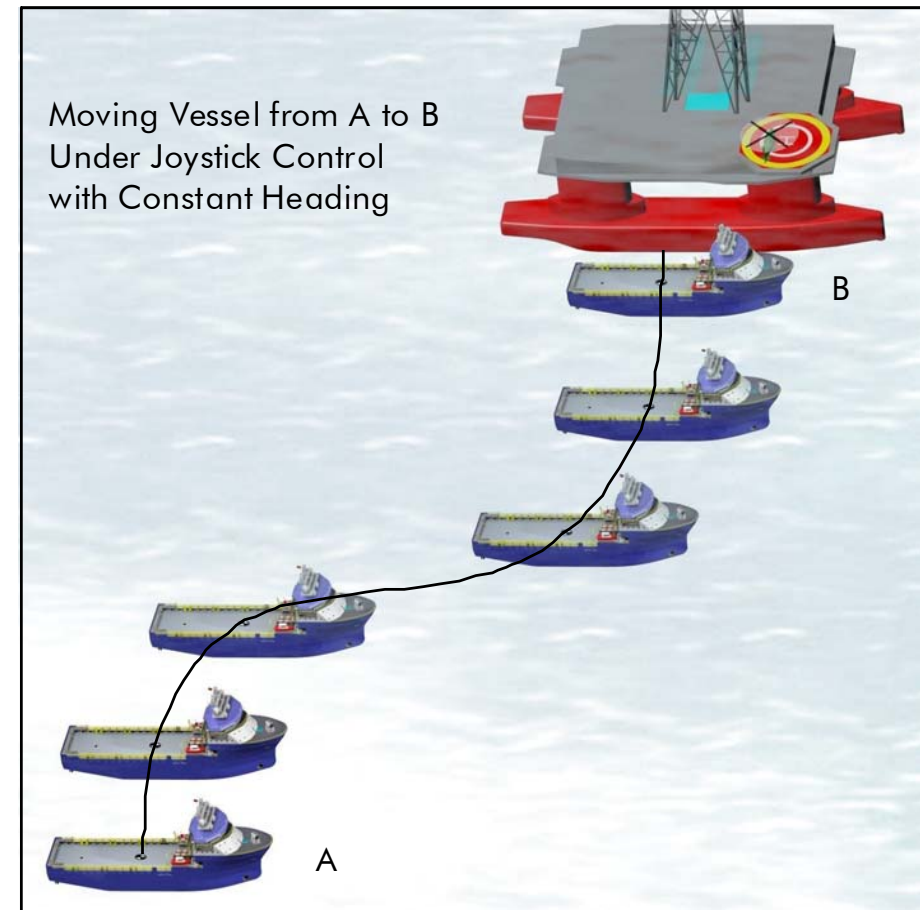
要求艏艉侧推

Below 4 knts

在4knts以下

**Requires a minimum of one
gyrocompass to be selected**

要求最少选择一个电罗经



