Extensions of Auto-Generated Code and NOSTROMO Methodologies (U)

<table>
<thead>
<tr>
<th>Name</th>
<th>THAAD Project Office</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pam McDonald</td>
<td></td>
<td>THAAD Project Office</td>
</tr>
<tr>
<td>Sandra Giles</td>
<td></td>
<td>Dynetics, Inc.</td>
</tr>
<tr>
<td>Dan Strickland</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Distribution A, Approved for public release, distribution unlimited*

Overview (U)

- Background
- ABC Extensions
- ADC-Warrick-Omaha
- NOSTROMO Extension
- NOS TROMO Demo
- Future Enhancements
Dynetics

Background (U)
Dynetics

AGC Terminology (U)

Dynetics

Testing vs. Non-Testing Efforts - COCOMO II Effort Distribution - Large Project

Waterfall Model
- Requirements
- Prelim. Design
- Detailed Design
- Code and Unit Testing
- Integration Testing
- Non-Testing
- Testing

- FT 36.2%
- TC 4.8%
- IP 15.9%
- CT 22.5%
- ED 24.5%

Phases (U)
Testing vs. Non-Testing Efforts - Code and Unit Testing Phase (U)

- Requirements: 4%
- Design: 8%
- Programming: 56.5%
- Test Plans: 5.5%
- V & V: 8.5%
- Project Office: 6%
- CM/QA: 6.5%
- Manuals: 5%

77.25% Non-Test
22.75% Test

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Testing vs. Non-Testing Effort - Synthetic SLOC (U)

- Non-Testing: 67.5%
- Testing: 32.5%

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Adapted AGC (U)

- Adapted AGC (U)
- AGC CODE
- Non-AGC SYNCHE SLOC: 5000 + 10000 = 15000
- 5000 SLOC in Ada95 Auto-generated by 5000 SLOC in Ada95
- 5000 SLOC in Ada95 Auto-generated by 5000 SLOC in Ada95
- Modification Percentages
  - Re-design: 5%
  - Re-code: 10%
  - Re-test: 25%
- Non-AGC Adapted:
  \[ \text{5000} \times (0.4 \times 0.05) + (0.3 \times 0.1) + (0.3 \times 0.25) \]
  \[ = 5000 \times 0.125 \]
  \[ = 625 \text{ ASLOC} \]
- AGC Adapted:
  \[ \text{250} \times (0.4 \times 0.05) + (0.3 \times 0.1) + \text{5000} \times (0.3 \times 0.25) \]
  \[ = 250 \times 0.05 + 5000 \times 0.075 \]
  \[ = 388 \text{ ASLOC} \]
- Adapted Synthetic SLOC:
  \[ = 625 + 388 = 1013 \text{ Adapted Synthetic SLOC} \]
- ESLOC Calculation:
  \[ = (1013 \text{ Adapted Synthetic SLOC}) + (10000 \text{ New Non-AGC SLOC}) + (2300 \text{ New Synthetic SLOC}) \]
  \[ = 13313 \text{ ESLOC} \]
Dynetics

AGC Worksheet (U)

Microsoft Excel Workbook with two main worksheets:
- Synthetic SLOC Worksheet – calculates Synthetic SLOC estimate
- New Size Worksheet – calculates ESLOC from Synthetic SLOC, New Non-AGC SLOC, and Adapted SLOC (above)
- Cells with yellow background are calculated
- Cells with tan background require inputs
- Assumes estimates for Generating and Resultant Adapted SLOC are discrete and known
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NOSTROMO Background (U)

Original NOSTROMO Concept (U)

Notional Obscurity Statistical Pox Observation Model

DATA
PAGE

REPORT

NEWT  NOSTROMO

7
Distributions of Uncertainty (U)

Setting n-1  Setting n  Setting n+1

NOSTROMO Application (U)
## New NOSTROMO Features (U)

