Analysis of Russian software

supporting onboard systems development lifecycle in context of import substitution policy

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ZOOM, Internet

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About us

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development tools
system engineering
avionics
software development
certification
DO-178C

State Research Institute of Aviation Systems

Advanced Systems and Avionics Integration

System engineering group

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2. Related work and our background
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Problem statement

back to our SYRCoSE 2018's slide

STEP 1

Need to develop certifiable system

Need software tools supporting development process

! Theory, methodology

Choose from market?

Make yourself?

Universal tool doesn't exist
Partial automation is harmful

- Fast
- Cheap
- Independent
- Custom

Have to formulate some requirements

Problem statement

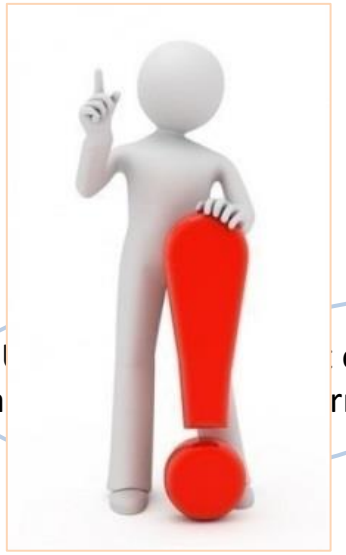
today

STEP 1

Need to develop certifiable system

Need software tools supporting development process

Theory, methodology



exist

rmful

Choose from market?

Make yourself?

- Fast
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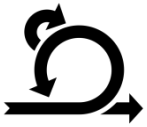
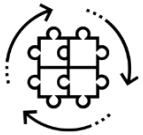
- Custom

Have to formulate some requirements

Why software for lifecycle management is so important



Complex lifecycles => special software



Necessary for big projects of complex systems development

Huge amount of related data

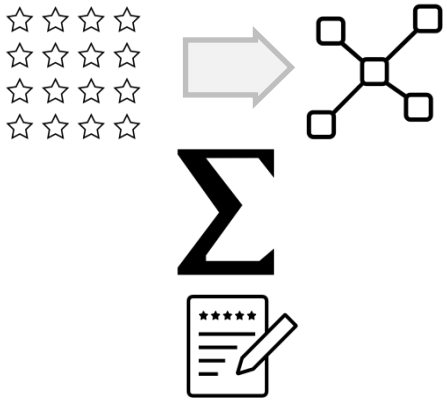
Certification => high responsibility

Related work

- Nobody wants to buy a pig in a poke

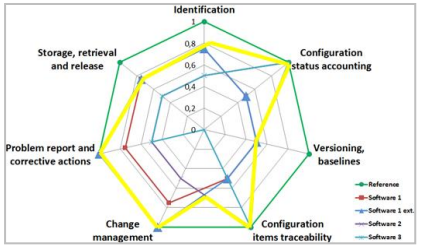
- Plenty software reviews
  - All over the Russian Federation
  - Different industries

- 3 types of methods
  - Matrices and graphs
  - Additive methods
  - Text reviews, marketing data

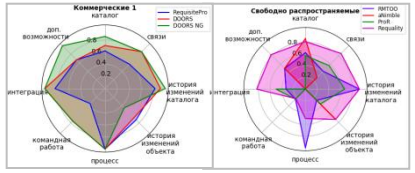


Our background

2018
- configuration mgmt: tools analysis
- requirements mgmt in avionics
- lifecycle mgmt: tools analysis (light)

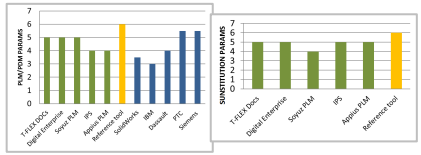


2019
- requirements mgmt: tools analysis



2020
- lifecycle mgmt: tools analysis

(+import substitution)



Choosing the method

Why not the most difficult method was chosen

- Not 100500 tools, not 100500 functions
- Strong selection of tools and functions

Our main goals:

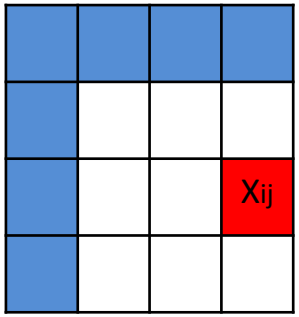
- To estimate the most popular software in Russian avionic enterprises with the most interest criteria for us

- If Russian PLM/PDM systems are ready for import substitution?

