NAV350 中文调试手册			
类型:	调试指导		
版本:	V1.0	日期:	2017-11-26

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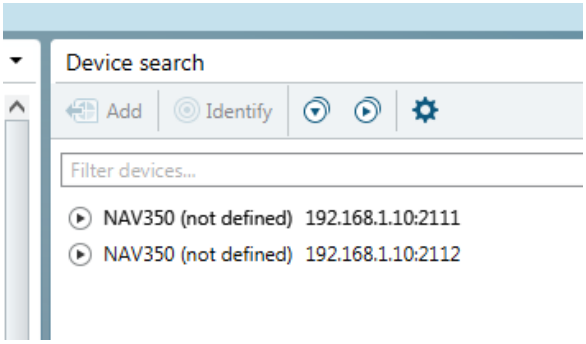
1. SOPAS 软件连接

推荐用以太网连接，IP 地址默认 192.168.1.10.

可看到在线的 NAV350：

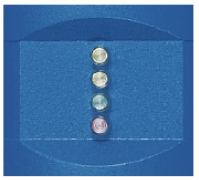


在调试过程中，可以观察 NAV 不同模式下的指示灯状态：

Status indicators

The LEDs signal the operational status of the NAV350.

The NAV350 has four LEDs. These visually signal the actual operational status and the status of the continuous self-check. The LEDs are on the front of the device on the NAV350. *tab. 4* shows the function of the LEDs.



Yellow LED (1)	Yellow LED (2)	Green LED	Red LED	Meaning
Off	Off	Off	Off	Device switched off. No supply voltage.
On	On	On	On	LED test for 5 s after switching on. The output signal switching device is active.
Off	On	Any	Any	A command is being processed
Off	Any	Flashing 1 Hz	Any	Stand by
Off	Any	Flashing 4 Hz	Any	Measurement mode
Flashing 4 Hz	Off	Flashing 1 Hz	Off	Firmware Update
Any	Any	Any	On	System error in the device For information on troubleshooting see *section 8.3 "Troubleshooting and rectification" on page 60*