Control Modes - DP (Dynamic Positioning) 控制模式—DP（动力定位）

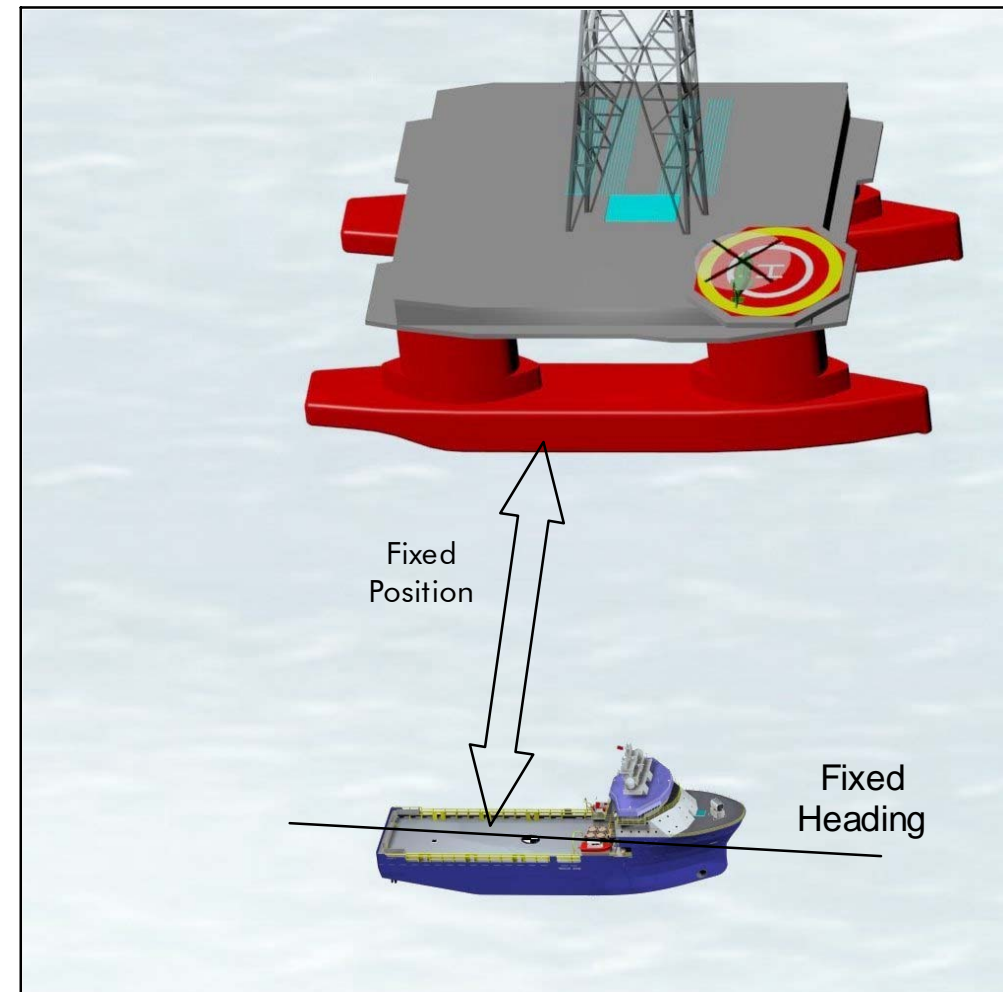
Automatic control of heading,
fore/aft and port/stbd axes
在前/后，左/右轴向上自动控制航向

