

UNCLASSIFIED

FY 2009 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2

DATE: February 2008

BUDGET ACTIVITY: 06
PROGRAM ELEMENT: 0604256N
PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

COST: (Dollars in Thousands)

Project Number & Title	FY 2007 Actual	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
Total PE	23,307	23,505	24,959	25,831	26,358	26,858	27,363
0602 ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)	11,427	11,476	12,239	12,645	12,884	13,115	13,352
0672 EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSTEMS (ENEWS)	11,880	12,029	12,720	13,186	13,474	13,743	14,011

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This is a continuing program that consolidates the design, fabrication and integration of Naval Electronic Warfare (EW) threat simulators for increased managerial emphasis and coordination. These simulator development efforts provide realistic Developmental and Operational Test and Evaluation (DT&E/OT&E) environments to test Tri-service EW systems and defensive tactics. These projects develop former Soviet and Free-World Anti-Air and Anti-Ship weapon system simulators in accordance with the Services' requirements.

The 0602 Project, Electronic Warfare Environment Simulation (ECHO), directly supports the Test and Evaluation resource requirements for all Naval Air EW development programs to include multi-spectral situational awareness and countermeasures. Programs in development and future programs include: Advanced Anti-Radiation Guided Missile (AARGM), ALR-67 (v) 2 and (v) 3, Integrated Defensive Electronic Countermeasures (IDECM) Suite ALQ-214, AAR-47 (v) 2 and the AAR-47 (v) 3, AVR-2, Advanced 6" Expendable, Advanced Strategic Tactical Expendable (ASTE), ALQ-144A, Strike and Assault Directed Infrared Countermeasures (DIRCM), Joint Strike Fighter, EA-18G, EA-6B Improved Capability Program (ICAP III), LR700 and the Low Band Transmitter.

The 0672 Project, Effectiveness of Navy EW Systems (ENEWS), is a Department of Navy (DON) unique project that supports Test and Evaluation (T&E) of Ships EW efforts. ENEWS provides T&E for surface and subsurface shipboard systems and tactics in digitally modeled battle scenarios at the component, fully integrated single ship, multi-ship and full-up multi-platform battle group levels. ENEWS also provides a secure anechoic closed

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loop T&E facility specifically designed to test shipboard systems at the stand alone subsystem or fully integrated systems level. The last and largest portion of this project addresses the flyable Infrared and Radio Frequency simulators flown on specially configured NP-3D aircraft to provide at-sea open air T&E for systems and tactics. All ENEWS assets are developed, operated and maintained by the Naval Research Laboratory, Washington, DC.

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B. PROGRAM CHANGE SUMMARY:

	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
FY 2008/FY 2009 President's Budget Submission	23,578	23,924	25,139
Congressional Undistributed Reductions/Rescissions	0	-152	0
Non-Pay Inflation Adjustments	0	0	-65
Rate Adjustments	0	0	-115
SBIR Assessment	-271	-267	0
FY 2009 President's Budget Submission	23,307	23,505	24,959

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Not applicable.

C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

D. ACQUISITION STRATEGY:

Not applicable.

E. PERFORMANCE METRICS:

Performance metrics are discussed within each project (R2a).

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DATE: February 2008

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PROGRAM ELEMENT: 0604256N

PROJECT NUMBER: 0602

PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

PROJECT TITLE: ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)

COST: (Dollars in Thousands)

Project Number & Title	FY 2007 Actual	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
0602 ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)	11,427	11,476	12,239	12,645	12,884	13,115	13,352

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The objective of this project is development of necessary simulation facilities and approaches to allow determination of the effectiveness of Electronic Warfare (EW) in real world engagement situations and to support the introduction of modern, effective systems into Naval Aviation. The heavy use of test resources by all Services demonstrates the importance of these assets. The Navy has been very successful in executing all of its major programs, and to date has had no major technical problems.

The Electronic Warfare Environment Simulation (ECHO) project is unique in that it is the only program within the Department of Defense (DoD) which develops and provides Naval anti-air warfare threat assets for Testing and Evaluation (T&E), and is a critical part of the Office of the Secretary of Defense (OSD) Test Resource Master Plan. The OSD Master Plan employs many ECHO project resources for planning, analysis, testing, and verification of airborne EW equipment.

