Criteria:

1. Is the paper relevant to the Journal? **Yes** No
2. Innovation: Does the manuscript contain new and significant information to justify publication? Excellent, **Good**, Fair, Poor
3. Technical quality: Are the experiment and/or theoretical methods described comprehensively? Are the interpretations and conclusions justified by the results? **Excellent**, Good, Fair, Poor
4. Presentation: Does this manuscript explain how it advances this field of research? Is the problem significant and precisely stated? Are the title, abstract, and keywords appropriate? Does the introduction state the objectives of the manuscript in terms that encourage the reader to read on? Is the author sufficiently proficient in the English language? **Excellent**, Good, Fair, Poor
5. What is your confidence in your review of this paper? **High**, Medium, Low

Journal judging criteria clearly addressed

Comments to the Author - Executive Summary:

The Editors seek an overview of the paper highlighting: the overall value of the paper; the clarity of the technical presentation; the good or positive aspects of the paper; and the suggested review decision (accept as is, minor revision, major revision, reject)

This paper presents the design of a new type of deployable reflector which uses segmented rigid panels arranged in an origami pattern and which can be folded via a linkage mechanism. It presents an optimization approach of the reflector geometry while maintaining its folding mechanism without collision. The design appears to be scalable and is also validated via an experimental prototype. The paper is well written and clear in its objectives. I suggest it be accepted with revision, addressing the points below.

Decision suggested to editor

Comments to the Author - Literature Review:

The Editors desire input on the completeness of the literature review: do the authors properly compare and contrast their new contributions to prior research; does the paper cite relevant articles?

The literature review mentions different types of current deployable antenna technologies. It mentions that the surface precision and stowed size of the architecture presented in the paper lies in between mesh-surface and solid-surface deployable reflectors. It could benefit from additional comparison with other reflector antenna designs.

Additional literature review suggested, a feasible revision

Comments organized into major and minor issues

Comments to the Author - Major Issues:

The Editors are looking for feedback on major issues or concerns this review has identified. These are items the reviewer feels must be addressed, explained or corrected before a publication decision can be made. These items can also be issues raised that justify why a "reject" recommendation is made.

- ☐ Section V.C describes objective functions for the geometrical optimization of the reflector. They seem to represent the ratio of stowed to deployed sizes. However it is unclear how and why they were chosen.
- ☐ The surface error discussion in Section VI.F talks about the effect of member length imperfections. The analysis is similar to that done in Hedgepeth's paper (https://doi.org/10.2514/3.7936) and could be interesting to compare with. Additionally it would be interesting to measure RMS surface error of the experimental prototype and compare with predicted values from the analysis. Also it would be good to discuss the RMS surface error from faceting of the doubly-curved surface with a specific number of rows and columns.

- ☐ The panels are assumed to be flat in this design architecture. How would the design change with doubly-curved panels (e.g., to decrease RMS surface error from faceting)? Would it still be foldable with the linkage mechanism?
- ☐ Section VI.D discusses scaling up the reflector design with more rows. What prevents more columns from being added? It would be good to discuss challenges with scaling up this design.

Revisions posed as questions for authors to answer

Comments to the Author – Minor Issues:

The Editors are seeking feedback on minor issues found. These are things that should be addressed in a revision, but don't impact a "publish" or "reject" decision. In particular, highlight issues found with technical English, mathematical typesetting, unclear figures, difficult to follow statements, unclear notation, etc.

- ☐ The Z-axis ranges in Fig. 1-4 are not consistent. For instance, can you use the same Z-axis range for the stowed and deployed states so the relative sizes are clear? In general all the axes labels can be made larger for ease of reading. Also, many axis labels in Figs.1-12 appear to be missing units.
- ☐ The optimized geometrical parameters appear to be the coordinates of certain vertices of the supporting truss structure. In the optimization results, Figs. 12 and 13 would benefit from a visualization of the reflector geometry as the parameters are varied within the presented ranges.
- ☐ A scale bar would be good to include in Figs. 18 and 19 with the experimental prototype. Also, a video of its stowage and unfolding would be great to include in Section VI.E as a link or footnote.
- ☐ Typo in Section VI.F second paragraph (repeated "are").

Minor edits suggested to make figures more readable and clear

Recommendation: Accept, decline, **accept after minor revision**, accept after major revision, reduce to note, other

Confidential Comments to the Associate Editor: none