Tab. 4: Meaning of the LED status indicators

重要模式：
待机模式 Standby：绿灯每秒闪一次；
测量模式 Measurement：绿灯每秒闪四次，也就是正常导航模式。

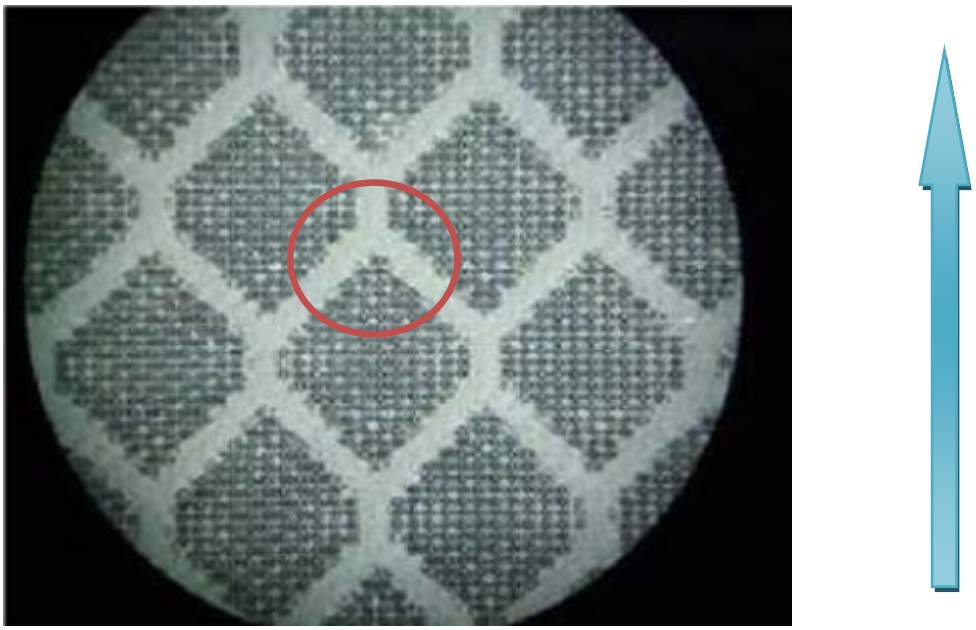
2. 布置和学习反射胶贴

2.1. 布置反射胶贴

在布置反射胶贴时，请注意以下原则：

a. 胶贴箭头朝向

粘贴时，保证胶贴上每个小单元的箭头朝上，如下图：

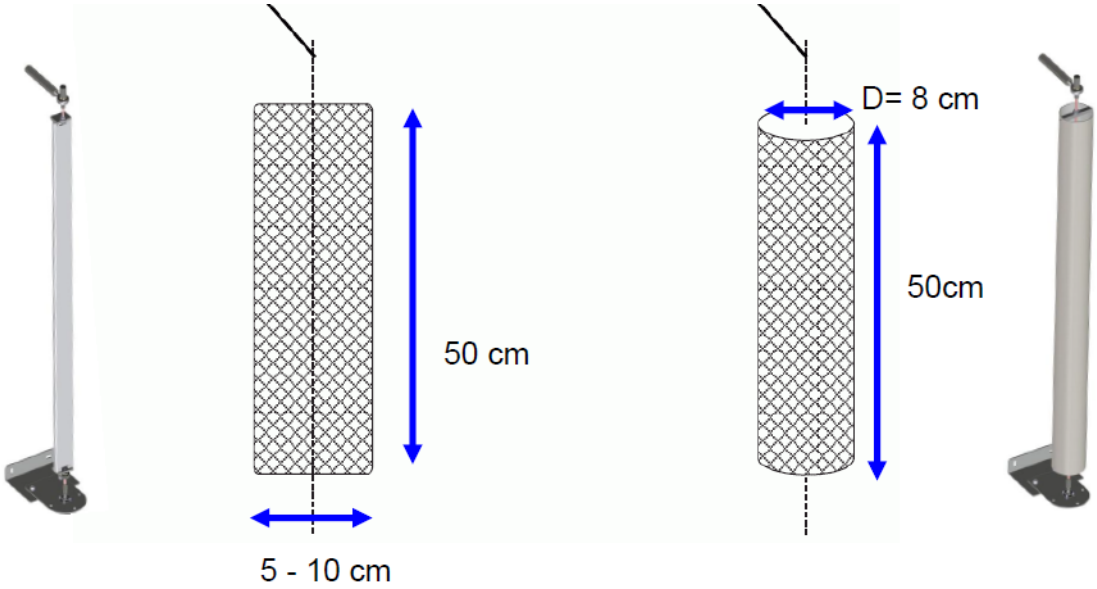


b. 平面和圆柱胶贴的尺寸

下图是制作平面胶贴和圆柱胶贴的推荐尺寸。

推荐使用圆柱胶贴，可视的角度更广。

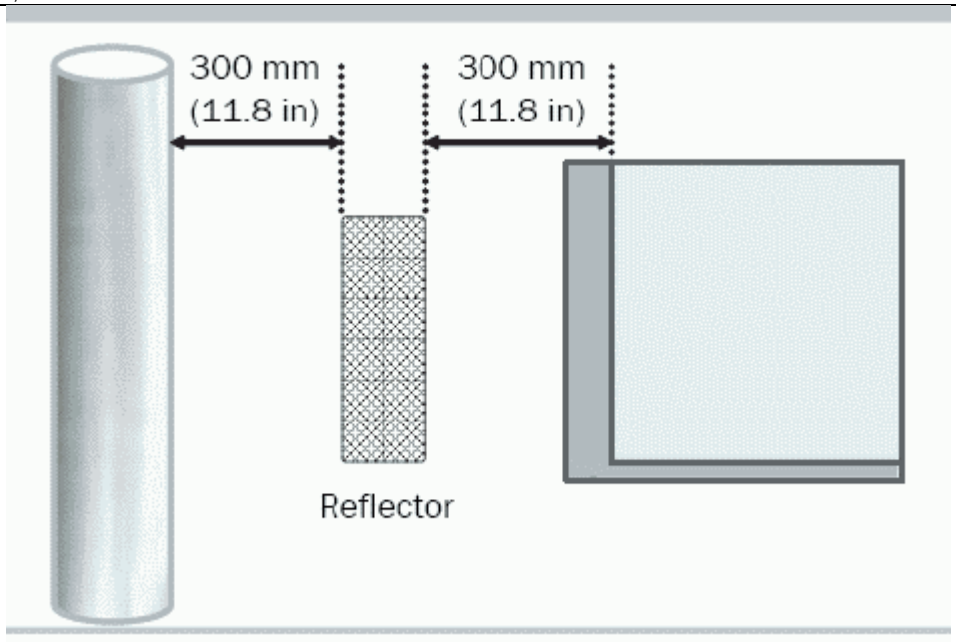
胶贴的高度根据现场底面的平整度而定，胶贴越高，数据越稳定。



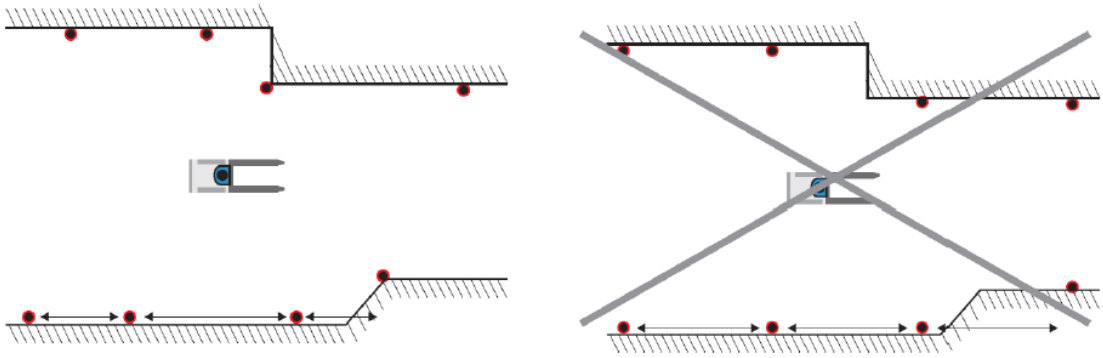
c. 反射胶贴与其他反光物的距离

如下图所示，反射胶贴与窗户、玻璃或其他圆柱形反射物的距离要大于 300m；

胶贴与胶贴之间距离要大于 500mm。



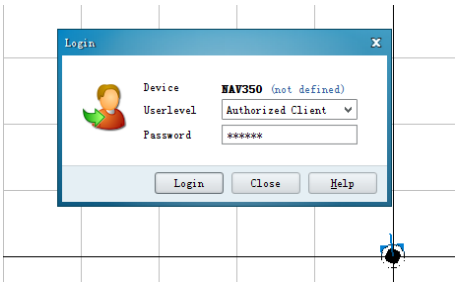
d. 反射胶贴布置不能采用对称方式
如下图右侧，对称方式布置胶贴，会导致 NAV350 坐标判断出错。



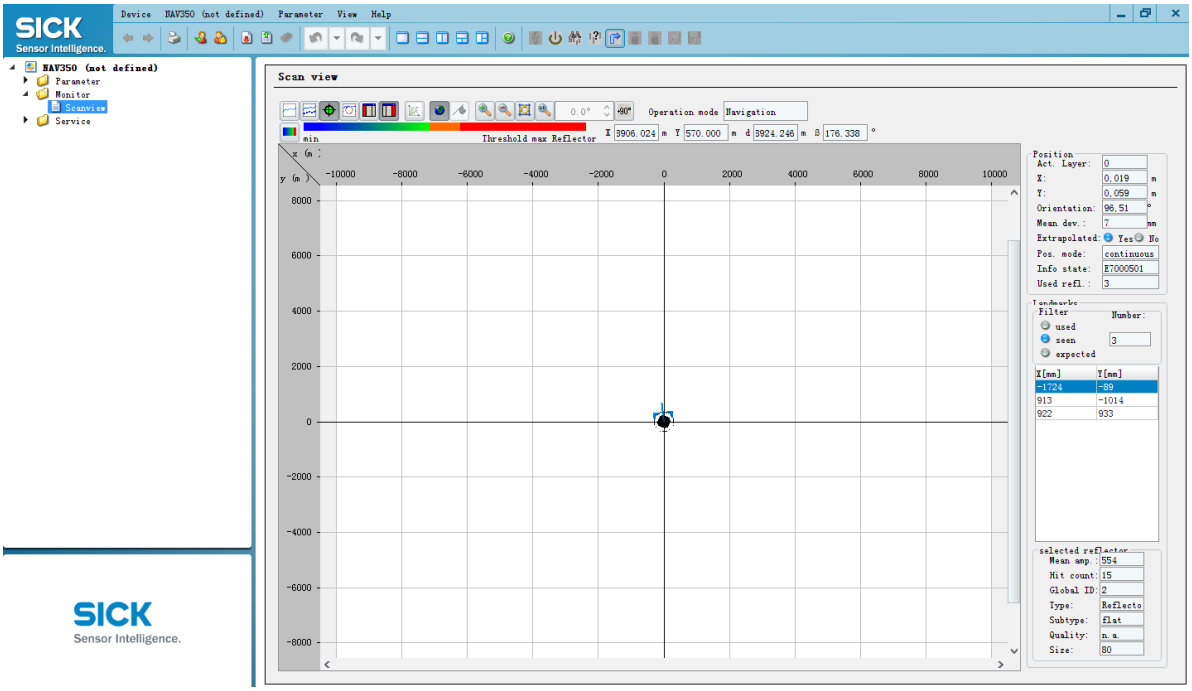
e. 胶贴与 NAV 最近距离必须大于 500mm

2.2. 通过 SOPAOS 学习反射胶贴

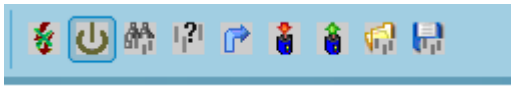
打开 NAV350 参数界面后，切换到用户界面，并且输入密码登陆：
密码是 client：



登陆后，可以看到 ScanView 界面：



接下来利用图标栏里的图标进行 NAV 的配置：



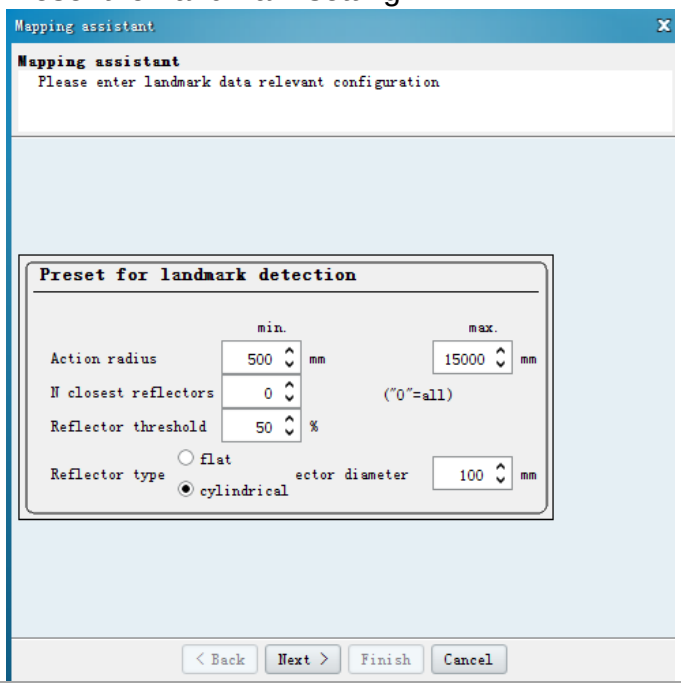
2.1.1. NAV 通电后，会自动进入 standby 模式，启动 NAV,等待 mapping 等设置。