This project directly supports the Test and Evaluation resource requirements for all Naval Air EW development programs, to include multi-spectral situational awareness and countermeasures. Programs in development and future programs include: Advanced Anti-Radiation Guided Missile (AARGM), ALR-67 (v) 2 and (v) 3, Integrated Defensive Electronic Countermeasures (IDECM) Suite ALQ-214, AAR-47 (v) 2 and the AAR-47 (v) 3, AVR-2, Advanced 6" Expendable, Advanced Strategic Tactical Expendable (ASTE), ALQ-144A, Strike and Assault Directed Infrared Countermeasures (DIRCM), Joint Strike Fighter, EA-18G, EA-6B Improved Capability Program (ICAP III), LR700 and the Low Band Transmitter (LBT).

This project provides for the development of an Integrated Air Defense T&E capability to be fielded at each of the three sites comprising the Navy's Tri-Center complex: Naval Air Warfare Center Weapons Division, China Lake and Point Mugu in CA, and Naval Air Warfare Center Aircraft Division, Patuxent River, MD.

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PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

PROJECT TITLE: ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
ELECTRO-OPTICAL/INFRA-RED (EO/IR) THREAT CAPABILITIES	5,083	2,675	2,395

FY 2007 - FY 2009: Provide the test community with the modern threat systems necessary for T&E of airborne EO/IR passive alert systems and airborne EO/IR active response systems. Develop many versus many (MvM) InfraRed Countermeasure Assessment System which provides spectral, power, and temporal systems to test and evaluate Missile Warning Systems (MWS) and measure the end-game effectiveness of IR expendables and DIRCM systems by simulating high speed IR missile engagements against airborne targets. Combine the capability of the existing IR seeker vans to enable testing of up to 12 seekers simultaneously to expedite data collection against tier 1 IR Surface to Air Missiles (SAMs). Upgrade the IR Sensor Stimulator (IRSS) with the capability for IR plume simulators to react to threat missile seeker guidance commands; to enable the plume stimulator to receive immediate feedback from the instrumentation observing the countermeasure's effectiveness; and to relay that "response" to the controlling software that generates the plume signature.

Funding decrease from FY 2007 to FY 2008 and FY 2009 is due to the fact that funds get aligned to different efforts based on the priority of the test shortfall. Funding for the EO/IR effort decreases due to the completion of the one versus many (1vM) and MvM portions of the InfraRed Countermeasure Assessment System (ICAS) in FY 2007 and FY 2008 respectively. These systems will support testing for Assault DIRCM and other Navy programs.

	FY 2007	FY 2008	FY 2009
RADIO FREQUENCY (RF) THREAT CAPABILITIES	4,242	6,818	7,747

FY 2007 - FY 2009: Provide the test community with the modern threat systems necessary for T&E of airborne RF alert, Situation Awareness, targeting systems and airborne RF response systems. Upgrade the existing open air range and laboratory threat simulators to provide a new generation, high fidelity double digit threat I-34 (Advanced Threat Simulator). Provide advanced modulation and millimeter wave capability to the Advanced Multiple Environment Simulators. Procurement and integration of an advanced threat system through Foreign Materials Acquisition channels. Continue intel updates to missile, radar, and gun simulations. Upgrade the I-32 Open Air Antenna with side lobe canceling, and replace the aging transmitter; provide the I-32 simulator at the Electronic Combat Range with a second frequency for multiple-missile launch, side lobe canceling, and

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PROJECT TITLE: ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)

improved Electronic Counter-Counter Measure (ECCM) capabilities. Develop long range threat systems to simulate double digit Surface to Air Missiles, using recent intelligence and available exploitation data gathered by the Missile and Space Intelligence Center (MSIC).

Funding increases from FY 2007 to FY 2008 and FY 2009 are due to the fact that funds get aligned to different efforts based on the priority of the test shortfall. Funding for the RF effort increases from FY 2007 to FY 2008 and FY 2009 due to the need to address double digit threat systems (I-32, I-34), and to start development of another high priority long range threat system. These systems are required to test the Joint Strike Fighter, EA-18G, and other Navy platforms.

	FY 2007	FY 2008	FY 2009
REQUIREMENTS AND VALIDATION	2,102	1,983	2,097

FY 2007 - FY 2009: Validate and track intel updates of the threat systems necessary for the operation and continuous improvement of Navy laboratories and ranges which provide engineering support, testing and analysis to the developers, integrators, testers and users of systems and technologies that counter or penetrate air defenses. Provide program management and systems engineering support for the development of simulators and the acquisition of foreign material to accurately reflect current and future threat scenarios.

