

# Assignment 2

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# NASA ARM TOOL

## 1. Gemini Control System

### IMPERATIVE

-----  
ARE APPLICABLE  
ARE TO  
IS REQUIRED TO  
MUST  
RESPONSIBLE FOR  
SHALL  
SHOULD  
WILL

### OCCURRENCE

-----  
0  
27  
0  
135  
11  
61  
136  
130

TOTAL 500 -----

### CONTINUANCE

-----  
:  
AND  
AS FOLLOWS:  
BELOW:  
FOLLOWING:  
IN PARTICULAR:  
LISTED:  
SUPPORT:

### OCCURRENCE

-----  
102  
616  
2  
0  
2  
0  
0  
1

TOTAL 723 -----

### DIRECTIVE

-----  
E.G.  
FIGURE  
FOR EXAMPLE  
I.E.  
NOTE:  
TABLE

### OCCURRENCE

-----  
15  
4  
18  
10  
1  
10

TOTAL 58 -----

### OPTION

-----  
CAN  
MAY  
OPTIONALLY

### OCCURRENCE

-----  
61  
52  
0

TOTAL 113 -----

WEAK PHRASE  
-----  
ADEQUATE  
AS APPROPRIATE  
AS REQUIRED  
BE ABLE TO  
BE CAPABLE OF  
CAPABILITY OF  
CAPABILITY TO  
EASY TO  
EFFECTIVE  
NORMAL  
PROVIDE FOR  
TIMELY

OCCURRENCE  
-----  
2  
0  
0  
20  
6  
6  
4  
0  
5  
13  
4  
1

TOTAL 61 -----

INCOMPLETES  
-----  
AS A MINIMUM  
BUT NOT LIMITED TO  
NOT DEFINED  
NOT DETERMINED  
TBC  
TBD  
TBE  
TBR  
TBS

OCCURRENCE  
-----  
0  
0  
0  
0  
0  
5  
0  
0  
0

TOTAL 5 -----

## Key Points

- i. Excessive number of imperatives is used, which is good for a system, but in this case, 'should' is also used various times, giving a bad impression.
- ii. Continuance is used excessively, which results in ambiguous requirements.
- iii. Sufficient directives have been used, results in high traceability and understandability.
- iv. Too many options are used, which makes it difficult to understand.
- v. Weak phrases are used more than sufficient, same is the case of Incompletes, at this stage such number of incompletes cannot be tolerated.

## 2. X-38 Fault Tolerant System Services

### IMPERATIVE

-----

ARE APPLICABLE  
ARE TO  
IS REQUIRED TO  
MUST  
RESPONSIBLE FOR  
SHALL  
SHOULD  
WILL

### OCCURRENCE

-----

0  
9  
0  
5  
0  
488  
7  
51

TOTAL 560

### CONTINUANCE

-----

:  
AND  
AS FOLLOWS:  
BELOW:  
FOLLOWING:  
IN PARTICULAR:  
LISTED:  
SUPPORT:

### OCCURRENCE

-----

54  
406  
6  
0  
0  
0  
0  
0

TOTAL 466

### DIRECTIVE

-----

E.G.  
FIGURE  
FOR EXAMPLE  
I.E.  
NOTE:  
TABLE

### OCCURRENCE

-----

2  
19  
3  
9  
3  
77

TOTAL 113

### OPTION

-----

CAN  
MAY  
OPTIONALLY

### OCCURRENCE

-----

12  
11  
1

TOTAL 24

| WEAK PHRASE<br>----- | OCCURRENCE<br>----- |
|----------------------|---------------------|
| ADEQUATE             | 0                   |
| AS APPROPRIATE       | 0                   |
| AS REQUIRED          | 0                   |
| BE ABLE TO           | 11                  |
| BE CAPABLE OF        | 13                  |
| CAPABILITY OF        | 0                   |
| CAPABILITY TO        | 6                   |
| EASY TO              | 0                   |
| EFFECTIVE            | 0                   |
| NORMAL               | 10                  |
| PROVIDE FOR          | 0                   |
| TIMELY               | 1                   |
|                      |                     |
| TOTAL                | 41                  |

| INCOMPLETES<br>----- | OCCURRENCE<br>----- |
|----------------------|---------------------|
| AS A MINIMUM         | 1                   |
| BUT NOT LIMITED TO   | 6                   |
| NOT DEFINED          | 0                   |
| NOT DETERMINED       | 0                   |
| TBC                  | 0                   |
| TBD                  | 0                   |
| TBE                  | 0                   |
| TBR                  | 0                   |
| TBS                  | 0                   |
|                      |                     |
| TOTAL                | 7                   |

