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**VALUE FOCUSED THINKING AS A TOOL FOR THE DEFINITION OF ELIGIBLE
INITIATIVES FOR A PLANETARY DEFENCE STRATEGY IN BRAZIL**

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Agenda

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- Objective
- VFT to generate alternatives
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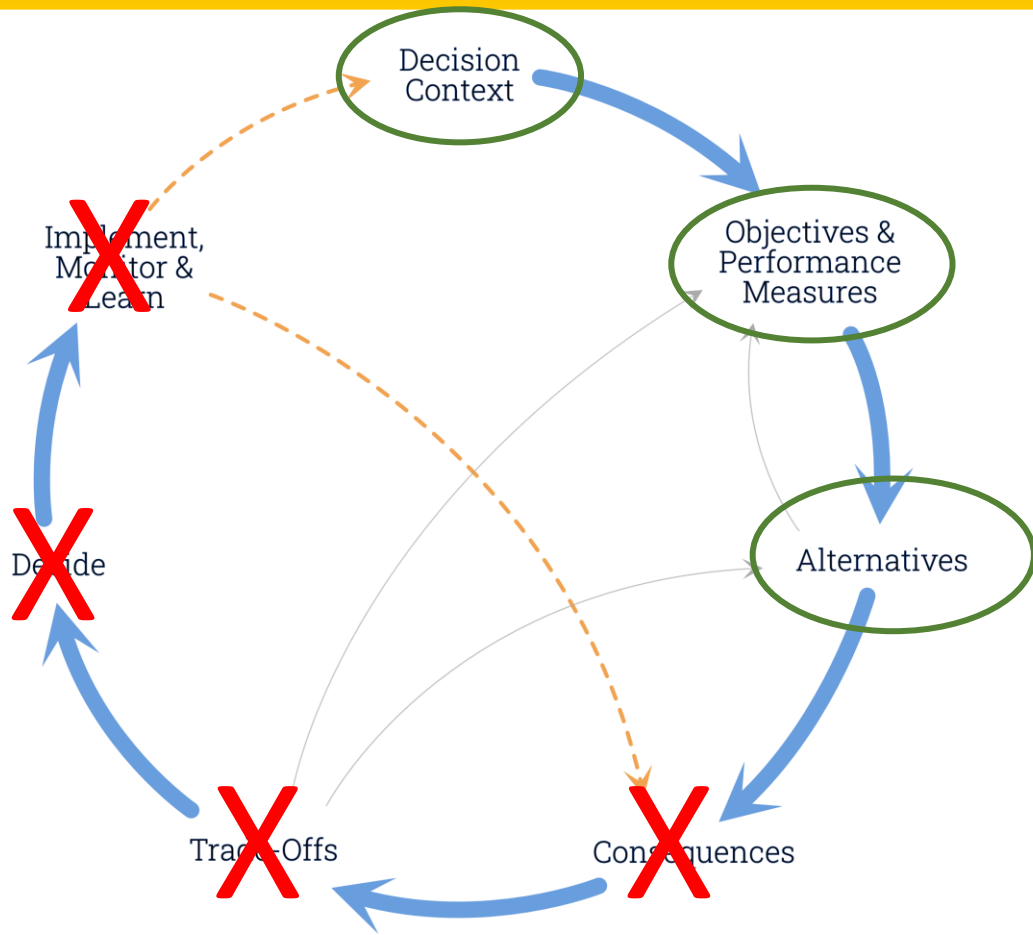
Context and problem

- Brazil is a country of continental proportions, regional leader in space activities, and in which cosmic events have been observed in recent years;
- There is no official participation of the country in initiatives for planetary defense.
- Brazil - represented by a group of amateur astronomers from the Observatory for Near Earth Asteroids Research (SONEAR) and Brazilian Meteor Monitoring Network (BRAMON)
- In Brazil, lack of:
 - Legislation
 - Technology
 - Funding
 - Strategy
 - human resources
 - Infrastructure
 - Policy and governance

Objective

- Present possible alternatives that can be adopted by Brazilian government can implement, taking into account restrictions, applying a PSM approach (Value-Focused Thinking - VFT), a Soft Operational Research method to structure complex problems.
- The method was applied to a group of space-related stakeholders (previously identified with a Contextual and Behavioural Centric Stakeholder Identification, a Systems Engineering method.
- A benchmark with USA model for planetary defense was carried out

VFT to generate alternatives



Define the Decision Context

What's the decision at hand and how does it relate to other decisions? Have we defined the problem we're trying to solve? Who is (or are) the decision maker(s)? What's in and out of scope? How should the process be structured – who needs to be engaged and what expertise will we need?

Clarify Objectives and Performance Measures

What are the decision objectives (the things that matter) and their performance measures (the specific metrics that will be used to develop and compare alternatives)? Have we captured all the things that matter, even the ones that are harder to quantify?

