INITIAL LESSONS LEARNED FROM CONDUCTING SCAMPI-B APPRAISALS

ITZHAK LAVI
SARIT ASSARAF
ISRAEL AIRCRAFT INDUSTRIES LTD.

CMMI Conference – Denver Nov. 2006
Background

- IAI Process Improvement Path
- CMMI Implementation in IAI

SCAMPI B&C Appraisals

Performing SCAMPI-B Appraisals in IAI

Lessons Learned and Recommendations
Largest industrial company in Israel
- 15000 employees, 2.3 $B annual sales

Involved in Development, Production, Maintenance and Service of Aerospace Systems

IAI divisions are ISO9000 and AS9100 certified

Started SW-CMM based Software development process improvement efforts in 1992

Started CMMI based process improvement efforts in 2002
Initial Lessons learned from conducting SCAMPI-B appraisals

Israel Aircraft Industries Groups and Divisions

IAI

ELTA

ELTA AEW

ELTA IMINT and Radar

ELTA SIGINT, EW and Communication

ELTA Technologies

Space & Missiles

Space

MBT Missiles

MBT Technologies

TAMAM

MLM

Military Aircrafts

MALAT

LAHAV

MATA

Commercial Aircrafts

Engineering

Business Aircrafts

Aerospace Assemblies

Manufacturing Technologies

RAMTA

BEDEK

Aircraft

Engines

Components
Corporate Initiatives for Process Improvement

Competitiveness Ability Improvement (CAI)
- Production Process Improvement
- Acquisition Process Improvement

Project Management Process Improvement
- Project Planning and Control
- Risk Management

New Product Introduction (NPI)
IAI Uniform Project Process Framework

System & Software Engineering Development
Processes and Methodologies

- Increase Quality
- Increase Sales
- Increase Profit
Initial Lessons learned from conducting SCAMPI-B appraisals

Israel Aircraft Industries Process Improvement Path -1

Starting SPIP – CMM based Software Process Improvement Program 1992

Identifying System Engineering process needs and starting SYSPIP 1997

Starting CAI activities and NPI development 1999

Starting ASSET: CMMI based Development Process Improvement 2002

SW-CMM 1989

SE-CMM 1995

CMMI 2000

Starting activities for project management process improvement 1993
Process improvement efforts are coordinated at the corporate level and sponsored by the company VP of Operations.

Many infrastructure assets are developed at the corporate level and are adapted by the groups and divisions. Other assets are developed within the groups and divisions.

Process improvement implementation is conducted at the group and division level and sponsored by the group or division management.
Initial Lessons learned from conducting SCAMPI-B appraisals
Since the beginning of the CMMI implementation program in 2002, there have been many formal and informal process reviews and appraisals in IAI groups and divisions, with the CMMI as the reference model with the following objectives:

- Identify strengths and weaknesses in the defined processes
- Identify strengths and weaknesses in the way processes are actually performed
- Provide the basis for process improvement activities
- Determine CMMI maturity level
The need for a formal non SCAMPI-A appraisal

While SCAMPI-A appraisals provide a reliable way to determine the CMMI maturity or capability levels, they are not as good for identifying strengths and weaknesses during the process improvement effort.

We needed a method that will be:

- Well defined and documented
  - Can be applied consistently
- Flexible and tailorable
  - Can be applied in many different situations
- Less effort than SCAMPI-A
  - Can be applied more frequently
- Will not provide rating
  - Will not create the stress usually associated with SCAMPI-A
SCAMPI-B Appraisal method

- Defined at the SEI in 2005 as ARC-B compliant appraisals method
- **Purpose:** To appraise a sample of the processes defined and implemented in the organization, and identify strengths and weaknesses, **WITHOUT** assigning maturity or capability level ratings
- Provides a higher level of flexibility than SCAMPI-A

Initial Lessons learned from conducting SCAMPI-B appraisals
SCAMPI-B Appraisals Concepts

- Define appraisal scope:
  - The organization parts to be appraised
  - The CMMI model scope to be considered

- Prepare formal Input and Plan documents

- Collect information from both direct artifacts and affirmations.
  - Indirect artifacts are usually not used in data sufficiency rules of SCAMPI-B

- Use data sufficiency rules and Draft Findings to verify and validate results

- Characterize practice implementation level as Red, Yellow or Green to provide easy understanding of the organization process status

- Appraisal team must consist of at least 2 members, in addition to the team leader

- Non Attribution
SCAMPI-C Appraisal method

Defined at the SEI in 2005 as ARC-C compliant appraisals method

Purpose: To appraise a sample of the processes defined or planned in the organization, and identify strengths and weaknesses, WITHOUT assigning maturity or capability level ratings

Provides a higher level of flexibility than SCAMPI-B
SCAMPI-C Appraisals Concepts

Define appraisal scope:
- The organization parts to be appraised
- The CMMI model scope to be considered

Prepare formal Input and Plan documents

Collect information from direct artifacts, indirect artifacts and/or affirmations