## Key Points

- i. Excessive number of imperatives is used, which is good for a system.
- ii. Continuance is used excessively, which results in ambiguous requirements.
- iii. Sufficient directives have been used, results in high traceability and understandability.
- iv. There are some options, but this amount is enough for a system, which does not increase the difficulty in understanding.
- v. Weak phrases are used more than sufficient, same is the case of Incompletes, at this stage such number of incompletes cannot be tolerated.

### 3. ASPERA-3 Processing and Archiving Facility

#### IMPERATIVE

-----

ARE APPLICABLE  
ARE TO  
IS REQUIRED TO  
MUST  
RESPONSIBLE FOR  
SHALL  
SHOULD  
WILL

#### OCCURRENCE

-----

0  
1  
0  
0  
2  
56  
0  
16

TOTAL 75

#### CONTINUANCE

-----

:  
AND  
AS FOLLOWS:  
BELOW:  
FOLLOWING:  
IN PARTICULAR:  
LISTED:  
SUPPORT:

#### OCCURRENCE

-----

54  
132  
1  
0  
0  
0  
0  
0

TOTAL 187

#### DIRECTIVE

-----

E.G.  
FIGURE  
FOR EXAMPLE  
I.E.  
NOTE:  
TABLE

#### OCCURRENCE

-----

2  
0  
1  
0  
1  
9

TOTAL 13

#### OPTION

-----

CAN  
MAY  
OPTIONALLY

#### OCCURRENCE

-----

6  
5  
0

TOTAL 11

WEAK PHRASE  
 -----  
 ADEQUATE  
 AS APPROPRIATE  
 AS REQUIRED  
 BE ABLE TO  
 BE CAPABLE OF  
 CAPABILITY OF  
 CAPABILITY TO  
 EASY TO  
 EFFECTIVE  
 NORMAL  
 PROVIDE FOR  
 TIMELY

OCCURRENCE  
 -----  
 0  
 0  
 0  
 0  
 0  
 0  
 0  
 0  
 0  
 0  
 0  
 0

TOTAL 0

INCOMPLETES  
 -----  
 AS A MINIMUM  
 BUT NOT LIMITED TO  
 NOT DEFINED  
 NOT DETERMINED  
 TBC  
 TBD  
 TBE  
 TBR  
 TBS

OCCURRENCE  
 -----  
 0  
 0  
 0  
 0  
 0  
 0  
 0  
 0  
 0

TOTAL 0

## Key Points

- i. Imperatives are not sufficient, which gives a bad impression.
- ii. Continuance is a bit more than enough, but it cannot be acceptable in this case.
- iii. Directives are insufficient, results in low traceability and understandability.
- iv. Options are not used excessively, which gives a positive impact.
- v. Weak phrases and incompletes are not used, that is to be appreciated.

## 4. Space Fractions

### IMPERATIVE

-----

ARE APPLICABLE  
ARE TO  
IS REQUIRED TO  
MUST  
RESPONSIBLE FOR  
SHALL  
SHOULD  
WILL

### OCCURRENCE

-----

0  
0  
0  
3  
0  
0  
0  
82

TOTAL 85

### CONTINUANCE

-----

:  
AND  
AS FOLLOWS:  
BELOW:  
FOLLOWING:  
IN PARTICULAR:  
LISTED:  
SUPPORT:

### OCCURRENCE

-----

26  
70  
0  
0  
0  
0  
0  
0

TOTAL 96

### DIRECTIVE

-----

E.G.  
FIGURE  
FOR EXAMPLE  
I.E.  
NOTE:  
TABLE

### OCCURRENCE

-----

0  
0  
2  
0  
0  
2

TOTAL 4

### OPTION

-----

CAN  
MAY  
OPTIONALLY

### OCCURRENCE

-----

8  
3  
0

TOTAL 11

### WEAK PHRASE

-----

ADEQUATE  
AS APPROPRIATE  
AS REQUIRED  
BE ABLE TO  
BE CAPABLE OF  
CAPABILITY OF  
CAPABILITY TO  
EASY TO  
EFFECTIVE  
NORMAL  
PROVIDE FOR  
TIMELY