C. OTHER PROGRAM FUNDING SUMMARY - NAVY RELATED RDT&E::

Not applicable.

OTHER PROGRAM FUNDING SUMMARY - NON-NAVY RELATED RDT&E::

Not applicable.

D. ACQUISITION STRATEGY:

Not applicable.

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 PROJECT NUMBER: 0672 PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSTEMS (ENEWS)

Project Number & Title	FY 2007 Actual	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
0672 EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSTEMS (ENEWS)	11,880	12,029	12,720	13,186	13,474	13,743	14,011

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The objective of the Effectiveness of Navy Electronic Warfare (EW) Systems (ENEWS) Project is the development and application of necessary simulation assets to determine the effectiveness of EW for navy ships in simulated real-world engagement situations. The project primarily supports the introduction of modern, effective shipboard and offboard EW systems, and tactics for the Surface Navy. The heavy use of ENEWS resources by Naval Sea Systems Command, Operational Test and Evaluation (OT&E) Force, Special Operations, and other EW Research, Development, Test and Evaluation (T&E) agencies speaks to the overall importance of this project. The project provides support for EW system design Engineering Test (ET), Development Test (DT), Operational Test (OT), and the development of utilization tactics. Its quick reaction capabilities have had great impact on crisis situations such as the Lebanon and Libyan crises, Iran Harpoon threat, Persian Gulf crisis, and Operation Desert Shield/Storm. Simulation Display is another ENEWS modeling tool that was developed to support T&E. The display has been adopted by most Department of Defense (DoD) T&E and training ranges to provide visualization of T&E and training scenarios. The primary threat to surface ships is Anti-Ship Capable Missile systems. The ENEWS Project is unique in that it is the only project within DoD dedicated to developing and providing realistic Anti-Ship Capable Missile assets to test and evaluate the effectiveness of shipboard EW systems and tactics against these type threats. The ENEWS Project is a critical part of the Office of the Secretary of Defense Test Resource Master Plan. This plan employs many of the ENEWS assets for planning, analysis, testing, and verification of shipboard and offboard EW systems techniques and tactics. As part of its normal activities, ENEWS provides Development Test and Evaluation (DT&E), OT&E, and Follow-on Operational Test and Evaluation (FOT&E) support to the surface Navy for all ship classes. DT, OT and FOT&E support includes AN/SLQ-32 Surface Electronic Warfare Improvement Program (SEWIP), R17.OX NULKA, Rapid Anti-ship Integrated Defense System, all MK245 Giant tests, advanced InfraRed (IR) decoys, decoy placement, ship IR signature and radar cross section measurement of DDG-51, LPD-17, DD-21 and PC class ships, High Power Microwave program, and other ship self-defense initiatives, including T&E of Future Naval Capability process. In addition, ENEWS assets are regularly employed to test the effectiveness of North Atlantic Treaty Organization ships' EW systems in joint allied exercises.

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PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSTEMS (ENEWS)

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
SIMULATOR HARDWARE UPGRADES	77	236	248

Provides simulator upgrades to ENEWS flyable and shore based IR and RF simulators.

The increase between FY 2007 and FY 2008 is due to an increased tempo of operational testing.

FY 2007 Accomplishments:

- Completed intelligence upgrades to MIKE 3 and VICTOR 1 Standard Instrumentation Pods (SIPs).
- Initiated intelligence upgrades to FOXTROT 3 and MIKE 4 SIPs.

FY 2008 Plans:

- Complete intelligence upgrades to FOXTROT 3 and MIKE 4 SIPs.
- Initiate intelligence upgrades to FOXTROT 2 and VICTOR 2 SIPs.

FY 2009 Plans:

- Complete intelligence upgrades to FOXTROT 2 and VICTOR 2 SIPs.

	FY 2007	FY 2008	FY 2009
SIMULATOR SOFTWARE UPGRADES	68	128	99

Provides software upgrades to existing ENEWS flyable and shore based simulations required due to either hardware upgrades or new intelligence information. FY 2007 focus is on upgrades to existing simulators.

The increase between FY 2007 and FY 2008 is due to an increased tempo of operational testing.