Requires bow, stern, ahead and
astern thrust

要求艏艉，向前和向后的推力

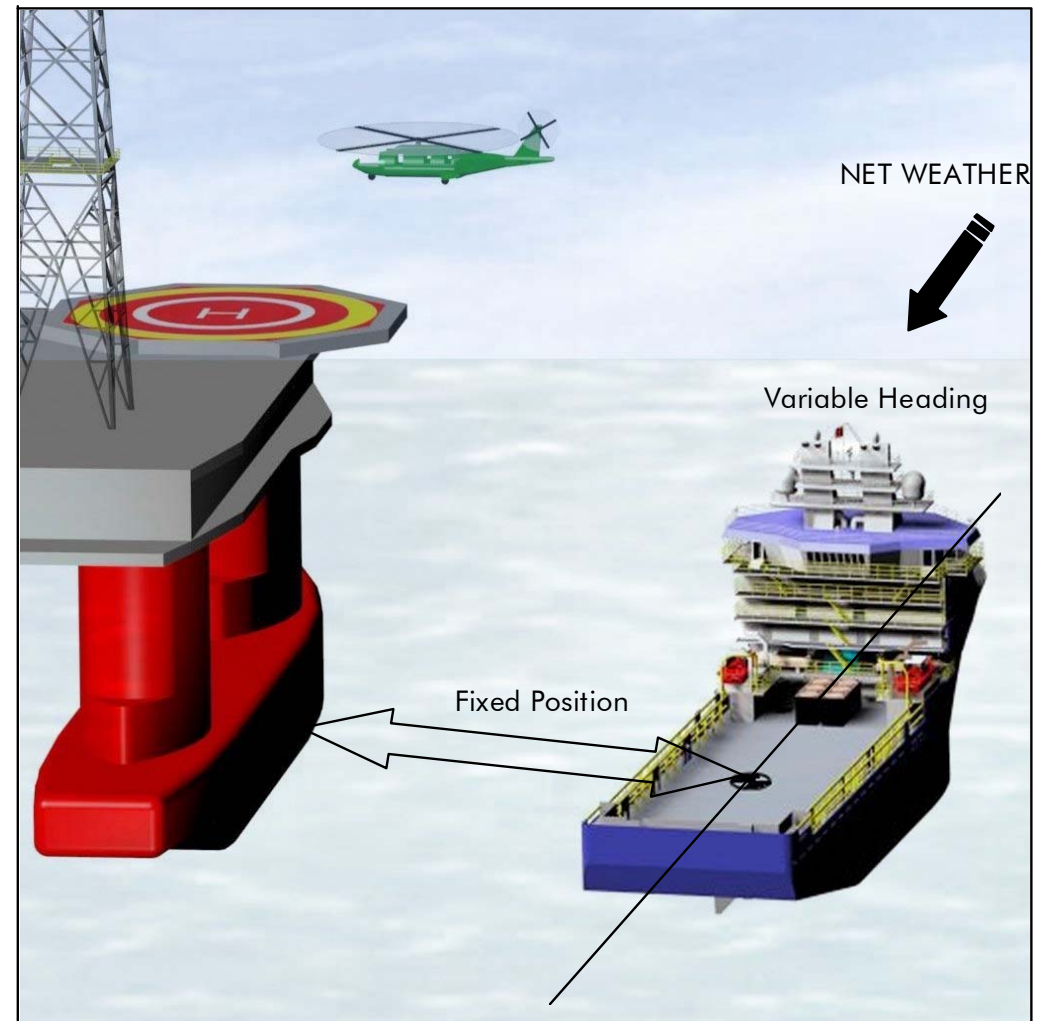
Requires a minimum of one
gyrocompass and one PME to be
selected