- Recommendations for import substitution era

Additive method: details

- Problem 1
- Data

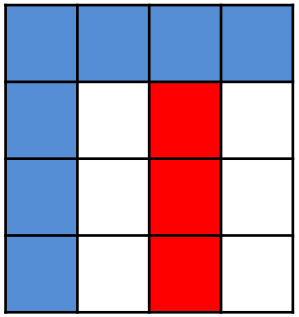


Criteria 3

Values 4

Tools 2

- Formula 1: function score



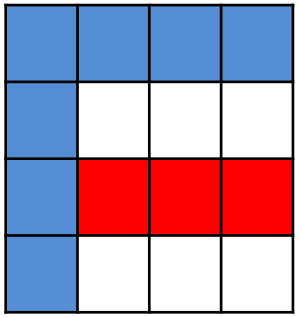
$$\forall j = \overline{1,m}: \; function_j = \sum_{i=1}^{n} x_{ij}$$

How many tools have each **function**?

5

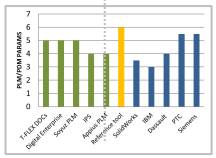
6

- Formula 2: tools score



$$\forall i = \overline{1,n}: \; tool_i = \sum_{j=1}^{m} x_{ij}$$

How many functions does each **tool** have?



Software sets

STEP 2

- Set “TOOLS 1”
  - T-FLEX DOCs
  - TIS (Digital enterprise)
  - Soyuz PLM
  - IPS PLM
  - Appius PLM

- Set “TOOLS 2”
  - SolidWorks PDM
  - IBM Rational CLM
  - Dassault Systemes Enovia
  - PTC Windchill PLM
  - Siemens Team Center PLM

Main reasons:

- active using in avionics industry
- we had knowledge and data

Criteria for comparison

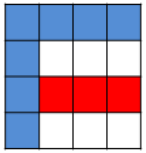
STEP 3

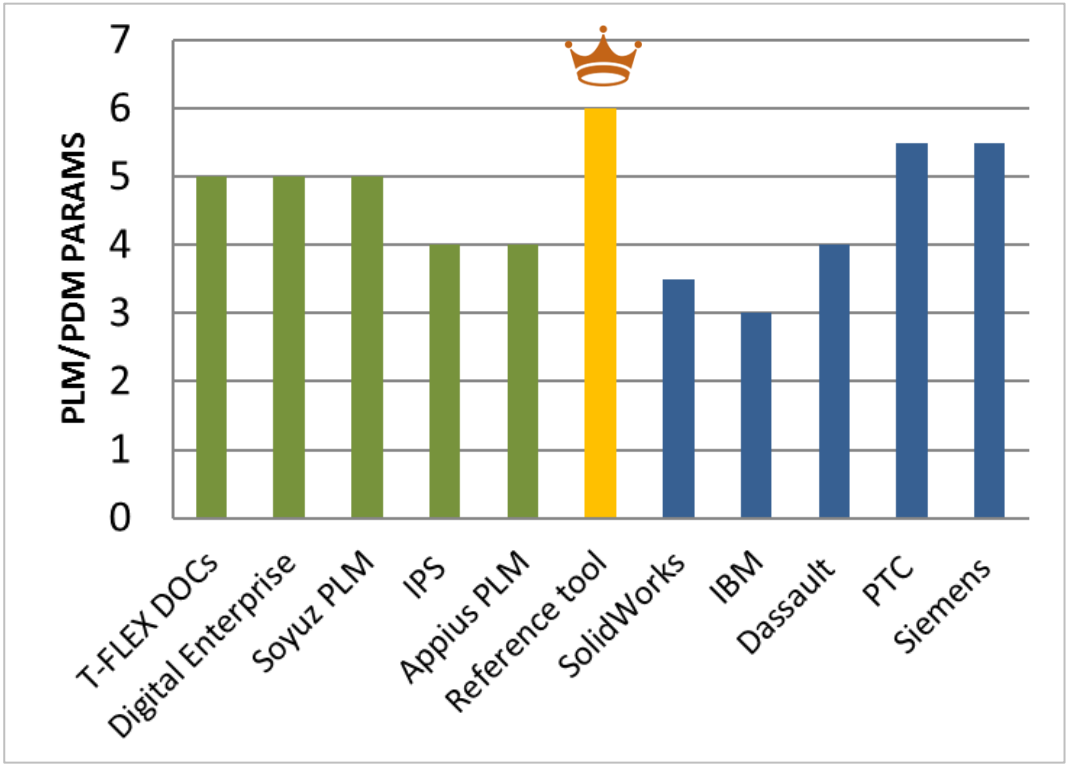
- Integration with CAD systems
- Reference data management
- Custom agreement processes with electronic signature and other types of workflows
- Technological support of production
- Requirements management
- Quality management