也可以点击图标：  ，进入待机模式。

2.1.2. 进入第一次 mapping 设置地图,添加胶贴。

点击图标：  ，按照提示一步一步设置：

Mapping assistant，Present for landmark setting:



Action radius: 设置扫描半径，500-10000，精度可以控制在 4mm。根据精度要求，需要把扫描半径缩短，建议控制在 10000mm 以内。

N Closest reflectors:设置添加胶贴个数，0 意思是添加扫毛到的所有胶贴，5 的意思是添加扫描到的最近的 5 个胶贴。

Reflector threshold: 反射阀值，50 不用改。

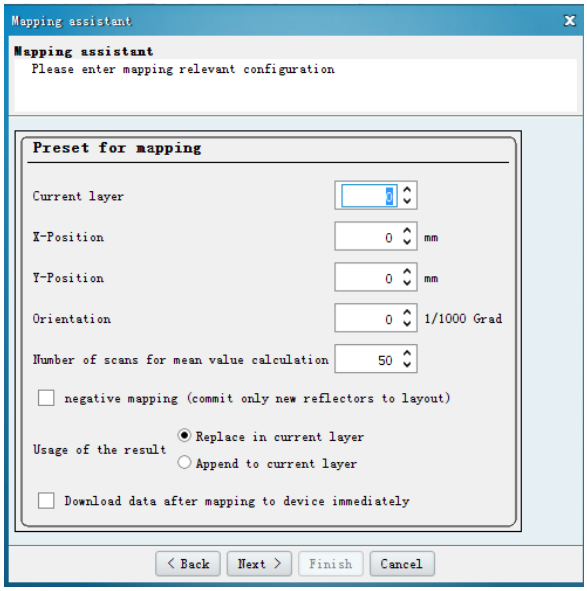
Reflector Type: 反射胶贴类型。

Flat: 平面的。

Cylindrical: 圆柱的，推荐使用这种。

Reflector Diameter: 直径或宽度，需要精确，

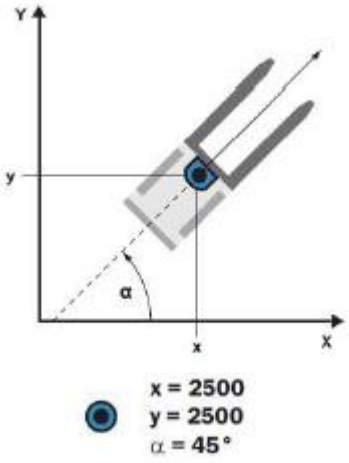
进入下一页:



Current Layer: 当前层，建议用保持为 0，意思是使用一个层。

*每个地图作为一个层，一个层最大可以用 12000 个胶贴。

X,Y Position:输入系统原点(工厂原点)，如下图：



建议使用 NAV350 初始位置为原点：NAV 背板朝向为 x 正，左侧为 y 正，相对于 X 轴逆时针为 orientation。此时，X, Y, Orientation 都为 0.

Number of for mean value calculation: 确定胶贴位置要扫描 50 次，不用修改。

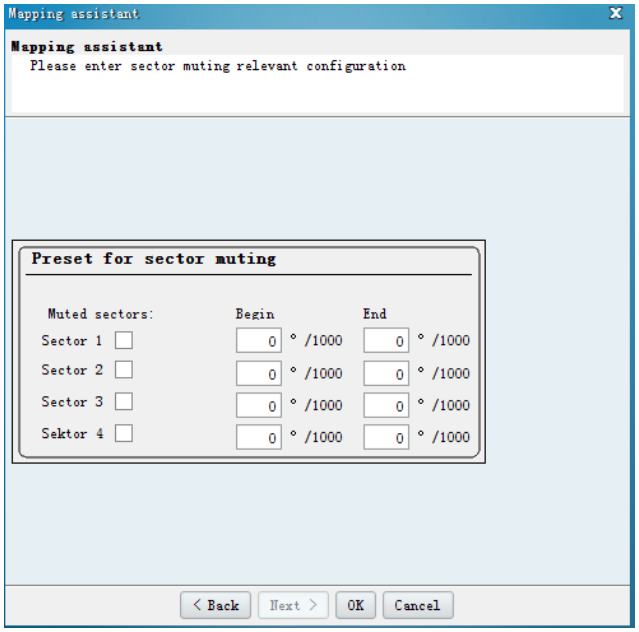
Usage of the result: 结果如何使用:

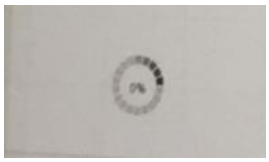
Replace: 第一次添加胶贴;

Append: 添加新的胶贴。

Download data after..:选择自动下载。

进入 muting 页面，一般用不到：通过设置角度来屏蔽。

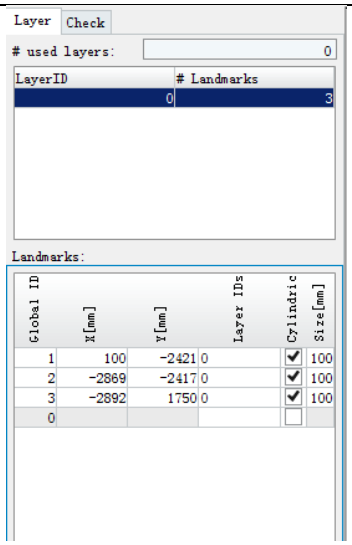


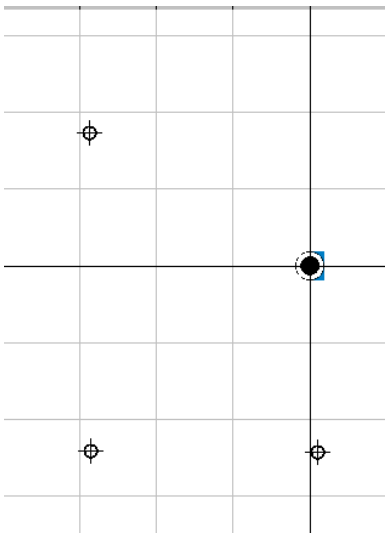


Mapping 完成后，点击下载地图图标  ;

2.1.3. 验证胶贴位置:

胶贴添加成功后，在 Monitor 里面，点击显示胶贴  ，点击居中  ，有必要的话点击转方向  ，把显示调整到自己看着舒服的角度。
左侧显示成功加入胶贴的个数，坐标等信息。
中间窗口显示 NAV 和胶贴的位置。

