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## Chapter 4

# Franz Ulinski: An Almost Forgotten Early Pioneer of Rocketry\*

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### Abstract

This article summarizes the life and rocketry related work of Franz Ulinski (1890–1974). He published, in 1920, his ideas of a spacecraft propelled by electrically charged particles. This idea was not considered feasible by his contemporaries and faded into oblivion. Due to recent achievements with ion propelled interplanetary spacecraft, it appears appropriate to uncover some historical facts about one of the ancestors of this technology.

### Introduction

In the early period of rocket development, several pioneers originating from the former Austro–Hungarian Empire proposed their ideas for that emerging field of interest. The best known—regarded as the “father of rocketry” in Western Europe—is Hermann Oberth. His booklet *Die Rakete zu den Planetenräumen* (*Rocket into Interplanetary Space*), published in 1923, set the scientific basis for a new field of research and engineering, which had been dealt with be-

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fore only in utopian literature. The subject was made even more popular in Europe by Max Valier, an Austrian-born freelance writer, who outlined his own rocket development strategy, which he partly implemented. He carried out many experiments with rocket cars, rocket railcars, sledges, and gliders, almost all of them accompanied by large publicity. Franz von Hoefft set up the first Western European spaceflight club in Vienna (1926) and proposed a rocket development plan with a space glider as the ultimate goal. Guido von Pirquet is noted for extensive trajectory calculations for reaching other planets and his suggestion of a space station as a foundation-stone for future manned trips to other planets. Not to forget Herman Potočnik (pen name: Hermann Noordung), who worked out, and published in 1929, a detailed study of a wheel-shaped space station,\* and Friedrich Schmiedl, who experimented with solid-fuel rockets for mail transportation. Last but not least, we have to mention Eugen Sänger, who established a test-bed for rocket engine development at the College for Advanced Technology in Vienna (“Technische Hochschule Wien”) in 1932.

For details about the contributions of these Austrian rocket pioneers we refer to some other articles in the rocket history literature.<sup>1-3</sup> For reviews of the international history of early rocketry, the reader is referred to two comprehensive books on the subject.<sup>4,5</sup>

In the following we will restrict our attention to the description of the life and work of Franz Ulinski. The next part will summarize known biographical detail, whereas the following parts describe his rocket proposals and discuss the reception of his ideas by contemporaries.

## Biography

Franz Ulinski was born in 1890 in Blosdorf, Moravia (now Mlžadejow, Czech Republic). After his school years in Wels, Upper Austria, where his parents had moved for work, he started a career in the Austro-Hungarian Army in 1910. During his service he worked, starting in 1917, at an airplane engine plant in Fischamend and in 1919–20 at the “Fliegerarsenal” (aircraft arsenal) in Vienna. At the end of 1920, the Army of the young republic of Austria (remaining from the former Austro-Hungarian Empire) had to severely reduce its forces and Ulinski was superannuated without further payment.

Since 1917 he was also registered as an extraordinary student at the College for Advanced Technology in Vienna (“Technische Hochschule Wien”) tak-

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\* Ed. – *Das Problem der Befahrung des Weltraums*, or *The Problem of Navigating in Space*.

ing a few courses on mechanics.<sup>6</sup> He auto-didactically\* obtained the VDI-Engineering-Diploma (VDI = "Verein Deutscher Ingenieure"—Association of German Engineers). During 1921–24 he worked as a development engineer and later as a design engineer for an Austrian car factory. In 1925 he set up and operated his own company (radio sale enterprise) and in 1929 an engineering workshop. From 1938–45 he first served as technical staff and later as a design engineer at the Siebel-Flugzeugwerke (Airplane-Factory) in Halle/Saale, Germany. After the Second World War he was employed as a design engineer at different engineering companies in Austria. Franz Ulinski died in 1974 in Wels.<sup>7</sup>

### **Electron Rocket Proposal (1919–20)**

Not much is known about Ulinski's first contact with the subject area of rocketry, but from the biographical information we have, it seems possible to have occurred during the time when he was a member of the Austro-Hungarian Army. One indication for the above made statement can be found in a picture from the "First World Exhibition of Interplanetary Machines and Mechanisms" in Moscow in 1927. This picture shows the model of a "dust" rocket designed by Ulinski displaying the year 1901 as date of its invention.<sup>8</sup> Considering that Ulinski was only 11 years old in 1901, the date was most probably a mistake made by the organizers of the exhibition.

No matter what the real date was, Ulinski can still be regarded as one of the first in the German-speaking part of Europe to publish an article with his ideas about spaceflight after the turn of the century. The Austrian flight magazine *Der Flug (The Flight)* printed an article, which was deposited as a manuscript at the Academy of Sciences in Vienna,<sup>9</sup> by Ulinski in its (special) edition of December 1920, with the following annotation:

The enclosed study was already written during World War I by the technical officer of the formerly Austro-Hungarian flying squadron Franz Ulinski. The realization of the principle of motion has also found confirmation in April 1920 by Prof. Dr. Einstein. On the occasion of the conference "Naturforschertag" in Bad Nauheim, the well known scientist explained the possibility of the investigation of space. Even if spaceflight due to quantitative proportions with today's means cannot be carried out, the theoretical conditions for the realization of space travel have been accepted for the first time by such an outstanding side...<sup>10</sup> (translated, in part and shortened by the author)

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\* self-taught.