要求最少选择一个电罗经和PME。



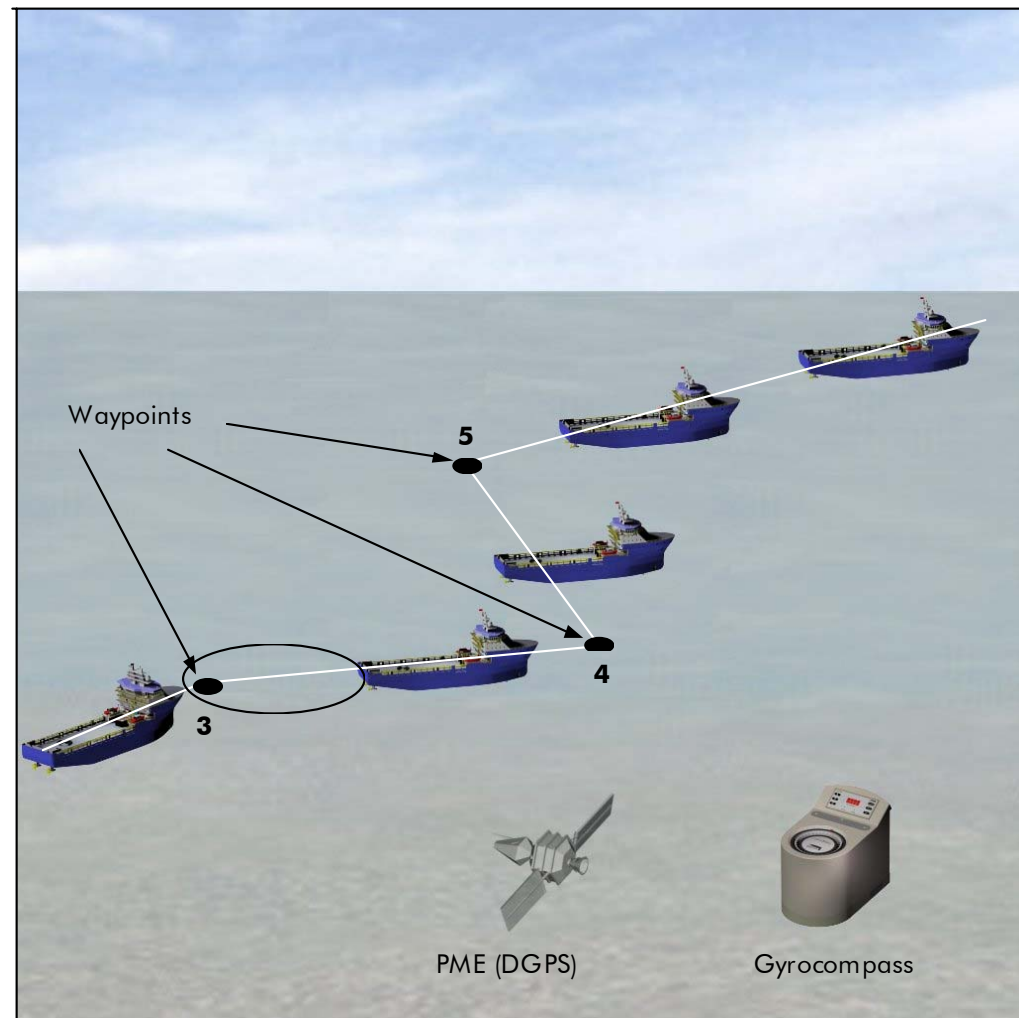
DP MINIMUM POWER DP 最小功率

- Minimum Power mode allows the DP system to automatically turn the vessel's heading into the net weather force, thus reducing the total load on the propulsion equipment. X and Y axes are still maintained on position by the use of a PME device.
- 最小功率模式允许DP系统自动调整航向到环境力方向，这样可以减少推进设备的总负荷。用一套PME设备可以保持X和Y向位置。



Track Follow 轨迹追踪

- **Automatic control of fore/aft and port/stbd axes heading along a predefined track.**
根据预定义的轨迹自动控制前/后, 左/右航向。
- **Requires bow, stern, ahead and astern thrust**
要求艏艉, 向前和向后的推力
- **Vessel can travel along track at any heading.**
- 船可以根据任何航向航行
- **Requires a minimum of one gyrocompass and one PME to be selected**
要求最少选择一个电罗经和PME。



