ProMark2 TRAINING

MODULE ONE

STOP & GO SURVEY

AIM OF MODULE 1

- **STATE BRIEFLY THE ADVANCED SURVEY CAPABILITIES OF THE ProMark2 WITH RESPECT TO STOP & GO OPERATIONS**

- **SHOW AND STATE BRIEFLY THE FUNCTION OF THE INITIALIZATION BAR**

- **STATE THE FACTORS AND REQUIREMENTS FOR CONDUCTING STOP & GO SURVEYS WITH THE ProMark2**

- **IDENTIFY THE MINIMUM NUMBER OF SATELLITES REQUIRED FOR STOP & GO SURVEYS**

- **EXPLAIN THE POTENTIAL PRODUCT THAT IS PRODUCED WHEN THERE IS A LOSS OF SIGNAL**

- **EXPLAIN BRIEFLY THE PRODUCT THAT IS PRODUCED WHEN A CYCLE SLIP OCCURS**

- **EXPLAIN WITH SUFFICIENT DETAIL THE REQUIREMENTS FOR PREPARING THE ProMark2 FOR STOP & GO OPERATIONS**

ProMark2 ADVANCEMENTS

- **THE FIRMWARE FOR THE NEW ProMark2 HAS BEEN UPGRADED WITH A FUNCTIONAL CAPABILITY TO SUPPORT STOP & GO TYPE SURVEYS**

- **THE ProMark2 IS THE FIRST GPS-BASED SYSTEM TO COMBINE PRECISE TOPOGRAPHIC SURVEYING AND STREET NAVIGATION CAPABILITIES**

- **DELIVERS PRODUCTIVITY AND EFFICIENCY NOT PREVIOUSLY AVAILABLE FOR SURVEYORS IN A COMPACT SYSTEM**

- **DATA COLLECTION IS 100 TIMES FASTER THAN STATIC GPS SYSTEMS**

- **THE ProMark2 PERMITS ONE-PERSON OPERATION**

- **THERE ARE NO LINE-OF-SIGHT REQUIREMENTS BETWEEN OBSERVATION POINTS**

ProMark2 OPTIONAL ACCESSORIES

INITIALIZATION BAR

ROVER   BASE

INITIALIZATION BAR

#107030

THE INITIALIZATION BAR IS USED TO FOR AMBIGUITY
RESOLUTION BETWEEN THE BASE AND ROVER ANTENNAS PRIOR
TO INITIATING DATA COLLECTION

STOP & GO SURVEY INFO

- **STOP & GO IS AN OPERATION <u>SUBSET</u> OF KINEMATIC SURVEYS IN WHICH DATA IS COLLECTED AND STORED WHILE MOVING. STOP & GO IS A HIGH PRODUCTION TYPE SURVEY MODE THAT IS USED TO OBTAIN <u>CENTIMETER</u> ACCURACIES BETWEEN THE BASELINE STATIC POINTS.**

- **STOP & GO SURVEYS REQUIRE TWO ProMark2 GPS RECEIVERS. ONE RECEIVER IS USED AS A BASE REFERENCE STATION ON A <u>KNOWN</u> SURVEY POINT. THE SECOND RECEIVER IS USED AS A ROVER FOR COLLECTING DATA OVER SEVERAL <u>UNKNOWN</u> SURVEY POINTS**

STOP & GO SURVEY INFO (Cont'd)

- **WHERE THE OCCUPATION TIME FOR STATIC SURVEYS MAY BE 30 MINUTES OR LONGER, THE OCCUPATION TIME FOR STOP AND GO USUALLY AVERAGES FROM A MINIMUM OF <u>15</u> TO <u>30</u> SECONDS ON AN UNKNOWN POINT. THE SHORTER OCCUPATION TIME IS ALSO AN ADVANTAGE OVER STATIC TYPE SURVEYS**

- **THE LOGGING OF RECEIVER COORDINATES AT EACH SURVEY (STOP) POINT MANDATES CAREFUL TRANSPORT (GO) OF THE <u>ROVER</u> RECEIVER TO MAINTAIN CARRIER LOCK WITH THE GPS SATELLITES TO PRECLUDE DATA LOSS**

- **A MINIMUM OF <u>FIVE</u> SATELLITES ARE REQUIRED DURING THE SESSION. WHEN THE ProMark2 ROVER IS COVERING SEVERAL SURVEY POINTS, THERE IS A POSSIBILITY THAT SIGNAL LOSS COULD OCCUR WHILE THE RECEIVER IS IN MOTION. THIS CONDITION MAY PRODUCE <u>CYCLE SLIPS</u> (e.g. loss of data) THAT CAN ONLY BE DETECTED AND CORRECTED DURING POST-PROCESSING**