### OCCURRENCE

-----

0  
0  
0  
1  
0  
0  
0  
0  
1  
0  
0  
0

TOTAL 2



| INCOMPLETES        | OCCURRENCE |
|--------------------|------------|
| -----              | -----      |
| AS A MINIMUM       | 0          |
| BUT NOT LIMITED TO | 0          |
| NOT DEFINED        | 0          |
| NOT DETERMINED     | 0          |
| TBC                | 0          |
| TBD                | 0          |
| TBE                | 0          |
| TBR                | 0          |
| TBS                | 0          |
|                    |            |
| TOTAL              | 0          |

## Key Points

- i. Imperatives are not sufficient, which gives a bad impression.
- ii. Continuance is adequate, which is acceptable.
- iii. Directives are insufficient, results in low traceability and understandability.
- iv. Options are not used excessively, which gives a positive impact.
- v. Weak phrases are negligible, and incompletes are not used, that is to be appreciated.

## 5. Standard Co-Emulation Modelling Interface

| IMPERATIVE      | OCCURRENCE |
|-----------------|------------|
| -----           | -----      |
| ARE APPLICABLE  | 0          |
| ARE TO          | 5          |
| IS REQUIRED TO  | 1          |
| MUST            | 44         |
| RESPONSIBLE FOR | 5          |
| SHALL           | 19         |
| SHOULD          | 20         |
| WILL            | 28         |
|                 |            |
| TOTAL           | 122        |

| CONTINUANCE    | OCCURRENCE |
|----------------|------------|
| -----          | -----      |
| :              | 708        |
| AND            | 432        |
| AS FOLLOWS:    | 14         |
| BELOW:         | 0          |
| FOLLOWING:     | 5          |
| IN PARTICULAR: | 0          |
| LISTED:        | 0          |
| SUPPORT:       | 0          |
|                |            |
| TOTAL          | 1159       |

| DIRECTIVE   | OCCURRENCE |
|-------------|------------|
| -----       | -----      |
| E.G.        | 0          |
| FIGURE      | 58         |
| FOR EXAMPLE | 15         |
| I.E.        | 16         |
| NOTE:       | 4          |
| TABLE       | 3          |
|             |            |
| TOTAL       | 96         |

OPTION  
-----  
CAN  
MAY  
OPTIONALLY

OCCURRENCE  
-----  
139  
12  
5  
  
TOTAL 156

WEAK PHRASE  
-----  
ADEQUATE  
AS APPROPRIATE  
AS REQUIRED  
BE ABLE TO  
BE CAPABLE OF  
CAPABILITY OF  
CAPABILITY TO  
EASY TO  
EFFECTIVE  
NORMAL  
PROVIDE FOR  
TIMELY

OCCURRENCE  
-----  
0  
0  
2  
0  
0  
0  
0  
2  
0  
2  
0  
1  
  
TOTAL 7

INCOMPLETES  
-----  
AS A MINIMUM  
BUT NOT LIMITED TO  
NOT DEFINED  
NOT DETERMINED  
TBC  
TBD  
TBE  
TBR  
TBS

OCCURRENCE  
-----  
0  
0  
0  
0  
0  
0  
0  
0  
0  
  
TOTAL 0

## Key Points

- i. Decent number of imperatives are used, which is acceptable.
- ii. Continuance is used excessively, which results in ambiguous requirements and a bad impression.
- iii. Directives are insufficient, results in low traceability and understandability.
- iv. Number of options are more than enough which gives a negative impact.
- v. Weak phrases are minimum, and incompletes are not used, which gives a positive impression.

