Brief information about the project

Name of the project	AP14872115 “Development and research of the novel tripod type parallel manipulators with six degrees of freedom”.
Relevance	Tripods (parallel manipulators with three legs) with six degrees of freedom in compared to hexapods (parallel manipulators with six legs) have a large workspace, small dimensions and metal consumption.
Purpose	The goal of the project is to develop and research the novel 3 - PRRS and 3 – PRPS types tripods with six degrees of freedom, where P, R and S are prismatic, revolute and spherical kinematic pairs, respectively.
Objectives	1. Topological synthesis of the novel 3-PRRS and 3-PRPS types tripods and their 3D modeling. 2. Kinematic analysis of the novel 3-PRRS and 3-PRPS types tripods. 3. Dynamic analysis and motion control of the novel 3-PRRS and 3-PRPS types tripods. 4. Manufacturing of experimental samples of the 3-PRRS and 3-PRPS types tripods and their testing.
Expected and achieved results	As a result of the project implementation there will be: 1. Determined the optimal schemes of the novel 3-PRRS and 3-PRPS types tripods and made their 3D models. 2. Determined the kinematic parameters, workspaces, and singular configurations of the novel 3-PRRS and 3-PRPS types tripods. 3. Determined the driving forces and forgues, as well as developed the motion control systems of the novel 3-PRRS and 3-PRPS types tripods. 4. Manufacturied the experimental samples of the novel 3-PRRS and 3-PRPS types tripods and improved their constructions.
Research team members with their identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and links to relevant profiles	1. Baigunchekov Zhumadil Zhanabaevich, Doctor of Technical Sciences, Professor, Academician of the National Academy of Sciences of the Republic of Kazakhstan (NAS RK). Web of Science: H-2, AAA-9038-2020, Scopus: H-4, ORCID iconhttps://orcid.org/0000-0002-5807-0541, authorId=6506823633. 2. Med Amine Labiri (Poitiriers University, France), PhD, Web of Science: AFK-5131-2022, Scopus: H-14, https://orcid.org/0000-0003- 0797-7669, authorId=36500011400. 3. Zhumasheva Zhadyra Tokanovna, Candidate of Technical Sciences, Associate Professor. Scopus: H-3, authorId=57194241887. 4. Kaiyrov Rustem Aibekovich, PhD, Scopus: H-2, https://orcid.org/0000-0002-0899-4981, authorId=57208861849. 5. Amanov Bekzat Ondasynuly, Scopus: H-1, authorId=57208859415.

	6. Tolenov Serik Asilkhanuly, ResearcherID -JNE-0837-2023, ORCID - https://orcid.org/0009-0009-4482-7943, Scopus Author ID – 57658934300. 7.Zholdassov Yernar Nurdosuly, Scopus: authorId=57305684300.
List of publications with links to them	1. Zhumadil Baigunchekov, Med Amine Laribi, Giuseppe Carbone, Azamat Mustafa, Serik Tolenov, Nurdaulet Dosmagambet. Structural-Parametric Synthesis of the Planar Four-Bar and Six-Bar function Generators with Revolute joints. Mechanisms and Machine Science, Springer, Vol. 124, 2023, pp. 277-285. 2. Zhumadil Baigunchekov, Med Amine Laribi, Giuseppe Carbone, Zhang Dong, and Rustem Kaiyrov. Structural-Parametric Synthesis of Path Generating Mechanisms. Mechanisms and Machine Science, Springer, Vol. 147, 2023, pp. 300-309. 3. Zhumadil Baigunchekov, Med Amine Laribi, Giuseppe Carbone, Rustem Kaiyrov, Serik Tolenov, Nurdaulet Dosmagambet. Structural-Parametric Synthesis of the Planar Four-Bar and Six-Bar function Generators with Revolute joints. Journal of Mechanisms and Robotics, 2024, Vol. 16/091001-1.
Patents	An application for the patent of the Republic of Kazakhstan "Tripod manipulator" has been submitted. Registration №2023/0341.1,17.05.2023.

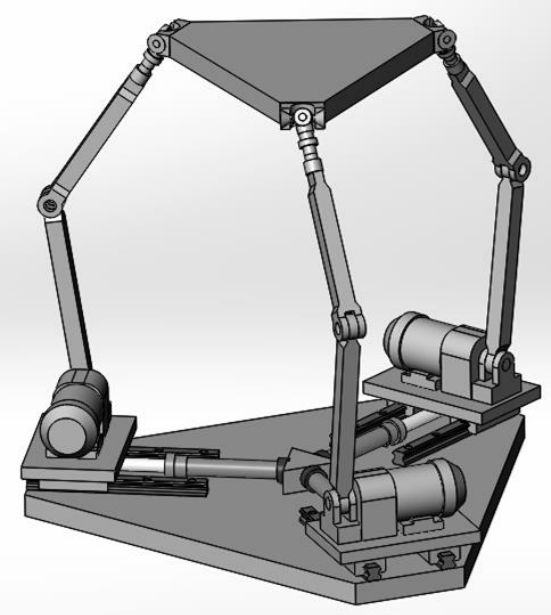

Fig. 1. 3D CAD model of the novel 3-PRRS type tripod.

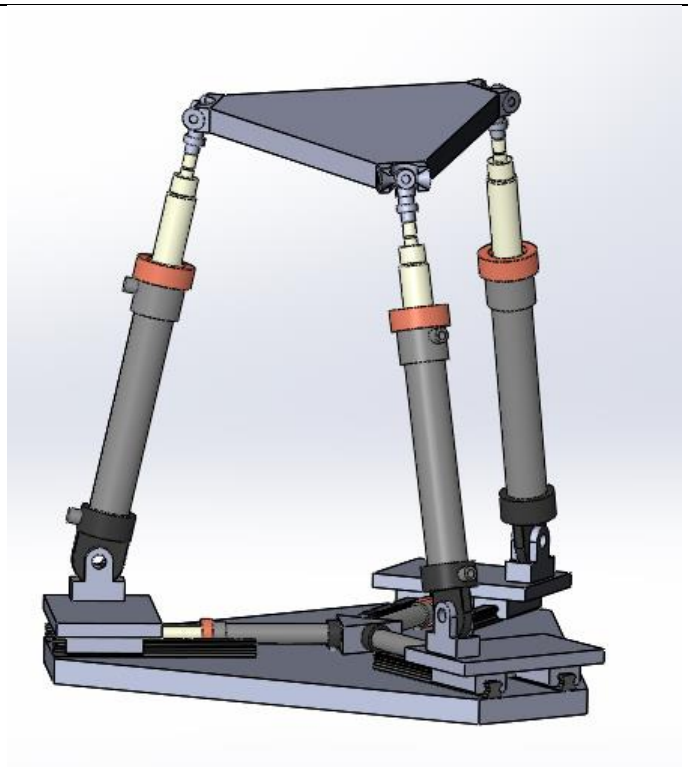

Fig. 3. 3D CAD model of the novel 3-PRPS type tripod.