AIAA American Institute of Aeronautics and Astronautics Los Angeles - Las Vegas Section

Newsletter

Ampaire and Surf Air Mobility Join Forces for Electric Future of Aviation

by Mr. Kevin Noertker, 18 February, 2021

Founder, President of Amp Division, Surf Air Mobility, and Co-Founder, Chief Executive Officer (CEO), Ampaire

https://ampaireinc.medium.com/ampaire-and-surf-air-mobility-join-forces-for-electric-future-of-aviation-896ad7a58baf (with permission)

Mr. Kevin Noertker

Today, Ampaire begins a new chapter. We have entered into a definitive agreement to be acquired by Surf Air Mobility. Together, we're accelerating adoption of electric flight to substantially reduce the cost and environmental impact of aviation. We're combining all of the critical components to achieve our shared vision of a future where personalized air travel is affordable for everyone and sustainable for generations to come. See Press Release.

We've achieved an incredible amount in our last five years. We've become recognized as thought leaders and pioneering 'doers' in electrified aviation. Our partners trust us, and our customers are enthusiastic to buy our products. We have flown the largest hybrid-electric aircraft, then flown it farther than any electrified general aviation aircraft, then flown it routinely on an airline route. We've been hard at work with NASA, the Department of Energy and private sector partners. We're innovating every day with new battery cooling technology, new high-voltage components, new charging systems and new powertrain architecture, and more — all aimed at developing practical, trusted and compelling alternatives to today's aircraft. The next phase of our journey is incredibly exciting.

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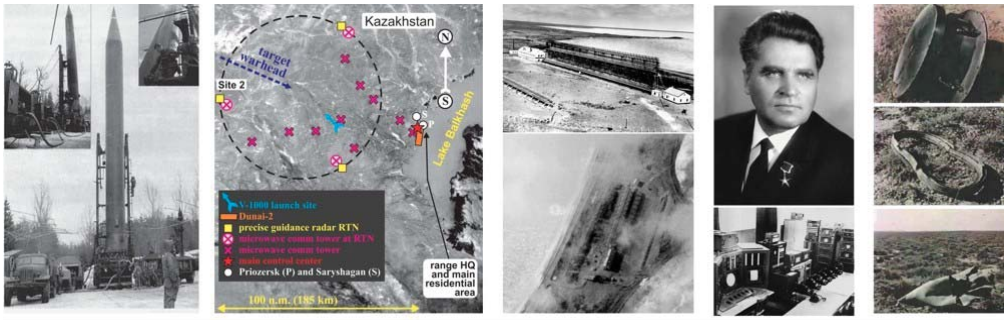
First IRBM Intercept – 60 Years Ago

by Mike Gruntman, Professor of Astronautics at USC, 3 March, 2021 (with permission)
https://www.linkedin.com/pulse/first-irbm-intercept-60-years-ago-mike-gruntman



On March 4, 1961, a Soviet guided missile intercepted and destroyed the approaching warhead of an intermediate-range ballistic missile (IRBM) SS-4 (R-12) at the Saryshagan test site in the Kazakhstan desert. Several successful intercepts followed, paving the way for the emergence of a powerful political, military, scientific–technological, and industrial missile defense complex in the Soviet Union.

A new chapter in the eternal competition between protecting and avenging, between the sword and the shield, has begun. While the U.S. Army demonstrated intercepts of tactical ballistic missiles earlier, the 1961 destruction of an IRBM warhead paved the way to emergence of strategic, or national, missile defense (http://astronauticsnow.com/md/).

This Soviet development culminated in deployment of the operational nuclear-armed missile defense system A-35 in early the 1970s protecting the Russian capital Moscow. Its successor, A-135, is operational today.

The Soviet Union began work on interception of ballistic missiles in the early 1950s. It relied on the prior development of the first guided missile air defense system SA-1. Accomplished scientist in radio engineering Grigorii Kisunko led the effort that achieved the first non-nuclear warhead intercept in 1961. The first intercepts also initiated development of penetration aids to defeat defenses of adversaries.