## 6. CS179G / ABC Paint Project

### IMPERATIVE

-----

ARE APPLICABLE  
ARE TO  
IS REQUIRED TO  
MUST  
RESPONSIBLE FOR  
SHALL  
SHOULD  
WILL

### OCCURRENCE

-----

0  
0  
0  
8  
0  
0  
7  
61

TOTAL 76

### CONTINUANCE

-----

:  
AND  
AS FOLLOWS:  
BELOW:  
FOLLOWING:  
IN PARTICULAR:  
LISTED:  
SUPPORT:

### OCCURRENCE

-----

43  
91  
0  
0  
0  
0  
0  
0

TOTAL 134

### DIRECTIVE

-----

E.G.  
FIGURE  
FOR EXAMPLE  
I.E.  
NOTE:  
TABLE

### OCCURRENCE

-----

0  
0  
3  
0  
0  
2

TOTAL 5

### OPTION

-----

CAN  
MAY  
OPTIONALLY

### OCCURRENCE

-----

10  
7  
0

TOTAL 17

| WEAK PHRASE<br>----- | OCCURRENCE<br>----- |
|----------------------|---------------------|
| ADEQUATE             | 0                   |
| AS APPROPRIATE       | 0                   |
| AS REQUIRED          | 0                   |
| BE ABLE TO           | 1                   |
| BE CAPABLE OF        | 0                   |
| CAPABILITY OF        | 0                   |
| CAPABILITY TO        | 0                   |
| EASY TO              | 2                   |
| EFFECTIVE            | 0                   |
| NORMAL               | 0                   |
| PROVIDE FOR          | 0                   |
| TIMELY               | 0                   |
|                      |                     |
|                      | TOTAL 3             |
| INCOMPLETES<br>----- | OCCURRENCE<br>----- |
| AS A MINIMUM         | 0                   |
| BUT NOT LIMITED TO   | 0                   |
| NOT DEFINED          | 0                   |
| NOT DETERMINED       | 0                   |
| TBC                  | 0                   |
| TBD                  | 2                   |
| TBE                  | 0                   |
| TBR                  | 0                   |
| TBS                  | 0                   |
|                      |                     |
|                      | TOTAL 2             |

## Key Points

- i. Decent number of imperatives are used, which is acceptable.
- ii. Continuance is adequate, which is acceptable.
- iii. Directives are too minimal, results in low traceability and understandability.
- iv. Options are not used excessively, which gives a positive impact.
- v. Weak phrases and incompletes are negligible, but incompleteness at this stage cannot be tolerated.

## 7. Open Watcom Linux Port GUI

| IMPERATIVE<br>----- | OCCURRENCE<br>----- |
|---------------------|---------------------|
| ARE APPLICABLE      | 0                   |
| ARE TO              | 0                   |
| IS REQUIRED TO      | 0                   |
| MUST                | 4                   |
| RESPONSIBLE FOR     | 0                   |
| SHALL               | 0                   |
| SHOULD              | 134                 |
| WILL                | 22                  |
|                     |                     |
|                     | TOTAL 160           |

CONTINUANCE  
-----  
:  
AND  
AS FOLLOWS:  
BELOW:  
FOLLOWING:  
IN PARTICULAR:  
LISTED:  
SUPPORT:

OCCURRENCE  
-----  
164  
136  
0  
0  
0  
0  
0  
0  
TOTAL 300

DIRECTIVE  
-----  
E.G.  
FIGURE  
FOR EXAMPLE  
I.E.  
NOTE:  
TABLE

OCCURRENCE  
-----  
0  
0  
0  
0  
0  
5  
TOTAL 5

OPTION  
-----  
CAN  
MAY  
OPTIONALLY

OCCURRENCE  
-----  
27  
4  
0  
TOTAL 31

WEAK PHRASE  
-----  
ADEQUATE  
AS APPROPRIATE  
AS REQUIRED  
BE ABLE TO  
BE CAPABLE OF  
CAPABILITY OF  
CAPABILITY TO  
EASY TO  
EFFECTIVE  
NORMAL  
PROVIDE FOR  
TIMELY

OCCURRENCE  
-----  
0  
0  
0  
3  
0  
0  
0  
0  
0  
0  
0  
0  
TOTAL 3

INCOMPLETES  
-----  
AS A MINIMUM  
BUT NOT LIMITED TO  
NOT DEFINED  
NOT DETERMINED  
TBC  
TBD  
TBE  
TBR  
TBS

OCCURRENCE  
-----  
0  
0  
0  
0  
0  
0  
0  
0  
0  
TOTAL 0

## Key Points

- i. Imperatives are acceptable, which is fine.