Results: Tools score

STEP 6

Formula 1





None of the tools have all functions

Overall score is not bad

Russian set has good results

TOOLS 1

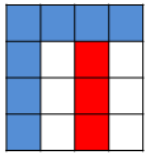
TOOLS 2

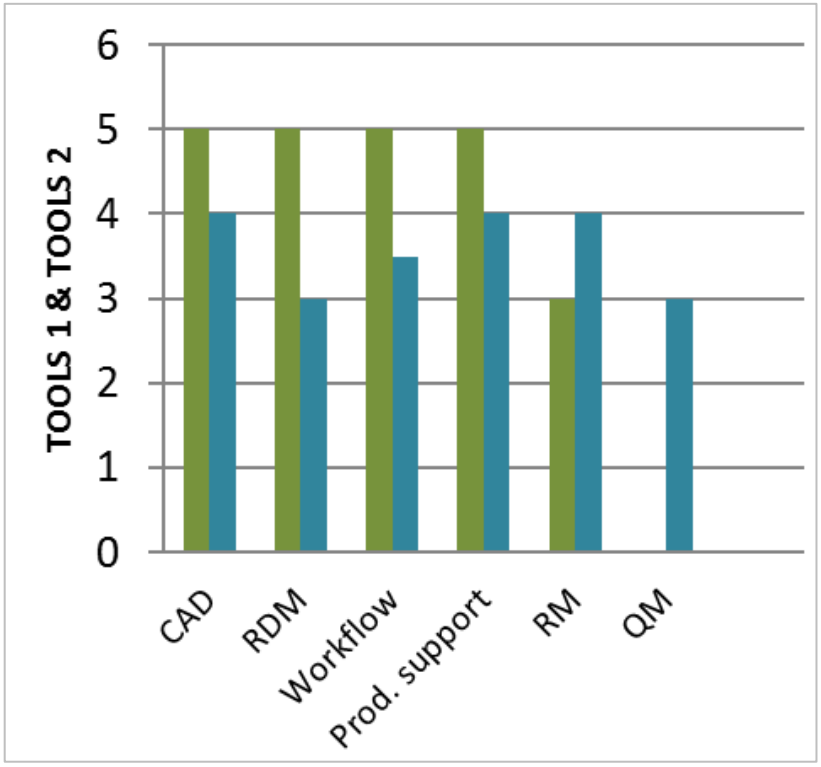
Reference tool

Results: Functions score

STEP 6

Formula 2





More and less popular functions

Some functions need attention

Russian set has some advantages

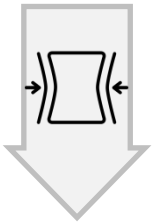
Challenge of import substitution

STEP 1

Government policy

"Restrictions" to use foreign software

Challenges for enterprises



How to choose replacement?
How to move projects and staff?
etc

Challenges for developers

How to satisfy new requirements?
How to give new appropriate tools?
etc

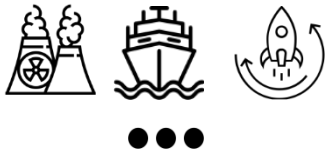
Import substitution => new criteria for analysis

STEP 3

- Registration in the Russian Register of software
- Certificate of FSTEC of Russia
- Integration with other software tools
- Russian-speaking technical support
- Implementation to the aviation industry
- Implementation to the other industries