Missile defense looked impossible to many in mid-1950s. Effective radar cross sections of warheads were 100 times smaller than those of typical aircraft and they flew at velocities up to 20 times faster than contemporary planes. The intercept would last only a few minutes from the warhead detection. Therefore, antimissile missiles had to be launched on short notice in a highly automated, computer-controlled process with precision, speed, and guidance accuracy far beyond the state of the art. At that time, electronics relied almost exclusively on vacuum tubes; digital computing was still in its infancy.

It was a bold decision to proceed with the development, pouring enormous resources into science, industry, and building a huge new test site in a hostile desert area without any infrastructure.

http://astronauticsnow.com/fip/fi_p_169.pdf

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The test missile defense system at Saryshagan, System A, included a long-range search and acquisition radar Dunai-2 (Hen Roost) to detect the incoming missile. Then three precise tracking and guidance radars (RTNs) tracked the approaching warhead and guided the intercepting missile toward it. The widely separated RTNs formed an equilateral triangle, accurately measured their distances to the target, and determined its absolute position by the method of three respective distances. The V-1000 interceptor missile exploded its fragmentation warhead, destroying the target.

Kisunko directed the follow-on design and deployment of the nuclear-armed operational missile defense system A-35 around Moscow. Disagreements on the future development in missile defense and power struggle in the defense establishment led to his firing in 1975. His legacy of scientific and engineering achievement, cemented on March 4, 1961, remains.

Today, many countries continue or consider development of missile defenses. This consequential field is highly politicized in the United States, as much as global warming and response to the pandemic. As in the past, opponents of missile defense believe that no technical means exist to protect against ballistic missile threats and preach arms control. Others advance development of technical means to provide defense, even limited, and thus give leaders of their countries additional dimension in responding to existential national security threats.

Israel spectacularly demonstrated the latter with the successful Iron Dome system and its successors. The United States deployed operational interceptors in Alaska and California focused on a particular threat from North Korea.

Historically, a bold initiative in missile defense, the Strategic Defense Initiative, played a critical role in ending the Cold War. No wonder that political opponents and their media associates disparaged SDI, calling it a "Star Wars" program.

As we look back at the 1961 achievement and its importance for science, technology, geopolitical struggle, and the Cold War, we face the exactly same question that then Chief of Naval Operations Adm. James Watkins formulated in 1983,

"Wouldn't it be better to protect the American people rather than avenge them?"

More than 60 years ago, the pioneers blazed the trail in search of technical means for defense against deadly ballistic missiles. As life goes on and new threats emerge, the eternal competition between the sword and the shield continues.


SCANNING OUR PAST

INTERCEPT 1961: FROM AIR DEFENSE SA-1 TO MISSILE DEFENSE SYSTEM A

I. INTRODUCTION

This article tells a little known story of the first antiaircraft system SA-1 in the Soviet Union, the first nonnuclear intercept of a long-range ballistic missile, and emergence of missile defense.

II. FROM ANTISHIP MISSILE TO AIR DEFENSE SYSTEM SA-1

Article (free download) from "Proc. IEEE" on the Intercept 1961 --
http://astronauticsnow.com/mg_pubs/2016_gruntman_proc-ieee_intercept.pdf

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Professor of Astronautics; physicist, engineer, and historian. Founding Chairman (2004-2007) of a unique in the U.S. space-focused academic unit - Department of Astronautical Engineering (ASTE) - in the USC Viterbi School of Engineering. ASTE Chairman: 2016-2019. (Holds USC joint appointment as Professor of Aerospace Engineering.) Space physicist and space engineer. Specialist in astronautics, space exploration, space technologies, space applications, rocket and spacecraft propulsion, rocketry, space plasmas, space environment, space sensors, science instrumentation, space missions, spacecraft design, and spacecraft technologies; orbital debris; history of rocketry, spacecraft, and missile defense; space education.
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