- ii. Continuance is more than sufficient, which results in ambiguous requirements.
- iii. Directives are too minimal, results in low traceability and understandability.
- iv. Options are not used excessively, which gives a positive impact.
- v. Weak phrases are negligible, and incompletes are not used, that is to be appreciated.

## 8. Bridge Management System

### IMPERATIVE

-----

ARE APPLICABLE  
ARE TO  
IS REQUIRED TO  
MUST  
RESPONSIBLE FOR  
SHALL  
SHOULD  
WILL

### OCCURRENCE

-----

0  
6  
0  
29  
8  
188  
14  
183

TOTAL 428

### CONTINUANCE

-----

:  
AND  
AS FOLLOWS:  
BELOW:  
FOLLOWING:  
IN PARTICULAR:  
LISTED:  
SUPPORT:

### OCCURRENCE

-----

163  
557  
2  
0  
0  
0  
0  
0

TOTAL 722

### DIRECTIVE

-----

E.G.  
FIGURE  
FOR EXAMPLE  
I.E.  
NOTE:  
TABLE

### OCCURRENCE

-----

16  
9  
7  
4  
0  
21

TOTAL 57

| OPTION     | OCCURRENCE |
|------------|------------|
| -----      | -----      |
| CAN        | 34         |
| MAY        | 99         |
| OPTIONALLY | 1          |
| TOTAL      | 134        |

| WEAK PHRASE    | OCCURRENCE |
|----------------|------------|
| -----          | -----      |
| ADEQUATE       | 1          |
| AS APPROPRIATE | 5          |
| AS REQUIRED    | 0          |
| BE ABLE TO     | 95         |
| BE CAPABLE OF  | 43         |
| CAPABILITY OF  | 1          |
| CAPABILITY TO  | 6          |
| EASY TO        | 0          |
| EFFECTIVE      | 2          |
| NORMAL         | 3          |
| PROVIDE FOR    | 0          |
| TIMELY         | 0          |
| TOTAL          | 156        |

| INCOMPLETES        | OCCURRENCE |
|--------------------|------------|
| -----              | -----      |
| AS A MINIMUM       | 0          |
| BUT NOT LIMITED TO | 0          |
| NOT DEFINED        | 0          |
| NOT DETERMINED     | 0          |
| TBC                | 0          |
| TBD                | 0          |
| TBE                | 0          |
| TBR                | 0          |
| TBS                | 0          |
| TOTAL              | 0          |

## 9. EUROPEAN INTEGRATED RAILWAY RADIO ENHANCED NETWORK

| IMPERATIVE      | OCCURRENCE |
|-----------------|------------|
| -----           | -----      |
| ARE APPLICABLE  | 0          |
| ARE TO          | 11         |
| IS REQUIRED TO  | 3          |
| MUST            | 6          |
| RESPONSIBLE FOR | 7          |
| SHALL           | 348        |
| SHOULD          | 32         |
| WILL            | 38         |
| TOTAL           | 445        |

CONTINUANCE  
-----  
:  
AND  
AS FOLLOWS:  
BELOW:  
FOLLOWING:  
IN PARTICULAR:  
LISTED:  
SUPPORT:

OCCURRENCE  
-----  
292  
412  
4  
1  
2  
0  
0  
0  
  
TOTAL 711

DIRECTIVE  
-----  
E.G.  
FIGURE  
FOR EXAMPLE  
I.E.  
NOTE:  
TABLE

OCCURRENCE  
-----  
4  
26  
9  
0  
18  
105  
  
TOTAL 162

OPTION  
-----  
CAN  
MAY  
OPTIONALLY

OCCURRENCE  
-----  
20  
74  
0  
  
TOTAL 94

WEAK PHRASE  
-----  
ADEQUATE  
AS APPROPRIATE  
AS REQUIRED  
BE ABLE TO  
BE CAPABLE OF  
CAPABILITY OF  
CAPABILITY TO  
EASY TO  
EFFECTIVE  
NORMAL  
PROVIDE FOR  
TIMELY

OCCURRENCE  
-----  
0  
1  
0  
13  
22  
0  
1  
0  
1  
15  
0  
0  
  
TOTAL 53

INCOMPLETES  
-----  
AS A MINIMUM  
BUT NOT LIMITED TO  
NOT DEFINED  
NOT DETERMINED  
TBC  
TBD  
TBE  
TBR  
TBS

OCCURRENCE  
-----  
4  
0  
0  
0  
0  
1  
0  
0  
0  
  
TOTAL 5

## Key Points

- i. Excessive number of imperatives is used, which gives a good impression.