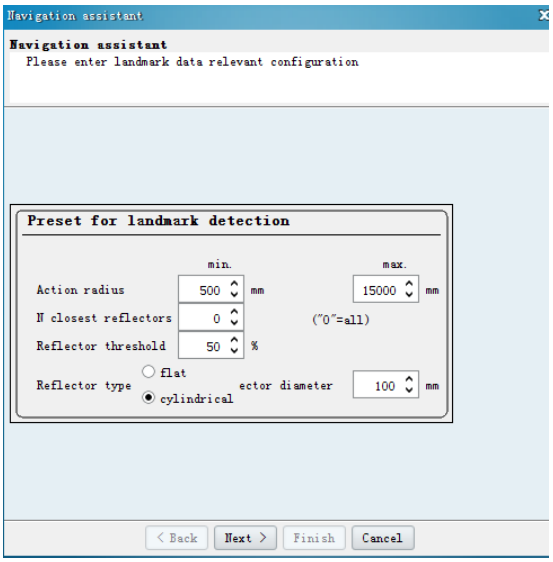




3. 进入导航模式

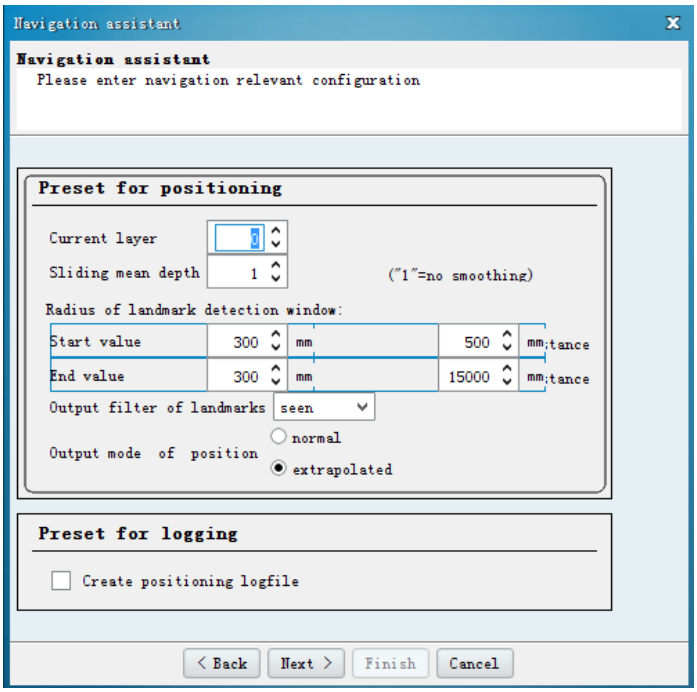
点击图标栏，  ，进入导航模式：
导航助手：

3.1. 基本参数设置



N Closest reflectors:设置导航用胶贴的个数。
*胶贴越多，通讯响应速度可能慢，定位精度不一定高。最少 3 块，建议使用 4,5 块。
Reflector threshold: 反射阈值，50 不用改。
Reflector Type: 反射胶贴类型。
Flat: 平面的。
Cylindrical: 圆柱的，推荐使用这种。
Reflector Diameter: 直径或宽度，需要精确，

3.2. 定位参数设置



Sliding mean depth：保持 1：滑动平均值，一般不用改。

Radius of Landmark..: 搜索胶贴的半径大小：在距离 NAV350 500mm 的位置，在半径 300mm 内搜索；在 7000mm 的位置，也在半径 300mm 范围内搜索。在这范围内如果没有搜索到胶贴，那么 NAV350 就会利用其它胶贴定位。

landmark filter：输出 landmark 的个数：

Sean:看到多少输出多少；

Used: 用到几块输出几块；

Expected:预期的数量。

Output mode of position:位置输出模式:

normal：发一次请求，立即就回复上一圈的位置（一般不用）；

extrapolated，等待扫描完成后发送数据（通常用这个模式）；

3.3. 进入导航模式

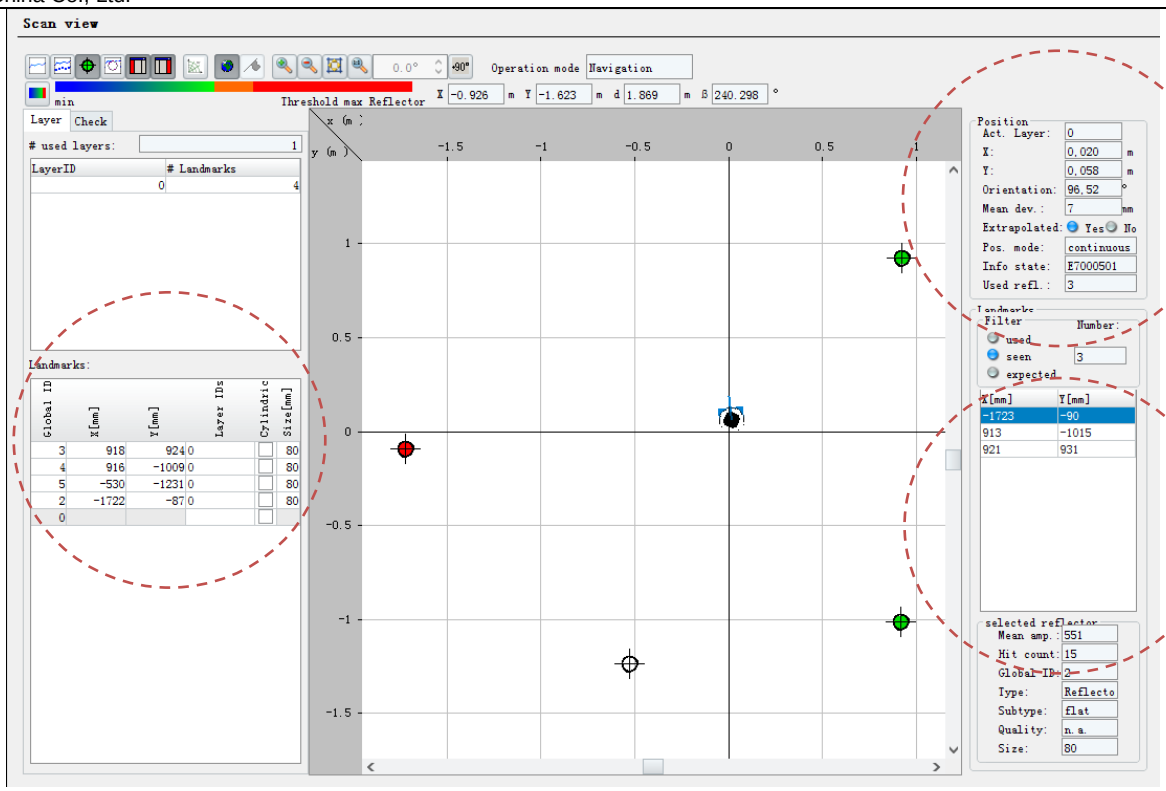
点击 Next，等待大概 1 分钟，NAV350 会进入导航模式。如下图：

观察 scan view，定位成功后，应该显示蓝色：

ScanView 中，左侧显示地图内的层信息以及所有胶贴信息；

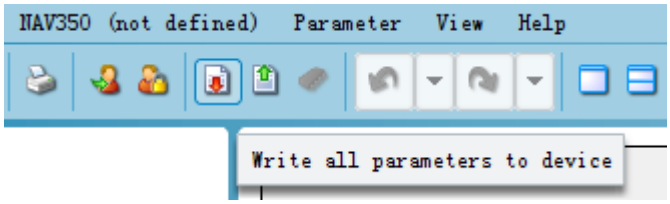
右侧显示当前 NAV350 的坐标和角度；定位模式；定位用到的胶贴数量等信息。

移动 NAV350，可以看到胶贴位置不变，NAV350 在地图上移动，坐标也在改变。

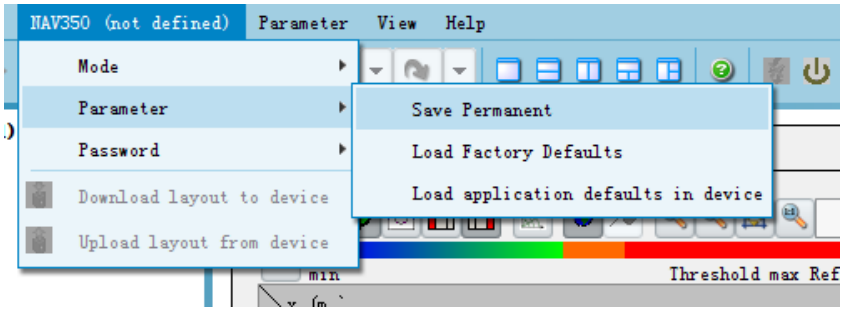


3.4. 永久保存参数

导航模式没问题后，首先点击如下红色下载图标：



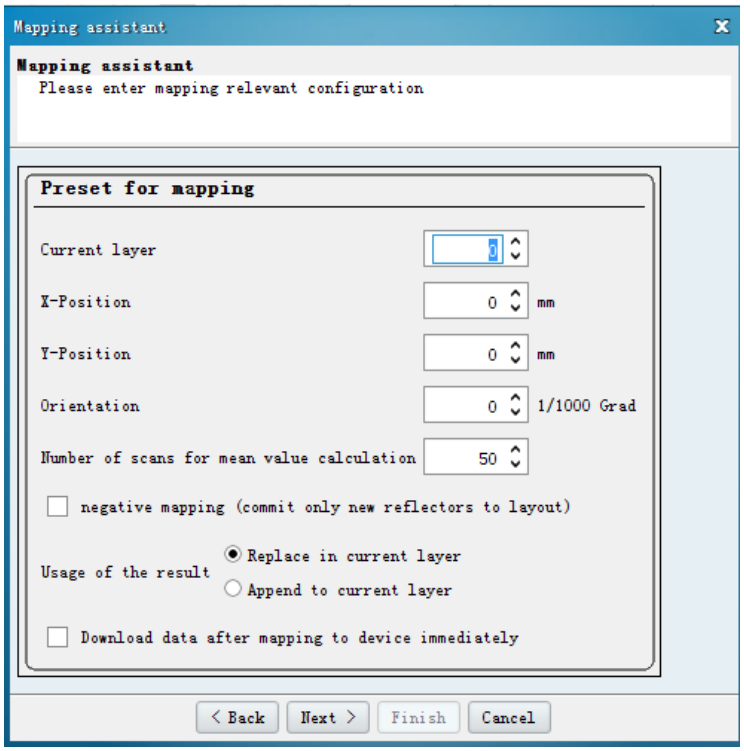
然后点击菜单里的永久保存：



3.5. 添加新的胶贴方式

进入 mapping 模式，把 AGV 推到 5-10 米以外的位置，保证 AGV 可以看到之前学习的 3 块胶贴，然后开始 Mapping。

到达下一步的时候，选择 Nagtive mapping，选择 Append to current layer，只添加新的胶贴，原有的不变：

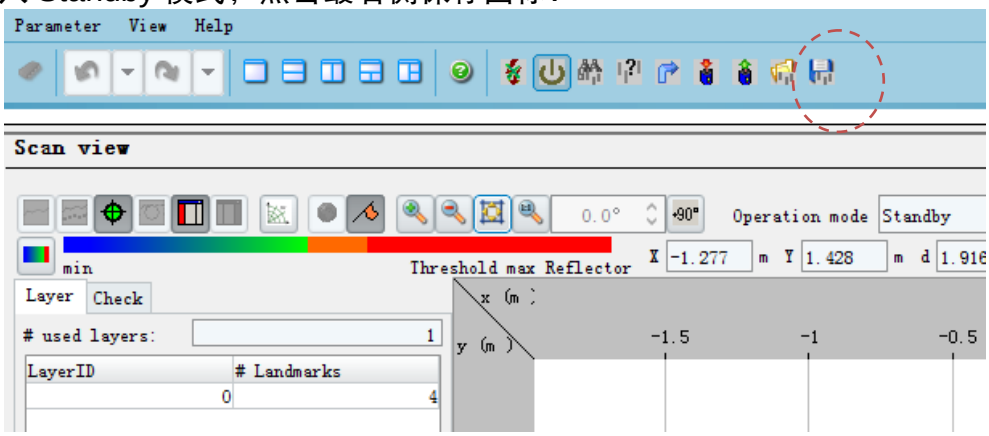


*如果新学习的胶贴和老胶贴有重复，可以点击胶贴列表，可以删除重复的胶贴。

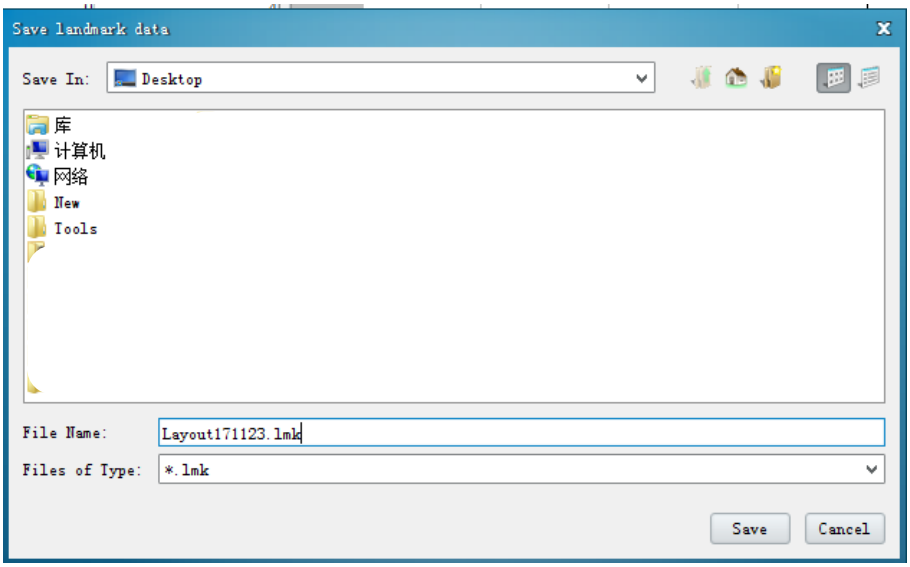
3.6. 调试下一台 NAV350

第一台 NAV350 调试完成后，可以生成一个 mapping 的配置文件，直接下载到下一台 NAV350 里就可以使用了。不用再重新做 mapping 了，步骤如下：