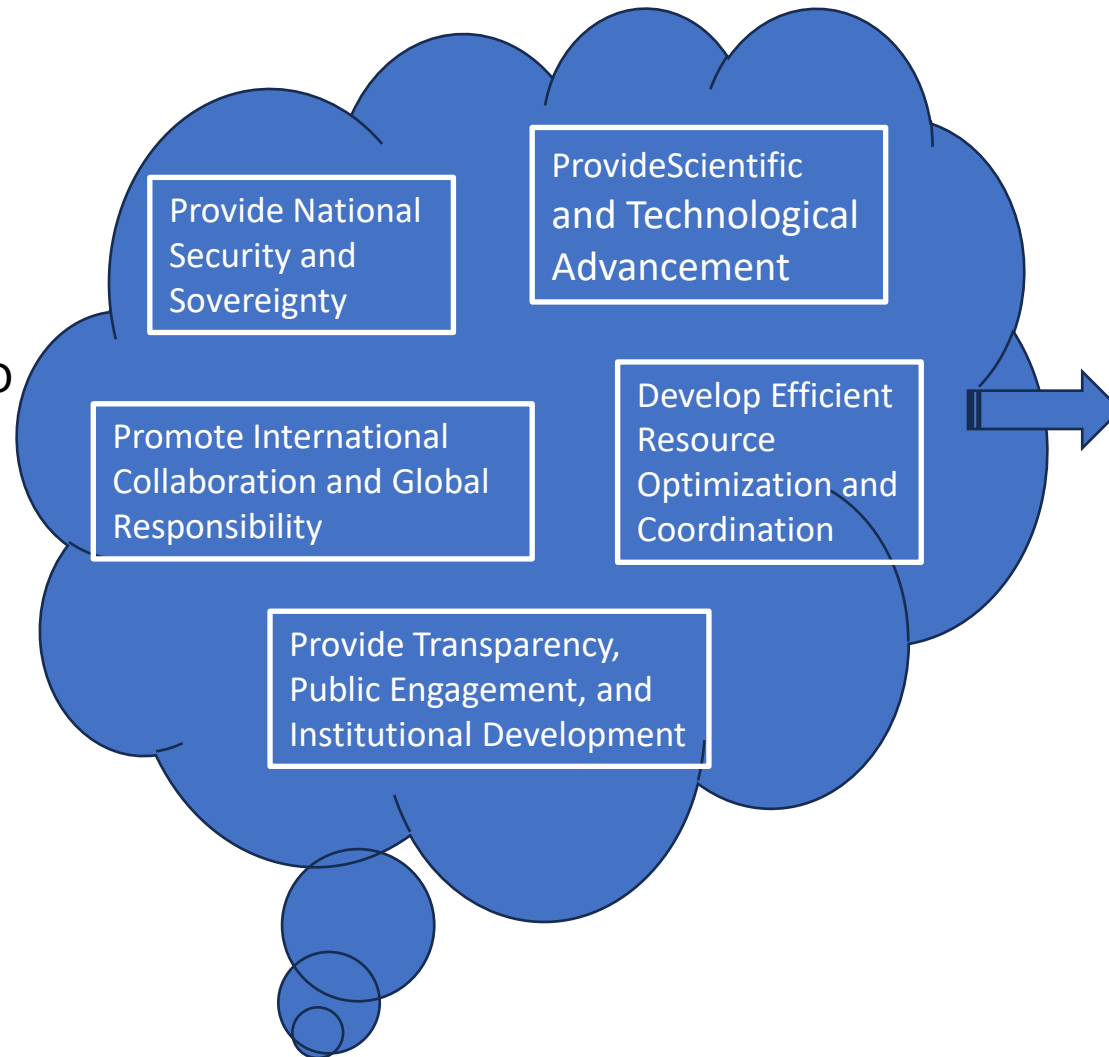
Develop Alternatives

What are the alternative actions under consideration – the things we could do? Does thinking about alternatives suggest refinements to the decision objectives or performance measures?

Application of the method

Context identification

1. Previous documentation available in Government sites (reference)
2. Interviews with experts from various areas who have an interest in the PD