- ii. Continuance is used excessively, which results in ambiguous requirements.
- iii. Sufficient directives have been used, results in high traceability and understandability.
- iv. Number of options used are more than enough, which makes it difficult to understand.
- v. Weak phrases are used more than sufficient, same is the case of Incompletes, at this stage such number of incompletes cannot be tolerated.

## 10. Inventory Management

|                 |            |
|-----------------|------------|
| IMPERATIVE      | OCCURRENCE |
| -----           | -----      |
| ARE APPLICABLE  | 0          |
| ARE TO          | 6          |
| IS REQUIRED TO  | 1          |
| MUST            | 87         |
| RESPONSIBLE FOR | 0          |
| SHALL           | 0          |
| SHOULD          | 123        |
| WILL            | 19         |
|                 | TOTAL 236  |
| CONTINUANCE     | OCCURRENCE |
| -----           | -----      |
| :               | 214        |
| AND             | 449        |
| AS FOLLOWS:     | 1          |
| BELOW:          | 1          |
| FOLLOWING:      | 0          |
| IN PARTICULAR:  | 0          |
| LISTED:         | 0          |
| SUPPORT:        | 0          |
|                 | TOTAL 665  |
| DIRECTIVE       | OCCURRENCE |
| -----           | -----      |
| E.G.            | 6          |
| FIGURE          | 25         |
| FOR EXAMPLE     | 2          |
| I.E.            | 0          |
| NOTE:           | 0          |
| TABLE           | 2          |
|                 | TOTAL 35   |
| OPTION          | OCCURRENCE |
| -----           | -----      |
| CAN             | 78         |
| MAY             | 25         |
| OPTIONALLY      | 7          |
|                 | TOTAL 110  |

| WEAK PHRASE<br>----- | OCCURRENCE<br>----- |    |
|----------------------|---------------------|----|
| ADEQUATE             | 0                   |    |
| AS APPROPRIATE       | 0                   |    |
| AS REQUIRED          | 1                   |    |
| BE ABLE TO           | 25                  |    |
| BE CAPABLE OF        | 0                   |    |
| CAPABILITY OF        | 0                   |    |
| CAPABILITY TO        | 0                   |    |
| EASY TO              | 2                   |    |
| EFFECTIVE            | 0                   |    |
| NORMAL               | 6                   |    |
| PROVIDE FOR          | 0                   |    |
| TIMELY               | 1                   |    |
|                      | TOTAL               | 35 |
| INCOMPLETES<br>----- | OCCURRENCE<br>----- |    |
| AS A MINIMUM         | 0                   |    |
| BUT NOT LIMITED TO   | 0                   |    |
| NOT DEFINED          | 0                   |    |
| NOT DETERMINED       | 0                   |    |
| TBC                  | 0                   |    |
| TBD                  | 0                   |    |
| TBE                  | 0                   |    |
| TBR                  | 0                   |    |
| TBS                  | 0                   |    |
|                      | TOTAL               | 0  |

### Key Points

- i. Number of imperatives used are acceptable but, in this case, 'should' is used excessively, result in a bad impression.
- ii. Continuance is used excessively, which results in ambiguous requirements.
- iii. Directives are not sufficient used, results in low traceability and understandability.
- iv. Too many options are used, which makes it difficult to understand.
- v. Weak phrases are used more than sufficient but as incompletes are not used, so it can be accepted.

## Overall Rankings of Above Documents

| Rank | RS Document                                       |
|------|---|
| 1.   | X-38 Fault Tolerate System Services               |
| 2.   | Gemini control system                             |
| 3.   | Standard Co-Emulation Modelling Interface         |
| 4.   | Bridge Management System                          |
| 5.   | Open Watcom Linux Port GUI                        |
| 6.   | European Integrated Railway Road Enhanced Network |
| 7.   | Space Fractions                                   |
| 8.   | Inventory Management                              |
| 9.   | ASPERA-3 Processing and Archiving Facility        |
| 10.  | CS179G / ABC Paint Project                        |