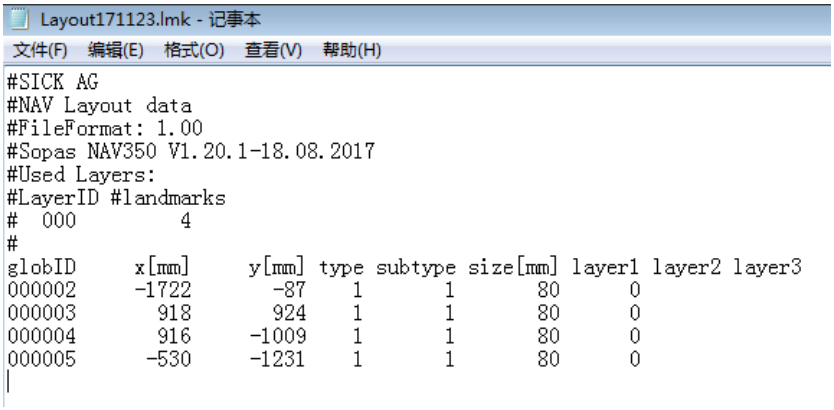
首先，进入 Standby 模式，点击最右侧保存图标：



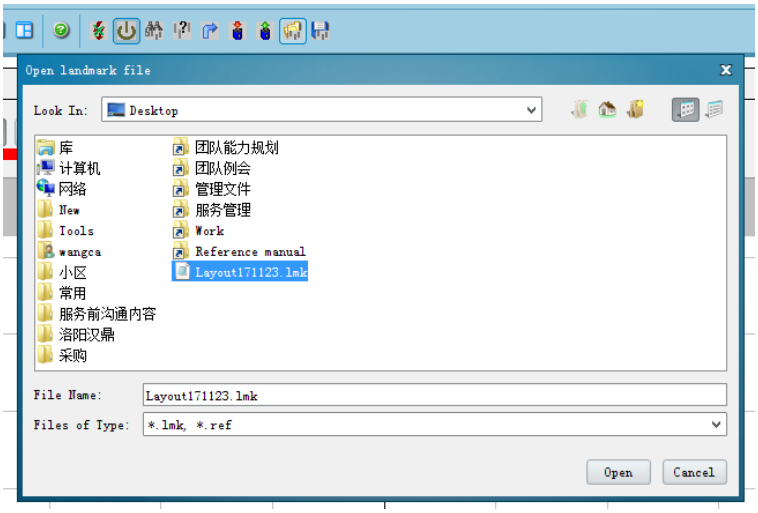
其次，地图保存到指定目录



然后，用记事本打开文件查看内容

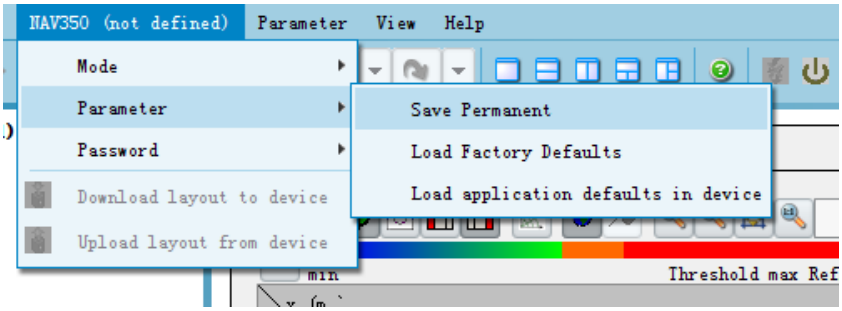


再次，连接到新的 NAV350，打开保存的地图文件：



然后，点击下载，地图就会成功下载到新的 NAV 里：

最后，点击永久保存：



4. 初始化和导航控制

以下是初始化 NAV350 的常用指令：
前面 9 条参数设置，后面 10-13 条是导航控制内容：

顺序	指令名称	发送	返回
1	Log-in（登录设备）	<STX>sMN SetAccessMode 3 F4724744<ETX>	sAN SetAccessMode 1
2	Standby mode（进入待机模式）	<STX>sMN mNEVAChangeState 1<ETX>	sMA mNEVAChangeStatesAN mNEVAChangeState 0 1
3	Write current layer（进入当前层）	<STX>sWN NEVACurrLayer 0<ETX>	sWA NEVACurrLayer
4	Set sliding mean	<STX>sWN NPOSSlidingMean 1<ETX>	sWA NPOSSlidingMean
5	Set position data format(设置数据格式)	<STX>sWN NPOSPoseDataFormat 1 0<ETX>	sWA NPOSPoseDataFormat
6	Set RF Window（反射板窗口大小）	<STX>sWN NCORIdentWindow 300 300 500 80000<ETX>	sWA NCORIdentWindow
7	Set N Closest Reflectors（最近反射板数量）	<STX>sWN NLMDnClosest 3<ETX>	sWA NLMDnClosest
8	Set Action Radius（设置扫描半径）	<STX>sWN NLMDActionRadius 500 80000<ETX>	sWA NLMDActionRadiussWN
9	Navigation mode（进入导航模式）	<STX>sMN mNEVAChangeState 4<ETX>	sMA mNEVAChangeStatesAN mNEVAChangeState 0 4
10	Requesting the position（每周期数据请求）	<STX>sMN mNPOSGetPose 1<ETX>	sMA mNPOSGetPosesAN mNPOSGetPose 1 6 1 0
11	Synchronize Timestamp(同步时钟)	<STX>sMN mNAVGetTimestamp<ETX>	sAN mNAVGetTimestamp 0 57D835

12	Velocity Input（每周期速度反馈）	<STX>sMN mNPOSSetSpeed A00 B00 552E3 1EE300 1<ETX>	sAN mNPOSSetSpeed 0
13	Requesting the position（每周期数据请求）	<STX>sMN mNPOSGetPose 1<ETX>	mNPOSGetPosesAN mNPOSGetPose 1 0 1 1 FFFFFFF5 FFFFFDD7 3A728 1 1 67A00 4 1 E7000501 3

4.1. 常用指令详解

4.1.1. 以 client 账号 Log-in（登录设备）

发送指令：<STX>sMN SetAccessMode 3 F4724744<ETX>

解释：以 client 账号登录设备，密码 client：

Command part	Description	Type	Range/Value
Command type	Request (SOPAS method by name)	String	**sMN**
Command	Set user level	String	**SetAccessMode**
NewModel	User level code	Int_8	**2 = operator** **3 = authorized client**
Password	Password Hash Value	UInt_32	**00000000 ... FFFFFFF**

反馈：sAN SetAccessMode 1

解释：登陆成功。

Command part	Description	Type	Range/Value
Command type	Request (SOPAS answer)	String	**sAN**
Command	Set user level	String	**SetAccessMode**
Success	Mode successfully set	Bool_1	**0 = no** **1 = yes**

4.1.2. 进入 Standby mode（待机模式）

发送指令：<STX>sMN mNEVAChangeState 1<ETX>

解释：进入 Standby 模式：

Request

Command Syntax: **sMN mNEVAChangeState** *mode* (according: SA, DA, UA, RA, MA, PA, PN)

Command part	Description	Type	Range/Value
Command type	Request (SOPAS method by name)	String	**sMN**
Command	Set operating mode	String	**mNEVAChangeState**
Mode	Number of valid operating mode.	Enum_8	**0 = power down** **1 = standby (Default)** **2 = mapping** **3 = landmark detection** **4 = navigation**

反馈 1：Acknowledge

Response (Method Acknowledge)

Command Syntax: **sMA mNEVAChangeState**

Command part	Description	Type	Range/Value
Command type	Response (SOPAS method acknowledge by name)	String	**sMA**
Command	Asynchronous Method Set Operating mode	String	**mNEVAChangeState**

反馈 2：内容。

Response after Execution

Command Syntax: **sAN mNEVAChangeState** *errorCode mode*

Command part	Description	Type	Range/Value
Command type	Response (SOPAS answer)	String	**sAN**
Command	Set Operating mode	String	**mNEVAChangeState**
ErrorCode	Error number	Enum_8	**0 = no error** **1 = invalid change** **2 = method break** **3 = unknown operating mode** **5 = timeout** **6 = method break; another command is active** **7 = general error**
Mode	Operating mode after execution	Enum_8	**0 = power down** **1 = standby** **2 = mapping** **3 = landmark detection** **4 = navigation**

4.1.3. Write current layer（设置层）

发送：<STX>sWN NEVACurrLayer 0<ETX>

解释：进入 layer 0.