Value	Strategic Goals	Milestone Goals	Ends Goals
1. National Security and Sovereignty	1.1 Short-Term (1-2 years)	1.1.1 Establish an inter-ministerial task force for threat assessment.	1.1.1.1 Form a working group with representatives from the Ministry of Defense, MCL, and crisis management bodies.
	1.2 Medium-Term (3-5 years)	1.2.1 Integrate planetary defense into national strategic planning.	1.2.1.1 Develop a dedicated strategic framework embedding planetary defense in current processes.
2. Scientific and Technological Advancement	2.1 Short-Term (1-2 years)	2.1.1 Partner with universities, research centers, and observation data collection.	2.1.1.1 Generate initial scientific reports and feasibility studies for planetary defense.
	2.2 Medium-Term (3-5 years)	2.2.1 Develop a coordinated research and technology program dedicated to planetary defense.	2.2.1.1 Establish a virtual research center to share data among academic and government institutions.
3. International Collaboration and Global Responsibility	3.1 Short-Term (1-2 years)	3.1.1 Initiate bilateral contacts for international information exchange.	3.1.1.1 Represent Brazil at international planetary defense forums and conferences.
	3.2 Medium-Term (3-5 years)	3.2.1 Negotiate and draft memoranda of understanding (MOU) or bilateral agreements on data sharing and coordinated emergency protocols for international planetary defense.	3.2.1.1 Establish initial bilateral MOU agreements with the US, European, and other key organizations.
4. Efficient Resource Optimization and Coordination	4.1 Short-Term (1-2 years)	4.1.1 Assess and catalog existing assets relevant to planetary defense.	4.1.1.1 Detailed report mapping available resources and identifying gaps.
	4.2 Medium-Term (3-5 years)	4.2.1 Develop a strategic multi-year resource optimization plan.	4.2.1.1 Successful pilot projects demonstrating efficient use of cross-sector resources.
5. Transparency, Public Engagement, and Institutional Development	5.1 Short-Term (1-2 years)	5.1.1 Collaborate with media outlets and educational institutions to produce accessible information.	5.1.1.1 Increased public understanding and support generated through transparent communication.
	5.2 Medium-Term (3-5 years)	5.2.1 Develop	5.2.1.1 Create a dedicated online platform for official government communication.

Results

Total: 31 alternatives

Short-term: 11

Medium-term: 10

Long-term: 10

Value	Alternatives
1. National Security and Sovereignty	<p>1.1.1.1 A preliminary inter-agency report assessing extraterrestrial threats. 1.1.1.2 Improved communication channels for rapid crisis response.</p> <p>1.2.1.1 Official policy documents and guidelines formalizing multi-agency cooperation. 1.2.1.2 Enhanced operational readiness and coordinated threat response.</p> <p>1.3.1.1 Permanent incorporation of planetary defense into national security policies. 1.3.1.2 A robust and rapid response mechanism against potential extraterrestrial hazards.</p>
2. Scientific and Technological Advancement	<p>2.1.1.1 Generation of initial scientific reports and feasibility studies for planetary defense. 2.1.1.2 Increased awareness and capacity building within the scientific community. 2.1.1.3 Association with IAWN and SMPAG</p> <p>2.2.1.1 A diversified portfolio of advanced detection and response technologies. 2.2.1.2 A strengthened innovation ecosystem aligned with international best practices.</p> <p>2.3.1.1 A self-sustaining, technology-driven pipeline for space monitoring and threat mitigation. 2.3.1.2 Institutionalized continuous innovation in the planetary defense domain.</p>
3. International Collaboration and Global Responsibility	<p>3.1.1.1 Establishment of framework agreements (formal or informal) for joint research and training. 3.1.1.2 Early access to global best practices and improved monitoring protocols.</p> <p>3.2.1.1 Legally binding agreements that secure Brazil's role in global planetary defense networks. 3.2.1.2 Clearly defined operational protocols for international coordination during emergencies.</p> <p>3.3.1.1 Recognition of Brazil as a key partner and regional leader in planetary defense initiatives. 3.3.1.2 A permanent network of international partnerships supporting ongoing planetary safety.</p>
4. Efficient Resource Optimization and Coordination	<p>4.1.1.1 Detailed report mapping available resources and identifying gaps. 4.1.1.2 Recommendations for repurposing existing assets for planetary defense functions.</p> <p>4.2.1.1 A validated funding and resource deployment strategy tailored for planetary defense. 4.2.1.2 Successful pilot projects that demonstrate improved resource efficiency and cross-sector collaboration.</p> <p>4.3.1.1 Stable, dedicated funding lines ensuring long-term viability of planetary defense initiatives. 4.3.1.2 Continuous improvement in resource allocation and operational efficiency through institutionalized practices.</p>
5. Transparency, Public Engagement, and Institutional Development	<p>5.1.1.1 Increased public understanding and support garnered through transparent communication. 5.1.1.2 A repository of stakeholder inputs to inform future policy decisions.</p> <p>5.2.1.1 Detailed legislative proposals with broad-based stakeholder support. 5.2.1.2 Clear guidelines for the roles and responsibilities of government and advisory bodies.</p> <p>5.3.1.1 A robust, accountable institutional framework ensuring operational excellence and public trust. 5.3.1.2 Ongoing, dynamic, and transparent collaboration between government, academia, and industry.</p>

Final considerations

- This initial proposal arose from interviews with experts from various areas who have an interest in the theme and who encounter difficulties in their respective segments to conduct initiatives on the PD in Brazil.
- Next step, apply a MCDA method for prioritizing alternatives according government restrictions:
 - ✓ Technology Control and Dual-Use Regulations
 - ✓ Regulatory Oversight of Airspace and Orbital Operations
 - ✓ National Security and Coordination Measures
 - ✓ Data Management and Information Sharing Protocols
 - ✓ Environmental and Land Use Controls
 - ✓ International Collaboration and Treaty Compliance
 - ✓ Budgetary and Audit Control Measures

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