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FY 2007 Accomplishments:

- Completed software intelligence upgrades to MIKE 3 and VICTOR 1 SIPs.
- Initiated software intelligence upgrades to FOXTROT 3 and MIKE 4 SIPs.

FY 2008 Plans:

- Complete software intelligence upgrades to FOXTROT 3 and MIKE 4 SIPs.
- Initiate software intelligence upgrades to FOXTROT 2 and VICTOR 2 SIPs.

FY 2009 Plans:

- Complete software intelligence upgrades to FOXTROT 2 and VICTOR 2 SIPs.

	FY 2007	FY 2008	FY 2009
SIMULATOR CHARACTERIZATION	29	34	40

Provides characterization of IR and RF simulators as part of the periodic checks on simulator performance and collects performance data for comparison with previously recorded data.

Operational requirements demand that these simulators be available to support testing events. Simulator baselines must be established, updated and documented in order to ensure the simulators are operating in accordance with their design specifications.

FY 2007 Accomplishments:

- Initiated and completed characterization of NOVEMBER Va, NOVEMBER Vb and 3rd generation INDIA II control panel.

FY 2008 Plans:

- Initiate and complete characterization of KILO, QUEBEC AND TANGO.

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FY 2009 Plans:

- Initiate and complete characterization of INDIA III and PAPA.

	FY 2007	FY 2008	FY 2009
SIMULATOR MAINTENANCE	998	975	1,167

Provides required simulator maintenance to ensure that the hardware simulators are available for customer testing. Preventative maintenance, troubleshooting, and repairs are performed as required.

Operational requirements demand that these simulators be available to support testing events. Maintenance is the key to having them available.

FY 2007 Accomplishments:

- Continued annual maintenance on 21 simulators - 15 RF and 6 IR simulators to support 15 flight/shore based tests.
- Initiated and completed transition of NOVEMBER and QUEBEC simulators into the Naval Research Laboratory Learjet Electronics Pod (NRL LEP).

FY 2008 Plans:

- Continue all efforts of FY 2007.
- Initiate and complete transition of the ROMEO simulator into the NRL LEP.

FY 2009 Plans:

- Continue all efforts of FY 2008.
- Initiate and complete transition of the INDIA III into the NRL LEP.

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	FY 2007	FY 2008	FY 2009
SIMULATOR CONTROL PANELS	244	213	268

Supports the development and maintenance of all simulator control panels.

Operational requirements demand that these simulator control panels be available to support testing events.

FY 2007 Accomplishments:

- Completed INDIA II simulator control panel.

FY 2008 Plans:

- Initiate QUEBEC control panel.

FY 2009 Plans:

- Complete QUEBEC control panel.
- Initiate and complete VICTOR 1 SIP control panel.

	FY 2007	FY 2008	FY 2009
LABORATORY FACILITIES	981	885	933

Provides maintenance and upgrades to the indoor laboratory and outdoor land based facilities required to perform testing of surface EW systems.

Change reflects slowdown of upgrades and increased tempo of operational testing.

FY 2007 Accomplishments:

- Initiated maintenance and upgrades to shore based test facilities and mobile test vans as required to conduct tests in support of SEWIP, NULKA and multi function EW programs.

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FY 2008 Plans:

- Continue all efforts of FY 2007.

FY 2009 Plans:

- Continue all efforts of FY 2008.

	FY 2007	FY 2008	FY 2009
SIMULATION THREAT REPOSITORY	43	29	35

Provides management, access, and configuration control of the classified document and simulations library.

Operational requirements demand that these digital simulators be available to support testing events. It requires the most up-to-date and accurate information on threat systems in order to model the realistic simulators.

FY 2007 Accomplishments:

- Continued transitioning NRL Codes 5750 and 5770's environmental, threat and platform simulations to the subversion software configuration management program. Upgraded subversion software library as new releases became available - 100 updates annually.
- Continued new digital models of Anti-ship Cruise Missile (ASCM) threats as they became available.
- Completed evaluation of subversion database software analyzing new capabilities to improve configuration management.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.

FY 2009 Plans:

- Continue all efforts of FY 2008.

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	FY 2007	FY 2008	FY 2009
SIMULATION INSTRUMENTATION	566	546	665

Provides development and maintenance of flight support instrumentation such as oscilloscopes, global positioning systems, videocassette systems, and monitors.