因为 NAV350 一个层可以录入 1 万多个胶贴，所以建议不要使用额外的层。

Command part	Description	Type	Range/Value
Command type	Request (SOPAS write by name)	String	**sWN**
Command	Set current Layer	String	**NEVACurrLayer**
CurrLayer	Layer number	UInt_16	**0 ... 319** **(Default: 0)**

反馈：sWA NEVACurrLayer

Command Syntax: **sWA NEVACurrLayer**

Command part	Description	Type	Range/Value
Command type	Response (SOPAS write by name)	String	**sWA**
Command	Set current Layer	String	**NEVACurrLayer**

4.1.4. Set sliding mean 设置平滑值

发送：<STX>sWN NPOSSlidingMean 1<ETX>

解释：设置 Sliding Mean 为 1.

Command part	Description	Type	Range/Value
Command type	Request (SOPAS write by name)	String	**sWN**
Command	Set sliding mean	String	**NPOSSlidingMean**
SlidingMean	Smoothing factor	UInt_8	**1 ... 63** **(Default: 1)**

反馈：sWA NLMDActionRadiussWN

Command Syntax: **sWA NPOSSlidingMean**

Command part	Description	Type	Range/Value
Command type	Response (SOPAS write by name)	String	**sWA**
Command	Set sliding mean	String	**NPOSSlidingMean**

4.1.5. Set position data format（设置数据格式）

发送：<STX>sWN NPOSPoseDataFormat 1 0<ETX>

Command Syntax: **sWN NPOSPoseDataFormat** *outputMode showOptParam*

Command part	Description	Type	Range/Value
Command type	Request (SOPAS write by name)	String	**sWN**
Command	Set positioning data format	String	**NPOSPoseDataFormat**
OutputMode	If set to 1 the NAV350 extrapolates the calculated position data to the point in time of transmission.	Enum_8	**0 = normal** **1 = extrapolated (Default)**
ShowOptParam	Select the transmission of the optional parameter	Bool_1	**0 = suppressed (Default)** **1 = enabled**

反馈：sWA NPOSPoseDataFormat

数据格式根据客户控制需求而设置。

Command Syntax: **sWA NPOSPoseDataFormat**

Command part	Description	Type	Range/Value
Command type	Response (SOPAS write by name)	String	**sWA**
Command	Set positioning data format	String	**NPOSPoseDataFormat**

4.1.6. Set RF Window（反射板窗口大小）

发送：<STX>sWN NCORIdentWindow 300 300 500 80000<ETX>

Command Syntax: **sWN NCORIdentWindow** *winLow winHigh distLow distHigh* (according: PF)

Command part	Description	Type	Range/Value
Command type	Request (SOPAS write by name)	String	**sWN**
Command	Define Reflector Identification Window	String	**NCORIdentWindow**
WinLow	Window radius in mm at *distLow*	UInt_16	**100 ... 2000 mm (Default: 300 mm)**
WinHigh	Window radius in mm at *distHigh*	UInt_16	**100 ... 2000 mm (Default: 300 mm)**
DistLow	Distance in mm at *winLow*	UInt_32	**500 ... 70 000 mm (Default: 500 mm)**
DistHigh	Distance in mm at *winHigh*	UInt_32	**500 ... 70 000 mm (Default: 70 000 mm)**

反馈： sWA NCORIdentWindow

Command Syntax: **sWA NCORIdentWindow**

Command part	Description	Type	Range/Value
Command type	Response (SOPAS write by name)	String	**sWA**
Command	Define Reflector Identification Window	String	**NCORIdentWindow**

4.1.7. Set N Closest Reflectors（最近反射板数量）

发送：<STX>sWN NLMDnClosest 3<ETX>

解释：设置定位用的最少反射胶贴数量为 3。

Command syntax: **sWN NLMDnClosest** *nClosest* (according: PC)

Command part	Description	Type	Range/Value
Command type	Request (SOPAS read by name)	String	**sWN**
Command	Set N closest reflectors	String	**NLMDnClosest**
NClosest	Quantity of N closest reflectors	UInt_8	**0 ... 40 (Default: 0)**

反馈：sWA NLMDnClosest

Command syntax: **sWA NLMDnClosest**

Command part	Description	Type	Range/Value
Command type	Response (SOPAS read by name)	String	**sWA**
Command	Set N closest reflectors	String	**NLMDnClosest**

4.1.8. Set Action Radius（设置扫描半径）

发送：<STX>sWN NLMDActionRadius 500 80000<ETX>

注释：最近 500mm，最远 80000mm。

Command syntax: **sWN NLMDActionRadius** *rFr rTo* (according: PO)

Command part	Description	Type	Range/Value
Command type	Request (SOPAS read by name)	String	**sWN**
Command	Set Action Radius	String	**NLMDActionRadius**
RFr	Minimum Actions Radius	UInt_32	**400 ... 70 000 mm** **(Default: 500)**
RTo	Maximum Action Radius	UInt_32	**400 ... 70 100 mm** **(Default: 70 000)**

Response

Command syntax: **sWA NLMDActionRadius**

Command part	Description	Type	Range/Value
Command type	Response (SOPAS read by name)	String	**sWA**
Command	Set action radius	String	**NLMDActionRadius**

Request Read

Command syntax: **sRN NLMDActionRadius**

Command part	Description	Type	Range/Value
Command type	Request (SOPAS read by name)	String	**sRN**
Command	Request action radius	String	**NLMDActionRadius**

Response

Command syntax: **sRA NLMDActionRadius** *rFr rTo*

Command part	Description	Type	Range/Value
Command type	Response (SOPAS read by name)	String	**sRA**
Command	Request action radius	String	**NLMDActionRadius**
RFr	Minimum Actions Radius	UInt_32	**400 ... 70 000 mm**
RTo	Maximum Action Radius	UInt_32	**400 ... 70 100 mm**

4.1.9. Navigation mode（进入导航模式）

发送：<STX>sMN mNEVAChangeState 4<ETX>

解释：进入导航模式。

Request

Command Syntax: **sMN mNEVAChangeState** *mode* (according: SA, DA, UA, RA, MA, PA, PN)

Command part	Description	Type	Range/Value
Command type	Request (SOPAS method by name)	String	**sMN**
Command	Set operating mode	String	**mNEVAChangeState**
Mode	Number of valid operating mode.	Enum_8	**0 = power down** **1 = standby (Default)** **2 = mapping** **3 = landmark detection** **4 = navigation**

4.1.10. Requesting the position（每周期数据请求）

发送：<STX>sMN mNPOSGetPose 1<ETX>

此步骤需要每 125ms 发送一次，因为 NAV350 的扫描频率是 8 次每秒。

请注意，发送平率过高胡导致收到乱码。

收到的数据格式，请参考 4.1.13 节。

Command Syntax: **sMN mNPOSGetPose** *wait* (according: PP, PV, Pv, Pw)

Command part	**Description**	**Type**	**Range/Value**
Command type	Request (SOPAS method by name)	String	**sMN**
Command	Position Request	String	**mNPOSGetPose**
Wait	If set to 1 the NAV350 waits for the next calculated position data. If set to 0 the NAV350 respond the position result instantly, valid at the timestamp in the pose response	Bool_1	**0 = instantly last pose result** **1 = wait for next pose result**

Response (Method Acknowledge, indicates *NPOSGetPose* has started)

Command Syntax: **sMA mNPOSGetPose**

Command part	**Description**	**Type**	**Range/Value**
Command Type	Response (SOPAS method acknowledge)	String	sMA
Command	Get pose	String	mNPOSGetPose

