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Space systems — Launch window estimation and collision avoidance

FDIS stage

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Foreword

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This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 Overview

Human-inhabited and inhabitable space stations and space capsules are exposed to the risk of collision with new launch vehicle stage(s) and spacecraft during their launch and early orbit phase. While such collision threats also exist during on-orbit spacecraft operations, the launch and early orbit phase is unique in that potential collisions with inhabitable space stations and space capsules can be avoided at minimal cost (i.e. without the expenditure of on-orbit manoeuvring fuel) through the proper selection of suitable launch times.

Consistent with Clause B.5 of the United Nations Long Term Sustainability guidelines[1] ~~[1]~~ and to protect human missions from the danger of collision with newly launched objects, the LCOLA approving agent may apply launch collision avoidance (LCOLA) methods to assess either collision risk, close approach, or both. If this assessment determines that launch at certain times would incur unacceptable risk to the human missions, the LCOLA approving agent may delay the time of launch.

In addition to establishing requirements for the safety LCOLA process, Annex A~~Annex A~~ provides details on algorithms, processes, and screening criteria that may be used to conduct safety LCOLA assessments. Annex A~~Annex A~~ is intended to ensure the safety and integrity of human-inhabited or inhabitable space stations.

Annex B~~Annex B~~ provides additional details on algorithms, processes, and screening criteria that may be used to conduct mission assurance LCOLA assessments. Annex B~~Annex B~~ is intended to ensure the safety and integrity of both the newly launched space objects and any on-orbit active spacecraft that can potentially collide with the launched objects for the initial LCOLA screening time period, and also to reduce the risk of unintended fragmentation events caused by collision of the newly launched space objects with orbital debris during that same initial screening period. A selection of general procedures for the determination of unacceptable risk that result in the identification of all collision-safe launch opportunities is described.

~~0.1~~0.2 Breakdown of space safety constituents across ISO standards

The space flight safety-relevant topics of ~~Space Traffic Coordination,~~space traffic coordination (STC), on-orbit collision avoidance, and launch collision avoidance are closely related. To minimize duplication and maximize document consistency, the various content that serve as the basis for these three disciplines has been divided up as shown in Figure 1.