Track Follow Features 轨迹追踪特性

- **Additional Features of Track Follow**

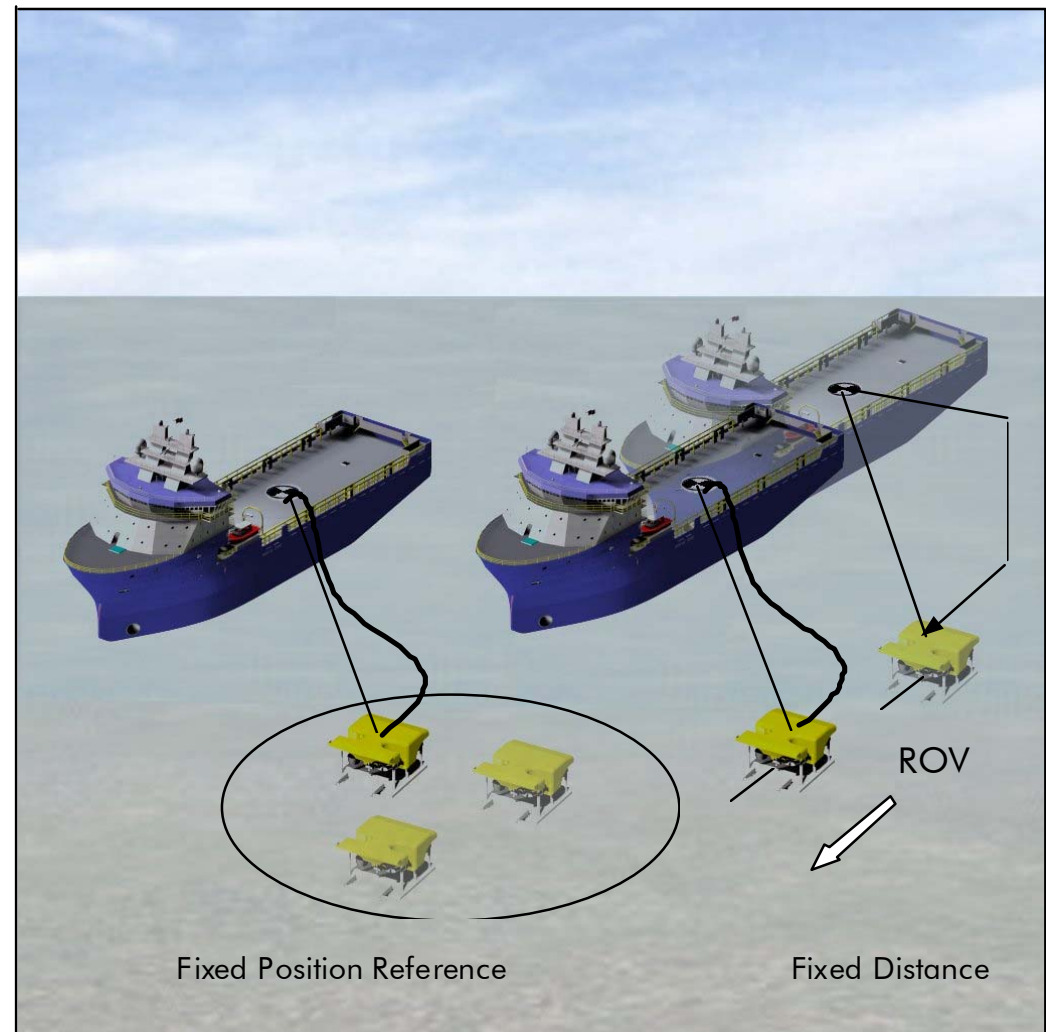
轨迹追踪其他特性

- **Incremental or continuous tracking.** 渐增的或者连续的追踪
- **Backwards tracking.** 倒向追踪
- **Up to 200 waypoints can be loaded via serial link (Survey System or DP Laptop).** 高达200个航途基准点可加载到串行连接中（测量系统或动力定位笔记本电脑）
- **Operator can define heading or have predefined track headings.** 操作员可以定义航向或预定义航向。
- **High tension slow down.** 高电压张紧缓冲
- **Controlled stopping.** 停止可控
- **Track Shift (Currently only Cross Track)** 轨迹移位（现仅有交径）

ROV FOLLOW

ROV 追踪

- ROV Follow maintains the vessel's position relative to an ROV. X and Y axes are controlled by the DP processor, Heading is also controlled by the processor but the operator can adjust the heading as required.
ROV追踪保持船的位置相对于一个ROV。X和Y轴可以根据DP处理器控制。航向也可以根据处理器控制但是操作员需要根据要求调整航向
- 2 ROV modes available
2个ROV模式可行
 - With Position Reference
带位置参考
 - With Acoustics Only
仅通过声纳系统



ROV with Position Reference ROV 配位置参照单元

- The ROV is allowed to move in a 'reaction radius' while the vessel is maintained in one position. If the ROV moves outside the 'reaction radius' a new vessel position is defined and the vessel will move to the position. The mode requires the use of a second PME device (DGPS).
当船保持在一个位置的时候，ROV允许船在一个作用半径内移动，如果ROV移动出这个作用半径，那么新的船舶位置将被定义，船将移动到新的位置。这个模式需要用第二个位置参照设备（DGPS）