Data sufficiency rules are less firm than in SCAMPI-B

Non Attribution
IAI Goals in using SCAMPI-B

- Use a well defined, repeatable and flexible method for process appraisal
  - Obtain information about current processes
  - Identify good practices that should be repeated
  - Identify weaknesses as early as possible
  - Obtain information about the level of readiness for a SCAMPI-A appraisal
- Avoid the stress associated with SCAMPI-A
  - No rating
Two formal SCAMPI-B appraisals were conducted in IAI:

- 1st SCAMPI-B appraisal performed in IAI LAHAV division in September 2005
- 2nd SCAMPI-B appraisal performed in IAI ELTA group in December 2005

In addition, three informal SCAMPI-B like appraisals were conducted in the same two organizations in 2006
Scope must be defined very carefully, especially when the time is very limited (5 to 7 days at the most)

- Usually: 2-3 projects, 4-5 process areas

Preparations for SCAMPI-B are similar to those for SCAMPI-A, e.g.:

- PIIDs preparation
- Appraisal team selection and training
- Plan, Logistics, Schedule
- Interview Scripts

Draft Findings sessions may be less important than in SCAMPI-A

For frequent PIIDs review SCAMPI-C may be more appropriate

SCAMPI-B appraisals helped in focusing management attention and raising awareness of important process issues
Initial Lessons Learned -2

- Best results are obtained when the team consists of people from both the appraised organization and from outside.

- SCAMPI-B may not be appropriate for initial process appraisal, because of the need to consider direct artifacts. SCAMPI-C may be better for this purpose.

- SCAMPI-B may not provide enough information about readiness for SCAMPI-A because Indirect Artifacts might not be examined in a SCAMPI-B.

- In some cases, SCAMPI-B method does not provide enough flexibility:
  - Draft Findings Presentation contents
  - Combinations of project and CMMI scope
## Combinations of Projects and CMMI Scope-1

<table>
<thead>
<tr>
<th></th>
<th>PP</th>
<th>PMC</th>
<th>REQM</th>
<th>CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project 1</td>
<td>DA</td>
<td>DA</td>
<td>DA</td>
<td>AF</td>
</tr>
<tr>
<td>Project 2</td>
<td>DA</td>
<td>DA</td>
<td>DA</td>
<td>AF</td>
</tr>
<tr>
<td>Project 3</td>
<td>AF</td>
<td>AF</td>
<td>DA</td>
<td>AF</td>
</tr>
<tr>
<td>Project 4</td>
<td>AF</td>
<td>AF</td>
<td>DA</td>
<td>AF</td>
</tr>
</tbody>
</table>

**Data Sufficiency rules require:**
- At least one direct artifact or one affirmation for each instantiation in scope
- Both a direct artifact and an affirmation when considering all instantiations in scope

**Legend:**
- **DA**: Direct Artifacts
- **AF**: Affirmations
- **Sufficient Data**: Green line
- **Insufficient Data**: Red dashed line

---

Initial Lessons learned from conducting SCAMPI-B appraisals

I. LAVI S. ASSARAF – IAI Nov. 2006
### Combinations of Projects and CMMI Scope-2

Not considered in SCAMPI-B

<table>
<thead>
<tr>
<th></th>
<th>PP</th>
<th>PMC</th>
<th>REQM</th>
<th>CM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In scope

Out of scope

Some process areas may intentionally not be covered in some projects to make better use of appraisal preparation and on-site time.
## Combinations of Projects and CMMI Scope-3

Not considered in SCAMPI-B

<table>
<thead>
<tr>
<th></th>
<th>PP</th>
<th>PMC</th>
<th>REQM</th>
<th>CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some practices may intentionally not be covered in some projects to make better use of appraisal preparation and on-site time.

Initial Lessons learned from conducting SCAMPI-B appraisals

I. LAVI S. ASSARAF – IAI Nov. 2006
Recommendations regarding usage of SCAMPI B&C

- Use SCAMPI-B appraisals systematically as one of the tools on the process improvement path
  - Perform once a year to check process status between SCAMPI-A appraisals
  - Limit the scope to one process area category (e.g.: Project Management PAs, Engineering PAs)
  - Plan SCAMPI-B appraisals in conjunction with other appraisals (such as SCAMPI-C) so that maximum information is obtained with a minimal effort
- Use SCAMPI-C appraisals for more frequent process and PIIDs preparation status review
- Make sure that the team consists of people both from the appraised organization and from outside
- Make sure that expectations from SCAMPI B & C are aligned with the methods’ capabilities
  - SCAMPI B or C are not a cheap replacement for SCAMPI-A
Sample plan involving SCAMPI-B appraisals

<table>
<thead>
<tr>
<th>Periodic Formal Appraisals to determine <strong>Maturity or Capability Levels</strong></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periodic Appraisals to identify <strong>Strengths and Weaknesses</strong> in Processes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interim evaluation of progress</strong> in process improvement and readiness for appraisals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SCAMPI-A**

**SCAMPI-B**

**SCAMPI-C**
Recommendations regarding the SCAMPI-B Method

Modify the SCAMPI-B method to enable more flexibility
- Scope definition
- Draft Findings presentation

Find a way to consider indirect artifacts in SCAMPI-B data sufficiency rules, in addition to direct artifacts and affirmations
Thank You

ITZHAK LAVI - ilavi@iai.co.il

SARIT ASSARAF - sassaraf@iai.co.il