

# **STANDARD TABLE OF CONTENTS FOR ATBD**

## **LIST OF FIGURES**

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## **ABSTRACT**

### **1.0 INTRODUCTION**

#### **1.1 Purpose of This Document**

Intended use of this document, including an identification of the retrieved product.

#### **1.2 Who Should Use This Document**

Clarifies the intended user of this document

#### **1.3 Inside Each Section**

The scope of each ATBD main section.

#### **1.4 Related Documents**

Documents related to the ATBD with citations and if not in the open literature a method for accessing the information.

#### **1.5 Revision History**

All revisions to this ATBD, including author of revision, description of revision, motivation for revision, and revision number and date.

### **2.0 OBSERVING SYSTEM OVERVIEW**

Overview of the algorithm(s), including the objectives, characteristics of the instrument(s) referencing rather than repeating requirements that provides the input data and retrieval strategies.

#### **2.1 Products Generated**

Include the intended output data products and their intended use.

#### **2.2 Instrument Characteristics (Reference the requirements or other documents)**

Reference the attributes of the sensing system(s) used to supply data for the retrieval algorithm at a level of detail sufficient to detail assumptions

### **3.0 ALGORITHM DESCRIPTION**

Complete description of the algorithm at the current level of maturity (which will improve with each revision).

#### **3.1 Algorithm Overview**

Overview of algorithms summarizing algorithm at a high level

#### **3.2 Processing Outline**

Fully describe the processing outline of the algorithm. All key elements and sub-elements needed to convey a comprehensive sense of the algorithm should be included. The level of detail should be consistent with the current maturity of the software architecture

(which will improve with each revision). A data flow diagram is permissible, provided it is consistent with the software architecture.

### 3.3 Algorithm Input

Attributes of all input data used by the algorithm, including primary sensor data, ancillary data, radiative transfer models, look-up tables, etc..

#### 3.3.1 Primary Sensor Data

#### 3.3.2 Ancillary Data

### 3.4 Theoretical Description

The physics, radiative transfer, and associated phenomenology key to the retrieval (“Physics of the Problem” subsection). Description of the mathematics used by the retrieval, including all simplifications, approximations, and numerical methods (“Mathematical Description of the Algorithm” subsection). Description of the output of the algorithm as encoded in the data product (“Algorithm Output” subsection).

#### 3.4.1 Physics of the Problem

#### 3.4.2 Mathematical Description

#### 3.4.3 Algorithm Output

## 4.0 Test Data Sets and Outputs

### 4.1 Simulated/Proxy Input Data Sets

Describe the test data sets used to characterize the performance of the algorithm and quality of the data product(s), including the breadth of the domain (typical versus stressing states) used in the analysis and assessment.

### 4.2 Output from Simulated/Proxy Inputs Data Sets

Description of results from algorithm processing on simulated input data. This is particularly important for output in the form of images.

#### 4.2.1 Precisions and Accuracy Estimates

Describe the predicted algorithm performance and quality of the products at a level of detail appropriate for the current algorithm maturity given instrument performance is as required

#### 4.2.2 Error Budget

Compared results of output data against requirements, presented as a table. Error budget limitations should be explained. Describe prospects for overcoming error budget limitations with future maturation of the algorithm, test data, and error analysis methodology.

## 5.0 Practical Considerations

Issues involving numerical computation, programming and procedures, quality assessment and diagnostics and exception handling at a level of detail appropriate for the current algorithm maturity.

### 5.1 Numerical Computation Considerations

Describe in sufficient depth how the algorithm is numerically implemented, including any possible issues with computationally intensive operations (e.g., large matrix inversions).

### 5.2 Programming and Procedural Considerations

Describe any important programming and procedural aspects related to implementing the numerical model into operating code.

### 5.3 Quality Assessment and Diagnostics

Describe how the quality of the output products and the retrieval itself is assessed, documented, and any anomalies diagnosed.

### 5.4 Exception Handling

list the complete set of expected exceptions, and describes how they are identified, trapped, and handled.

### 5.5 Algorithm Validation

TBD by the Contractor

Pre-Launch Validation (Reference Document)

Post-Launch Calibration and Validation (Reference Document)

## 6.0 ASSUMPTIONS AND LIMITATIONS

All the assumptions that have been made concerning the algorithm theoretical basis and performance estimates for all assumptions that cannot be verified at the current time. Description of potential limitations in the intended use of the algorithm and its products. If the content is not the final ATBD, describe what is likely to be changed for future enhancement.

### 6.1 Performance

Assumptions that have been made concerning the performance estimates. To the extent possible, the potential for degraded performance should be explored, along with mitigating strategies.

### 6.2 Assumed Sensor Performance

Document assumption of as-required sensor performance, noting possible impacts of performance is not met

### 6.3 Pre-Planned Product Improvements

Potential future enhancements to the algorithm, the limitations they will mitigate, and possible and useful related information and links. This subsection should be organized into separate subsections for each potential enhancement, ordered according to a combination of highest operational priority and greatest feasibility.

#### 6.3.1 Improvement 1

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#### 6.3.N Improvement N

## 7.0 REFERENCES

Include all references mentioned in the ATBD.