STOP & GO SURVEY INFO (Cont'd)

- **IF SIGNAL LOSS OCCURS THAT RESULTS IN A CYCLE SLIP, IT WILL PRODUCE A <u>NEW</u> ABIGUITY THAT WILL BE DIFFERENT FROM THE PREVIOUS AMBIGUITY RESOLUTION. ASHTECH SOLUTIONS SOFTWARE CONTAINS ALGORITHMS OR MATHEMATICAL <u>FIXES</u> THAT CAN RESTORE SIGNAL CONTINUITY AND ENSURE THAT THERE IS ONLY <u>ONE</u> AMBIGUITY RESOLUTION FOR EACH SATELLITE RECEIVER PAIR.**

- **USE THE <u>MISSION PLANNING</u> MODULE CONTAINED IN THE ASHTECH SOLUTIONS SOFTWARE AND EXAMINE THE <u>TIME SPAN</u> OF THE SESSION TO DETERMINE THE NUMBER OF GPS SATELLITES THAT WILL BE AVAILABLE TO MINIMIZE THESE TYPES OF PROBLEMS**

- **RECEIVERS (BOTH THE BASE AND THE ROVER) MUST BE <u>INITIALIZED</u> TO ENSURE CARRIER AMBIGUITY RESOLUTION FROM SEVERAL GPS SATELLITES**

STOP & GO SURVEY INFO (Cont'd)

- WHEN THE INITIALIZATION BAR IS USED, INTEGER AMBIGUITY RESOLUTION (WAVELENGTH CYCLE MEASUREMENTS) TAKES APPROXIMATELY 5 MINUTES BASED UPON THE FOLLOWING FACTORS:

- -- ENVIRONMENTAL CONDITIONS

- -- SATELLITE GEOMETRY

- [NOTE: FOR FURTHER INFORMATION ON INITIALIZATION TYPES, REFER TO THE ProMark2 FAQ's POSTED AT THE END OF THIS MODULE]

STOP & GO SURVEY INFO (Cont'd)

RECEIVERS (BOTH BASE REFERENCE AND THE ROVER) MUST BE <u>INITIALIZED</u> TO ENSURE CARRIER AMBIGUITY RESOLUTION FROM SEVERAL GPS SATELLITES. FOR FURTHER INFORMATION ON INITIALIZATION TYPES, REFER TO THE ProMark2 FAQ's POSTED AT THE END OF THIS MODULE

- FOR STOP & GO SURVEY, THE ProMark2 EPOCH DATA RECORDING INTERVAL CAN BE SET FROM A MINIMUM OF 1 SECOND UP TO 120 SECONDS AS OPPOSED TO THE <u>FIXED</u> 10 SECOND RECORDING INTERVAL USED FOR STATIC SURVEYS IN EARLIER VERSIONS OF THE ProMark2. THE INTERVAL SETTING IS DEPENDENT UPON VARIABLE FIELD AND SATELLITE COVERAGE CONDITIONS

ProMark2 FAQ's

Q: **How do I tell the difference between the ProMark2 with static only capability and the kinematic capable model?**

A: **When the receiver is powered up, the receiver firmware version will be displayed in the introduction screen of the receiver display. The receiver firmware version will be 2.0 or higher. (See Graphic)**

ProMark2 FAQ's (Cont'd)

Q: What is ProMark2 Kinematic?

A: Kinematic is an adjective meaning to move or be in motion. The word kinematic used in conjunction with GPS positioning means you collect data while moving. Conventionally speaking, there are two types of kinematic GPS operations:

--Post-processed &

--Real-Time Kinematic (RTK)

Post-processed kinematic, like the kind used in the ProMark2 kinematic involves the user collecting GPS data while moving and then performing the precise position computations at a later time.

[Complete operating procedures for Stop & Go and Continuous Kinematic are detailed in the ProMark2 User Manuals]

ProMark2 FAQ's (Cont'd)

Q: How do I upgrade a version 1.x PM2 to one with kinematic capability?

A: Upgrading to kinematic capability requires new <u>firmware</u> for each receiver and one new piece of hardware for each kit. The process of upgrading the ProMark2 is relatively easy. The first step in the upgrade process is to contact Thales Navigation or an Ashtech dealer near you. The contact phone numbers are available @ http://www.thalesnavigation.com/.

Q: What is an Initialization Bar?

A: The ProMark2 system uses the Initialization Bar to determine the centimeter level GPS position rapidly and reliably. The bar is a mount for both the base and rover antennas with a quick-release system for the rover. The post-processing software knows the length of the bar and that information is used to "help" the processor resolve the centimeter level solution. Once the system is initialized, continuous lock on at least 5 satellites must be maintained

(Please see the user manuals for a full description of field procedures)

GO TO MODULE TWO