## NOSTROMO Application Version History (U)

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>v0.1</td>
<td>24/07/2020</td>
<td>Concept development, new VB code, high storage and memory constraints</td>
</tr>
<tr>
<td>v0.2</td>
<td>24/08/2020</td>
<td>Added VBA code to demonstrate certain tables</td>
</tr>
<tr>
<td>v0.3</td>
<td>26/08/2020</td>
<td>Added scale factors and cost drivers</td>
</tr>
<tr>
<td>v0.4</td>
<td>30/08/2020</td>
<td>Added multiple charts and data viewers</td>
</tr>
<tr>
<td>v0.5</td>
<td>08/09/2020</td>
<td>Added additional software and documentation</td>
</tr>
<tr>
<td>v0.6</td>
<td>08/09/2020</td>
<td>Added EAF and EAF chart</td>
</tr>
<tr>
<td>v0.7</td>
<td>13/09/2020</td>
<td>Added EAF output and changed names to NOSTROMO</td>
</tr>
<tr>
<td>v0.8</td>
<td>09/09/2020</td>
<td>Added VBA to filter graph, changed the filter function to support</td>
</tr>
<tr>
<td>v0.9</td>
<td>19/09/2020</td>
<td>Added EAF tab</td>
</tr>
<tr>
<td>v1.0</td>
<td>27/10/2020</td>
<td>Added PrintKeys function</td>
</tr>
<tr>
<td>v1.1</td>
<td>22/01/2021</td>
<td>Added Requirements Analysis, Rangevalue, Output screen</td>
</tr>
<tr>
<td>v1.2</td>
<td>26/02/2021</td>
<td>Added Pathway data and values, COCOMO, auxiliary by area</td>
</tr>
<tr>
<td>v1.3</td>
<td>09/03/2021</td>
<td>Histogram chart added, removed non-linear effect equations</td>
</tr>
<tr>
<td>v1.4</td>
<td>17/03/2021</td>
<td>Updated output</td>
</tr>
<tr>
<td>v1.5</td>
<td>21/04/2021</td>
<td>Added COCOMO and Pathway outputs</td>
</tr>
<tr>
<td>v1.6</td>
<td>25/05/2021</td>
<td>Added COCOMO and Pathway outputs</td>
</tr>
<tr>
<td>v1.7</td>
<td>09/06/2021</td>
<td>Added Conditional Formatting</td>
</tr>
<tr>
<td>v1.8</td>
<td>20/07/2021</td>
<td>Added Sum, Mean</td>
</tr>
<tr>
<td>v1.9</td>
<td>05/08/2021</td>
<td>Added AGC, modified from Sum, Mean, total 10 methods</td>
</tr>
<tr>
<td>v1.10</td>
<td>16/09/2021</td>
<td>Subdivisions and some data validation</td>
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</tbody>
</table>
### Dynetics

**Screenshots - NOSTROMO COCOMO II Charts Sheet - Notional Data (U)**

<table>
<thead>
<tr>
<th>Project</th>
<th>Scenarios</th>
<th>No. of Scenarios</th>
<th>Total Cost (Million $)</th>
<th>Total Cost (Person Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project A</td>
<td>5</td>
<td>3</td>
<td>50,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Project B</td>
<td>10</td>
<td>5</td>
<td>80,000</td>
<td>1,600</td>
</tr>
<tr>
<td>Project C</td>
<td>15</td>
<td>8</td>
<td>100,000</td>
<td>2,000</td>
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</tbody>
</table>

### Dynetics

**Screenshots - NOSTROMO AGC Calculator - Notional Data (U)**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>AGC Value</th>
<th>AGC Value (Adjusted)</th>
</tr>
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<tbody>
<tr>
<td>Scenario A</td>
<td>100</td>
<td>110</td>
</tr>
<tr>
<td>Scenario B</td>
<td>200</td>
<td>220</td>
</tr>
<tr>
<td>Scenario C</td>
<td>300</td>
<td>330</td>
</tr>
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Copy as Note
Using NOSTROMO (U)

Future Enhancements (U)
New methodologies deliver insight into the real risks associated with software development.