The Rio Scale

Introduction

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Nearly everyone is familiar with the Richter Scale for quantifying earthquake severity. Can we similarly quantify the importance of a candidate SETI signal? The Rio Scale is an attempt to do just that. It is an ordinal scale between zero and ten, used to quantify the impact of any public announcement regarding evidence of extraterrestrial intelligence.

The concept was first proposed in Rio de Janeiro, Brazil (hence its name) by Iván Almár and Jill Tarter in a paper presented to the 51st International Astronautical Congress, 29th Review Meeting on the Search for Extraterrestrial Intelligence, in October, 2000. Under their leadership, members of the IAA SETI Committee (and its successor, the IAA SETI Permanent Committee) officially adopted the Rio Scale in 2002, and have continued working to refine and perfect it, in order to bring some objectivity to the otherwise subjective interpretation of any claimed ETI detection.

Rio	Importance
10	Extraordinary
9	Outstanding
8	Far-reaching
7	High
6	Noteworthy
5	Intermediate
4	Moderate
3	Minor
2	Low
1	Insignificant
0	None

Interpreting Rio Scale Values

Precedent

In many ways, a public announcement of a discovery of extraterrestrial intelligence would have societal consequences similar to the announcement of the impending impact of a large asteroid. Published in 1997, the so-called Torino Scale quantifies the significance of such a potential threat. The two-dimensional Torino Scale takes into account both the potential damage from such an asteroid impact, and the probability that it will collide with Earth. The Rio Scale described here borrows heavily on the design of the Torino Scale. It similarly attempts to quantify the relative importance of a rare event, in terms of both its potential societal impact and the credibility of the evidence presented.

A similar metric, the San Marino Scale, has recently been introduced for quantifying the potential hazard associated with an active SETI experiment, or other aimed transmission from Earth into space.

- **Link to [Torino Scale website]**
- **Link to [San Marino Scale website]**

Structure

As originally proposed and subsequently refined, the Rio Scale is mathematically defined as:

$RS = Q * \delta$

where **Q**, an estimated level of consequences, is the sum of three parameters (class of the phenomenon, discovery type, and distance), and δ represents the assessed credibility of a

claimed discovery. The value for **Q** is easily quantified as a function of the class of the reported phenomenon, the type of discovery, and the estimated distance to the source of the phenomenon detected. The value assigned for δ is somewhat more subjective, and is likely to vary over time and between observers.

It should be noted that the Rio Scale is a tool for dynamic, rather than static, analysis. Throughout the life of any unfolding SETI event, as research is conducted and verification measures pursued, new information is constantly being made available which will impact our perceptions as to the significance and credibility of the claimed detection. Thus, the Rio Scale value assigned to any SETI detection can be expected to change significantly (either upward or downward) over time.

Rio Scale Calculator

If you are using a JavaScript-enabled browser, you may follow this **Link** to an interactive Rio Scale Calculator. Radio buttons enable the user to quickly enter the particulars of any detection (hypothetical or actual) being analyzed. The calculator software then computes the resulting Rio Scale value for the event under study. We invite members of the scientific community and the press to use this tool for estimating Rio values during analysis of SETI candidate events, and to assign Rio Scale values in quantifying their estimates of the importance of any reputed detection.

Work In Progress

The Rio Scale remains a work in progress. Information presented on this web page is intended to be used by members of the IAA SETI Permanent Committee solely for purposes of further developing this research tool. Users should expect that this Rio Scale page, and the Rio Scale Calculator linked from the above paragraph, will change from time to time, at the discretion of IAA SETI Permanent Study Group. The current version contained herein, Revision 1.2, was officially accepted by the IAA SETI Permanent Committee at its 2003 meeting in Bremen, pending future revisions at subsequent meetings, and has been submited to the International Academy of Astronautics for formal adoption.

References

Click on the links below to obtain copies of various papers related to the development of the Rio Scale. These documents (provided in Portable Document Format) are copyright © by the International Academy of Astronautics, and their respective authors.

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