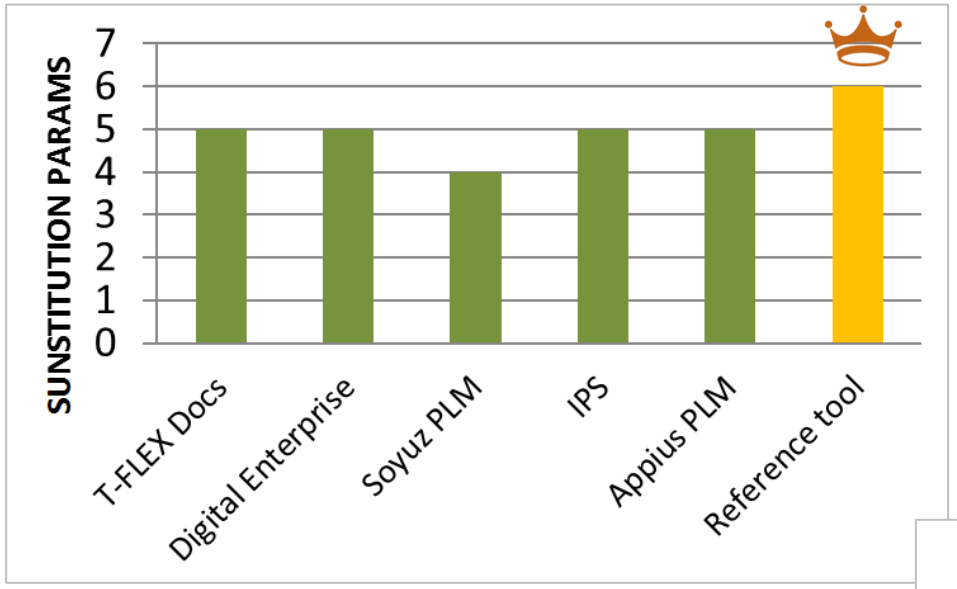




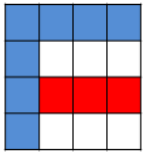



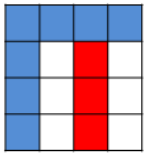
Additive method for import substitution

STEP 6

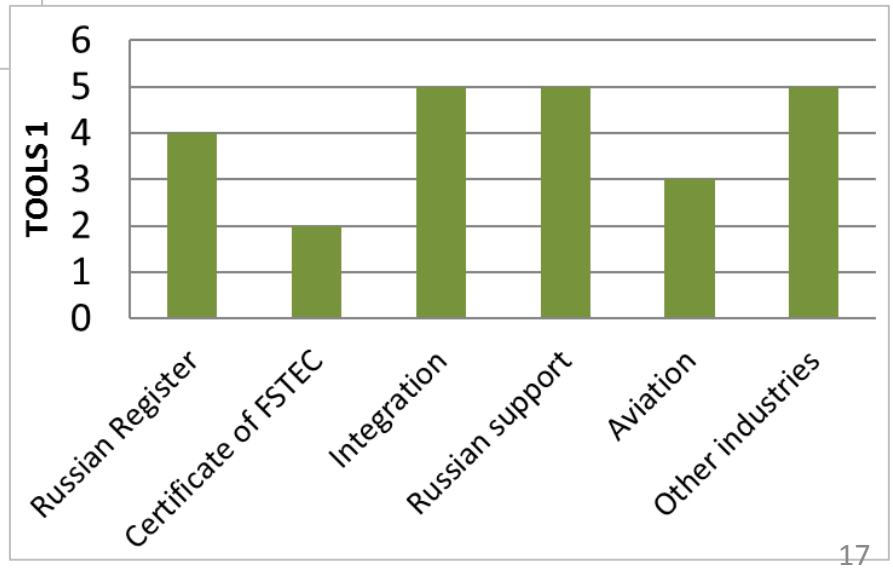


Tools score





Functions score



Recommendations

- Suitable for solving a problem
- Comparison with analogues
- Geographical location
- Staff for implementation
- History of successful implementations

Method is applicable to different industries

- Digitalization is everywhere
- Forced to choose tools? Examine them!
- The sooner the better
- Lifecycles are different, but have similarities
- Not only functions can be criteria

Conclusion

- Actual problem – choice of tools
- Method for software analysis was shown
- Ideal software doesn’t exist
- Import substitution is a driver to growth
- We are on the right way

Thank you!

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