Operational capabilities demand that these instrumentation systems be available to support testing events.

FY 2007 Accomplishments:

- Continued upgrades and maintenance of flight support systems as necessary to support the IR/RF ENEWS simulators. There are 15 RF and 6 IR simulators.

FY 2008 Plans:

- Continue all efforts of FY 2007.

FY 2009 Plans:

- Continue all efforts of FY 2008.

	FY 2007	FY 2008	FY 2009
SIMULATION VALIDATION	606	521	586

Provides for the validation of hardware simulators and digital models. Develops reports that contain detailed descriptions and parametric data of the threat simulators or digital models and compares the simulator's parametric data to the actual threat parametric data.

DoD and Department of the Navy regulations require validation of all threat simulations used in an OT&E event.

FY 2007 Accomplishments:

- Completed INDIA II, MIKE 3, NOVEMBER III and IV, FOXTROT 1 SIP, and QUEBEC hardware validation reports.

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Provided reports to Simulator Validation Working Group (SVWG).
- Initiated TANGO, NOVEMBER Va and Vb hardware validation reports.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Complete NOVEMBER Va and submit report to the SVWG.
- Initiate INDIA I, PAPA and KILO hardware validation reports.

FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Complete NOVEMBER Vb and TANGO hardware validation reports and submit to the SVWG.

	FY 2007	FY 2008	FY 2009
ELECTRONIC ATTACK/ELECTRONIC SUPPORT SIMULATIONS	498	477	444

Provides improvements and intelligence upgrades to ASCM Digital Models to include fly-out models, NULKA and other off-board decoys including chaff models. Also, supports the maintenance of the Threat Database to provide threat intelligence for the development of T&E digital scenarios.

Operational requirements demand that these digital models and scenarios simulations be available to support testing events.

FY 2007 Accomplishments:

- Continued improvements and intelligence upgrades to ALPHA I, INDIA I, II, III, LIMA, NOVEMBER III, QUEBEC, TANGO, and TANGO II. In all, a total of 9 digital models.
- Continued upgrade to cruise missile simulation suite to improve capability to model advanced threats by adding graphical user interface (GUI).

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FY 2008 Plans:

- Continue all efforts of FY 2007.

FY 2009 Plans:

- Continue all efforts of FY 2008.

- Complete upgrade to cruise missile simulation suite to improve capability to model advanced threats by adding GUI.

	FY 2007	FY 2008	FY 2009
PROGRAM MANAGEMENT	416	393	461

Provides technical management functions in support of the ENEWS project; engineering and technical support required for the overall efforts of ASCM Simulator and Digital Models development to meet DT/OT testing requirements, development of detailed test resource requirements, and provides an interface between N-912, N-433, Office of Naval Research, and other ENEWS oversight activities. Also, provides technical leadership to the Navy Surface ASCM Threat SVWG.

Needed operational capabilities require increased effort towards these simulators and simulations to be available for testing of critical systems for future deployment. This results in additional management costs.

FY 2007 Accomplishments:

- Continued management of the SVWG.

- Initiated and completed update of FY 2007 Program Management Plan.

- Initiated and completed FY 2007 quarterly reports, earned value management analysis, progress tracking and analysis.

FY 2008 Plans:

- Continue all efforts of FY 2007.

- Initiate and complete update of FY 2008 Program Management Plan.

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- Initiate and complete FY 2008 quarterly reports, earned value management analysis, progress tracking and analysis.

FY 2009 Plans:

- Continue all efforts of FY 2008.
- Initiate and complete update of FY 2009 Program Management Plan.
- Initiate and complete FY 2009 quarterly reports, earned value management analysis, progress tracking and analysis.

	FY 2007	FY 2008	FY 2009
CLASSIFIED PROGRAM	7,354	7,592	7,774

Details about this program are classified.

FY 2007 Accomplishments:

- Details are of a higher classification.

FY 2008 Plans:

- Details are of a higher classification.

FY 2009 Plans:

- Details are of a higher classification.

C. OTHER PROGRAM FUNDING SUMMARY - NAVY RELATED RDT&E:

Not applicable.

OTHER PROGRAM FUNDING SUMMARY - NON-NAVY RELATED RDT&E:

Not applicable.

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D. ACQUISITION STRATEGY:

Not applicable.