

Title: Risk estimations with problematic theta values in their risk trend should not be suggested

As a satellite operator **I want** to not have the risk estimations of my conjunctions be suggested if their risk trend produces bad theta values.

Background

Customers said they can't use risk estimations which produce such values. There is the check_theta JNI function to check for bad theta values in two consecutive risk trend values.

Thoughts

It would be a good idea to adjust the collision probabilities in order to find out if customers can use the risk estimations then. For this purpose, the adjust_coll_prob JNI function can be used. The risk estimations should be set to "not suggested" in any case for now though. It could also be an idea to check if the affected values are NaN. If so, a simple stdout statement would be helpful to point this out.

Acceptance criteria

- A new class has been created that uses Calculations class and the MongoDB (directly, not via API). It contains a new method.
- The method does the following:
 - For satellites with norad IDs smaller than 30k, the conjunctions with bad theta risk trend values have been set to "not suggested" in DB
 - The risk trends of those conjunctions have been adjusted with adjust_coll_prob JNI function

Currently-existing (already implemented) situation:

In MongoDB, the db "thedb" is used. It contains the collection "conjunctions" which contains conjunction documents of the exact same structure as can be retrieved via API.

API doc can be found here: **removed for anonymization**

The conjunctions can be retrieved here: **removed for anonymization**

There is a Java class named Calculations with these JNI functions in them:

```
public static native void analyze_theta
```

```
(  
    double[] time_to_tca_0,  
    double[] coll_prob_0,  
    double[] time_to_tca_1,  
    double[] coll_prob_1,  
    double[] result_theta  
);
```

```
public static native void adjust_coll_prob
```

```
(  
    double[] time_to_tca_0,
```

```
double[] coll_prob_0,  
double[] time_to_tca_1,  
double[] coll_prob_1,  
double[] result_adjusted_value  
);
```

The arrays are supposed to contain only one value, except if suffixed with "_array".

More information:

Please also send a very small rough UML diagram of the solution as well as the Linux commands you would use with git.

Your submission does not need to be a runnable project, it suffices to send the main Java code, a small picture and a list of commands.