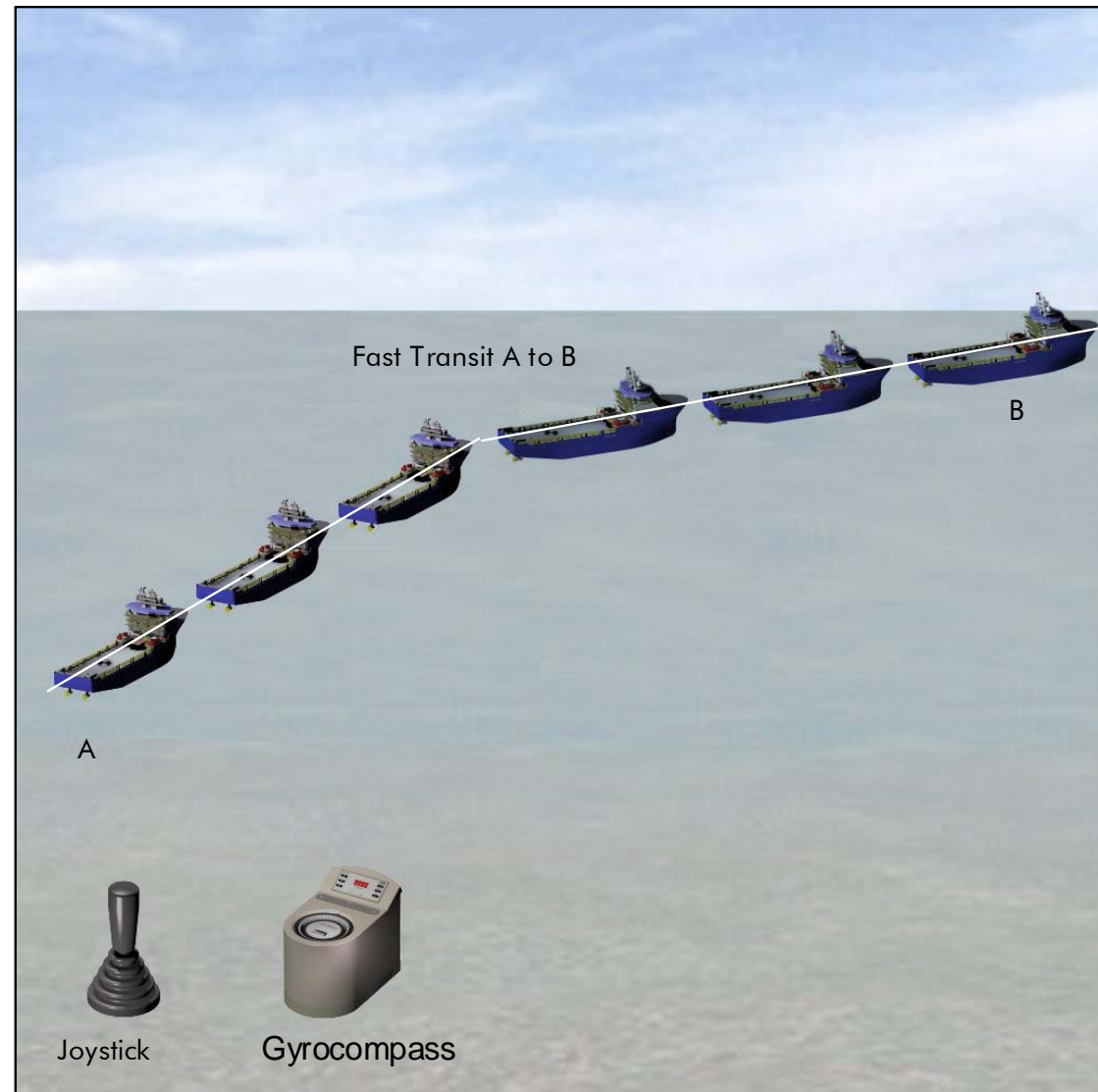
- Reduces thruster activity as the ROV is allowed to move while the vessel is stationary. 减弱推进器的动力，ROV可以在船静止的时候移动
- Reaction radius size can be defined by the operator.
操作员可定义作用半径的大小

ROV with Fixed Distance only ROV定距

- With only the ROV beacon available the vessels position is maintained at a constant seabed distance from the ROV.
只有当ROV的信标可用的时候，船的位置才能保持在从海底到ROV不变的位置。
- Increased thruster activity and vessel movement.
增加推进器的动力，船移动。

AUTO PILOT 自动舵

- The DP system has an internal Auto Pilot mode. As with normal Auto Pilots the DP system uses the Main Propeller for Propulsion and steers using the rudder only. 动力定位系统自带自动舵模式。一般的DP系统用主推作推进，仅用舵驾驶。
- The Systems requires the use of a Gyro compass to maintain heading. 系统要求使用电罗经保持航向



AUTO SAIL 自动航行

- **Auto Sail Mode controls the vessel along a track of two or more operator defined points at higher speeds than Auto Track.**

