Space Domain Awareness

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Course Description

Space Domain Awareness (SDA) is focused on the actionable knowledge required to predict, avoid, deter, operate through, recover from, and attribute cause to losing or degrading space capabilities and services.

A major purpose for SDA is to provide decision makers with a quantifiable and timely body of evidence of behaviors attributable to specific space threats and hazards. SDA encompasses all activities of information tasking–collecting, fusing, exploiting, quantifying and extracting–that concludes with identifying and predicting credible threats and hazards.

Included in SDA is collecting raw observables, identifying physical states and parameters (like orbit, attitude, size and shape) determining functional characteristics (such as active vs. passive, thrust capacity, payloads), inferring mission objectives (such as communications,weather), identifying behaviors, and predicting credible threats and hazards.

Course Topics

Module 1 - Introduction to SDA
- Applications, Challenges, Implications and Definitions
- Key Questions About Space Objects and How to Find the Answers
- Stakeholders and Wake-up Calls
- Space Domain Information Fusion Model
- Strategy and Tactics for SDA
- SDA Value Chain and Market Assessment

Module 2 - Space and Space Objects
- Space Environment and Its Impact on Space Objects and SDA
- Orbit Design and Applications with the Restricted Two-Body Problem and Perturbations
- Conjunction Assessment Risk Analysis
- Orbit Determination Issues
- Uncertainty, Covariance and Probability of Collision/Time of Closest Approach

Module 3 - Information Needed to Conduct SDA
- Active and Passive Sensing
- Sensors and Measurements
- Sensor and Measurement Constraints

Module 4 - Using SDA Data and Information
- Space Domain Information Fusion Model
- Five Levels of Data
- Data processing and catalog update

Module 5 - SDA Case Studies and Examples
- GEOScan Mission Design
- ArgusSat Mission and System Design
- Detailed End-to-End Case Study
- Hands-on Exercises

Who Should Attend

This course is of particular interest to space system operators, system developers, managers and administrators. Anyone interested in space situational awareness, space traffic management and/or space domain awareness will find the course and course materials invaluable.

This course will be exceptionally useful to space situational awareness professionals, space domain awareness analysts and designers, especially those interested in SDA sensors, data,data flow, data fusion and data sharing.

Course Materials

Each participant will receive:

- Electronic course handout
- A copy of the new eBook, Space Domain Awareness
- Supporting Excel Spreadsheets

Course Objectives

At the end of this course you should be able to:

- Know and apply Space Domain Awareness (SDA) philosophies,tools and techniques
- Understand the value chain for SDA and what government and industry stakeholders need
- Describe the overall purpose of space domain awareness relative to space situational awareness and space traffic management
- Understand and apply the strategy and tactics of SDA
- Explain the elements of the space environment and their affect on objects in space
- Describe object motion, key events and object behavior in space
- Describe what it means to characterize objects and identify space objects
- Apply a space mission design process to create a system for onorbit sensing of objects

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