4.1.11. Synchronize Timestamp（同步时钟）

发送：<STX>sMN mNAVGetTimestamp<ETX>

此命令用于控制系统和 NAV350 进行时钟同步。

Command Syntax: **sMN mNAVGetTimestamp**

Command part	**Description**	**Type**	**Range/Value**
Command type	Request (SOPAS method by name)	String	**sMN**
Command	Sync Timestamp	String	**mNAVGetTimestamp**

Response

Command Syntax: **sAN mNAVGetTimestamp** *errorCode timestamp*

Command part	**Description**	**Type**	**Range/Value**
Command type	Response (SOPAS answer)	String	**sAN**
Command	Sync Timestamp	String	**mNAVGetTimestamp**
ErrorCode	Error number	Enum_8	**0 = no error** **1 = invalid operating mode** **7 = general error**
Timestamp	Internal NAV350 timestamp	UInt_32	**0...4 294 967 295 ms (0xffffffff)**

4.1.12. Velocity Input（每周期速度反馈）

发送：<STX>sMN mNPOSSetSpeed A00 B00　552E3 1EE300　1<ETX>
此命令为了达到更高的定位精度。

Response

Command Syntax: **sAN mNPOSSetSpeed** *errorCode*

Command Syntax: **sAN mNPOSSetSpeed** *errorCode* **Command part**	**Description**	**Type**	**Range/Value**
Command type	Response (SOPAS method by name)	String	**sAN**
Command	Set Velocity of the NAV350	String	**mNPOSSetSpeed**
ErrorCode	Error code	Enum_8	**0 = no error** **1 = wrong operating mode** **3 = parameter out of range** **7 = general error**

Command Syntax: **sMN mNPOSSetSpeed** *X Y Phi timestamp coordBase* (according: PV, Pv, Pw)

Command part	**Description**	**Type**	**Range/Value**
Command type	Request (SOPAS method by name)	String	**sMN**
Command	Set Velocity of the NAV350	String	**mNPOSSetSpeed**
X	X-component of velocity in the coordinate system defined by *coordBase*	Int_16	**-32 000 ...** **+32 000 mm/s**
Y	Y- component of velocity in the coordinate system defined by *coordBase*	Int_16	**-32 000 ...** **+32 000 mm/s**
Phi	Angular velocity of the NAV350	Int_32	**-360 000 ...** **+360 000 mdeg/s**
Timestamp	Timestamp of the Velocity vector related to the NAV350 clock	UInt_32	**0...4.294.967.295 ms (0xffffffff)**
CoordBase	Coordinate system of the velocity vector, local or global	Enum_8	**0 = local coordinate system of the NAV350** **1 = absolute coordinate system**

4.1.13. Requesting the position（每周期数据请求）

发送：<STX>sMN mNPOSGetPose 1<ETX>
二次读取 NAV350 的位置数据：

Command Syntax: **sMN mNPOSGetPose** *wait* (according: PP, PV, Pv, Pw)

Command part	**Description**	**Type**	**Range/Value**
Command type	Request (SOPAS method by name)	String	**sMN**
Command	Position Request	String	**mNPOSGetPose**
Wait	If set to 1 the NAV350 waits for the next calculated position data. If set to 0 the NAV350 respond the position result instantly, valid at the timestamp in the pose response	Bool_1	**0 = instantly last pose result** **1 = wait for next pose result**

Response (Method Acknowledge, indicates *NPOSGetPose* has started)

Command Syntax: **sMA mNPOSGetPose**

Command part	**Description**	**Type**	**Range/Value**
Command Type	Response (SOPAS method acknowledge)	String	sMA
Command	Get pose	String	mNPOSGetPose

Response after Executing *mNPOSGetPose*

Command Syntax: **sAN mNPOSGetPose** *version errorCode wait poseData [pose data [x y phi] optPose-Data [outputMode timestamp meanDev navMode infoState quantUsedReflectors]]*

Command part			**Description**	**Type**	**Range/Value**
Command type			Response (SOPAS method by name)	String	**sAN**
Command			GetPose	String	**mNPOSGetPose**
Version			Version of POSE Data	UInt_16	**0000 ... FFFF**
ErrorCode			Error code	Enum_8	**0 = no error** **1 = wrong operating mode** **2 = asynchrony Method terminated** **3 = invalid data** **4 = no position available** **5 = timeout** **6 = method already active** **7 = general error**
Wait			If set to 1 the NAV350 waits for the next calculated position data. If set to 0 the NAV350 respond the position result instantly, valid at the timestamp in the pose response	Bool_1	**0 = synchronous: last position result** **1 = asynchronous: new calculated position**
PoseData			Set to1, if pose data follow	UInt_16	**0 = no pose data** **1 = pose data follow**
Pose Data	X		X-Position	Int_32	**-10 000 000 ...** **+10 000 000 mm**
	Y		Y-Position	Int_32	**-10 000 000 ...** **+10 000 000 mm**
	Phi		Orientation	UInt_32	**0...360000 mgrad**
	OptPoseData		Set to 1, if optional pose data follow	UInt_16	**0 = no optional data** **1 = optional data follow**
	OPD	output-Mode	Data are instantly or extrapolated	Enum_8	**0 = instantly** **1 = extrapolated**

		Time-stamp	Timestamp	UInt_32	**0...4 294 967 295 ms (0xffffffff)**
		Mean-Dev	Mean deviation	Int_32	**0... 2000 mm**
		Nav-Mode	Position mode	Enum_8	**0 = initial positioning** **1 = continuous positioning** **2 = virtual positioning** **3 = positioning stopped** **4 = position invalid** **5 = external**
		InfoState	Diagnosis Information	UInt_32	**Information is shown in the table below**
		NumUsedReflec-tors	Number of used Reflectors	UInt_8	**0...40**

诊断信息：

InfoState

Bit					Description
0x	00	00	01	00	No external speed available
0x	00	00	02	00	No internal speed available
0x	00	00	04	00	Internal prediction used
0x	00	00	08	00	Simple prediction used
0x	00	00	10	00	No prediction used
0x	00	00	20	00	No speed compensation done
0x	00	00	40	00	Not enough landmarks in layer
0x	00	00	80	00	No landmarks available
0x	00	01	00	00	Not enough landmarks in layer for initialization
0x	00	02	00	00	Not enough landmarks available
0x	00	04	00	00	Less than 3 landmarks used
0x	00	08	00	00	Positioning failed
0x	00	10	00	00	Positioning reinitialized with internal speed
0x	00	20	00	00	Positioning reinitialized
0x	00	40	00	00	Positioning reinitialized
0x	00	00	00	01	Position is extrapolated
0x	00	00	00	02	Filter operating radii was skipped
0x	00	00	00	04	Filter sector muting was skipped
0x	00	00	00	08	Filter NClosest was skipped
0x	01	00	00	00	Speed computation done
0x	02	00	00	00	Prediction done
0x	04	00	00	00	Correlation done
0x	08	00	00	00	Reinitialized
0x	10	00	00	00	Reinitialized
0x	20	00	00	00	Landmark selection done
0x	40	00	00	00	Positioning done
0x	80	00	00	00	Positioning finished

4.2. 位置数据转换

注释：反馈的数字是 16 进制，直接用计算器转换成十进制。
举例：角度 43.58.

负值，要用十六进制减去最大值 FFFFF：
举例：-285mm
FFFFFEE2-FFFFFFFF=FFFFFFFFFFFFEE3

想了解更详细功能，请致电 SICK 服务热线 400 0121 000 咨询。