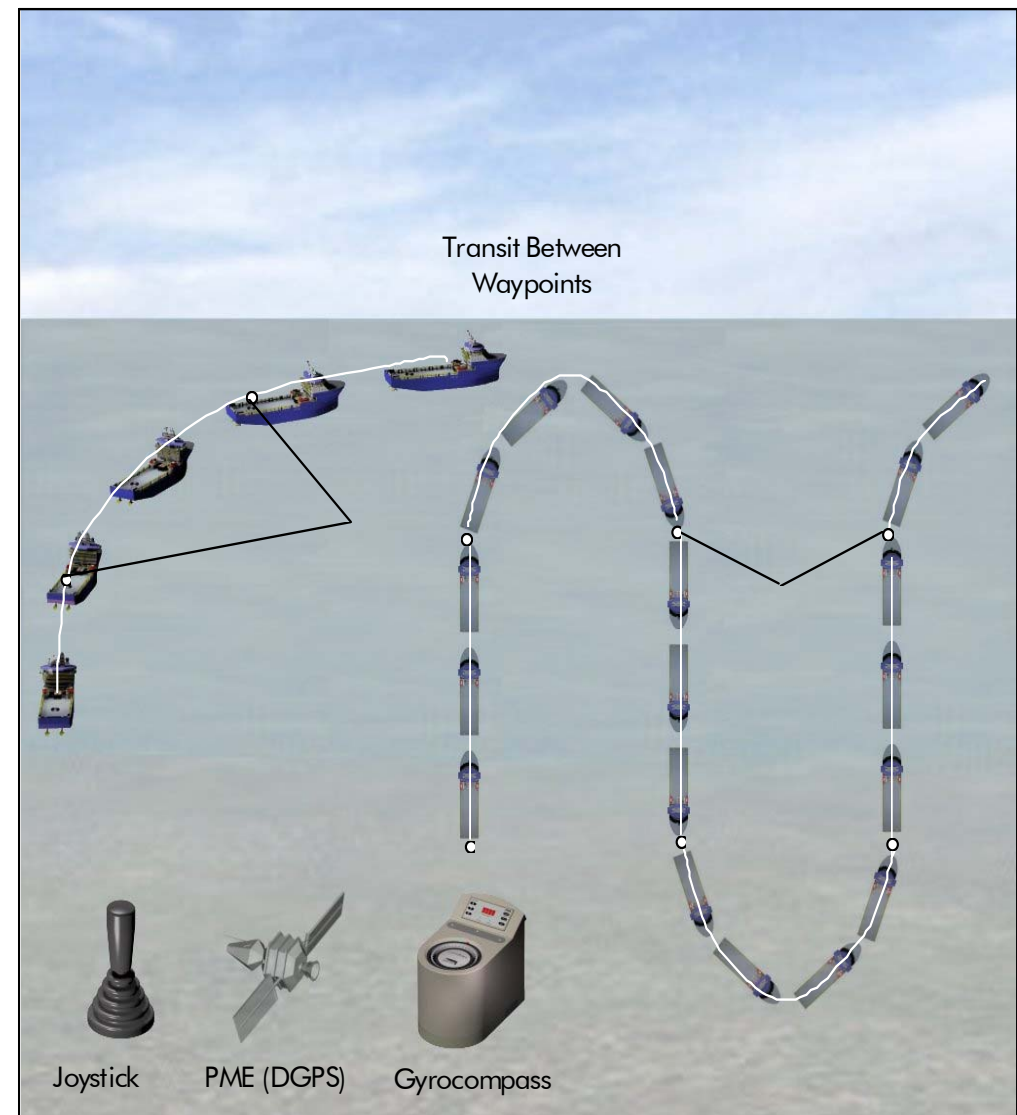
自动航行模式控制船沿着2个或者更多的由操作员定义的点所构成的轨迹行驶，其速度高于自动追踪。

- **The DP uses the Main Propeller for forward thrust and rudder for steering the vessel as tunnel thrusters become inadequate at high speeds.**

在高速行驶下，侧推的推力不够，DP系统用主推作为向前的推进器，用舵操纵船。

- **The DP automatically adjusts the vessels heading to move the vessel along the track.**

DP系统自动调节船的航向或者沿着轨迹使船移动。



Model Control 模式控制

- **Should all reference systems fail, Model control will maintain position by the use of it's internal model. Over a period of time the vessel will drift off position.**

当所有的参考系统失效的时候，模式控制将利用它自己的内部模式保持船的位置。过一段时间后，船才会渐渐离开位置。

- **Model control allows the operator to take control of the vessel in a safe and orderly manner.**

模式控制允许操作员在安全有序的情况下控制船。



Marine & Offshore Dynamic Positioning Systems