Ulinski describes in the article a spaceship using corpuscular rays as impulse. The energy for accelerating the electrons comes from either solar energy, which has been transformed into electrical energy before, or from the use of “intra-atomic” energy. Unfortunately, the study suffers from some serious errors in the description of the physics involved, but still it can be considered one of the first to propose the energy gained from solar radiation as a driving power for a spacecraft.<sup>11</sup>

There is no more firsthand information about further rocketry activities of Ulinski available, except some documents concerning the design of parachutes.<sup>12, 13</sup> One variant of these chutes for use with rockets was published in a sketch of a book by Willy Ley.<sup>14</sup>

### **Reception of His Work by Contemporary Rocket Pioneers**

I could only find two references quoting Ulinski’s 1920 paper in the period 1920–26. One is a short paragraph in a book about habitableness of celestial bodies. There the author states that the calculations and construction details of Ulinski’s spacecraft are too premature due to several unsolved problems.<sup>15</sup> The other reference quotes the error about the rocket principle, that it would be almost without reaction above the atmosphere, which is present in Ulinski’s article. It also criticizes the superficial treatment of the principles of spaceflight. Nevertheless, the author concludes with the statement that Ulinski’s article offers plenty of interesting suggestions.<sup>16</sup>

In 1927 Max Valier describes a new variant of Ulinski’s original proposal.<sup>17</sup> The new spaceship consisted of a closed chamber, within which the rocket engine should work. It is interesting to note that the design described in the text does not coincide with the accompanying picture on the cover. The article was followed by a short biographical sketch.<sup>18</sup> The disagreement of this described design with the laws of mechanics (physics) is rather obvious and brought Ulinski into disrepute in the rocket circles of the time.<sup>19</sup> The new design (figure on the cover) of Ulinski’s electron propelled space ship was advertised thereafter in many newspaper articles and in Valier’s books.<sup>20–24</sup> Ulinski started to deliver public talks about spaceflight at the beginning of 1928.<sup>25, 26</sup> This publicity led to a thorough calculation of the energy requirements of the electron ejector spacecraft by Guido von Pirquet. He showed the impracticability of Ulinski’s idea for using this type of spacecraft to launch from Earth.<sup>27, 28</sup>

In 1929 Hermann Oberth devoted the last chapter of his revised book to the electrical spacecraft.<sup>29</sup> In this chapter he also directed attention to the fact that one cannot (indefinitely) eject electrical charged particles from a spacecraft. One

has to neutralize the particle stream, which was not taken into account in Ulinski's design. Nobody pointed out this flaw earlier. The solution of neutralization of a stream of electrical charged particles has been already discussed earlier by Kondratyuk.<sup>30</sup> After 1929 only a few more references mentioning Ulinski's electron rocket could be found.<sup>31-33</sup>

### **Rocketry Lecture (1941)**

In no treatise of the history of rocketry was the name of Franz Ulinski connected to rocketry after 1930. It was believed that he was not active in the field anymore. This statement seemed to be true, but in view of some recent developments it has to be revised.

During my research on Ulinski's activities performed over the last few years, I found only new material for the time period earlier than 1930 and reported my findings at the annual history of astro/cosmonautics, organized by and held at the Hermann-Oberth-Space-Flight-Museum in Feucht near Nürnberg, Germany.<sup>34</sup>

At the end of 2000, I got in touch with a colleague from Germany, who came across an unknown manuscript by Ulinski and made it available to me. In the following paragraph, I am going to summarize the news.

The manuscript is a typewritten version of a talk on "The Problem of Rocket Flight" that Ulinski presented on 24 March 1941 at the VDI ("Verein Deutscher Ingenieure").<sup>35</sup> Starting with a short summary of the history of rockets, where he also describes in some detail the different rocket designs of the rocket pioneers Ganswindt, Hoefft, Oberth, Tsiolkovsky, and Goddard, he concentrates in the second part of the manuscript on the design of a jet engine of his own design and its possible application in a high-altitude airplane (Siebel-Flugzeugwerke, Halle/Saale, Germany). Additional future research will be required to illuminate Ulinski's role in the airplane company, the status of rocket development in the company, et cetera.

All information gathered up to now supports the assumption that Ulinski was still actively interested in the problems of rocketry (at least until the end of World War II). One of the most interesting questions, whether the talk was public (questionable taking into account the circumstances at the time), can not be answered yet.

All the original information sources are in German, so I added some more references to biographical and work related literature (with some of the drawings and figures reproduced).<sup>36-38</sup>

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This note added after the IAA History Symposium in Houston: On 23 October 2002, my coworker and close friend Dipl.-Ing. Fritz Sykora died in Vienna, Austria.

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