

GENERAL INFORMATION

System	Impeller	GPS*
Necessary equipment	Monitor, impeller, wires, (magnet on sliding seat possible, but not necessary)	Monitor, receiver
Necessary preparation	Impeller and wire installation, calibration	None
Measurement method	Impeller spins with moving boat relative to water; computer counts turns of impeller; calculates distance traveled relative to water, boat velocity relative to water, stoke rate	Computer receives signals from satellites to determine position on earth every 1-3 sec; calculates distance traveled over ground and boat velocity over ground
Calibration	Through rowing of a known distance, the calibration factor is found and set on monitor	Automatically done by computer
Accuracy	Distance traveled and velocity always relative water: Less than 2% for any measurement with or without current	Distance traveled and velocity always over ground: ~ 1- 15m for position or any distance; This means that without current the distance or velocity measurement for one single stroke could be off by more than 10%, but accuracy improves dramatically with overall distance and the calculation of average velocity over longer time; Measurements of actually traveled distance and boat velocity on water with current are off depending on the relation of the current speed to average speed of the boat relative to the water
Energy consumption	Low	Relatively high

	Impeller		GPS	
	Without current	With current	Without current	With current
Actual total distance rowed	<p>Positives:</p> <ul style="list-style-type: none"> -Very good, if properly calibrated -Accurate by 1-2% <p>Negatives:</p> <ul style="list-style-type: none"> -Calibration necessary 	<p>Positives:</p> <ul style="list-style-type: none"> -Very good, if properly calibrated -Accurate by 1-2% <p>Negatives:</p> <ul style="list-style-type: none"> -Calibration necessary 	<p>Positives:</p> <ul style="list-style-type: none"> -Very good for large distances -Accurate by 1-15m <p>Negatives:</p> <ul style="list-style-type: none"> -Possibly inaccurate for small distances 	<p>Positives:</p> <ul style="list-style-type: none"> -Measurement is over around <p>Negatives:</p> <ul style="list-style-type: none"> -Extremely inaccurate
Speed per stroke	<p>Positives:</p> <ul style="list-style-type: none"> -Very good, if properly calibrated -Accurate by 1-2% <p>Negatives:</p> <ul style="list-style-type: none"> -Calibration necessary 	<p>Positives:</p> <ul style="list-style-type: none"> -Very good, if properly calibrated -Accurate by 1-2% <p>Negatives:</p> <ul style="list-style-type: none"> -Calibration necessary 	<p>Positives:</p> <ul style="list-style-type: none"> -Measurements vary widely from stroke to stroke <p>Negatives:</p> <ul style="list-style-type: none"> -Measurements vary widely from stroke to stroke 	<p>Positives:</p> <ul style="list-style-type: none"> -Extremely inaccurate <p>Negatives:</p> <ul style="list-style-type: none"> -Extremely inaccurate
Average pace	<p>Positives:</p> <ul style="list-style-type: none"> -Very good, if properly calibrated -Accurate by 1-2% <p>Negatives:</p> <ul style="list-style-type: none"> -Calibration necessary 	<p>Positives:</p> <ul style="list-style-type: none"> -Very good, if properly calibrated -Accurate by 1-2% <p>Negatives:</p> <ul style="list-style-type: none"> -Calibration necessary 	<p>Positives:</p> <ul style="list-style-type: none"> -Very good, through increased accuracy of traveled distance -Improvement through smoothing programs <p>Negatives:</p> <ul style="list-style-type: none"> - 	<p>Positives:</p> <ul style="list-style-type: none"> - <p>Negatives:</p> <ul style="list-style-type: none"> -Extremely inaccurate