

**WenchAng Spacecraft Launch Site
Hainan, China
October 2022**

The missile rose in a graceful arc, the thunderous burn of its solid-fuel booster engine rippling through the predawn sky. It wasn't a large missile, barely twenty feet tall, and it was fired from an auxiliary launchpad at the sprawling coastal base, which was more accustomed to massive satellite-carrying rockets. Yet to those watching the flight, it was considerably more important than the latest spy satellite.

The missile's fiery exhaust disappeared from sight in a matter of seconds. But the cameras from a reconnaissance plane tracked its progress far out to sea, supplemented by satellites that targeted the launch. The distant lenses viewed the missile as the exhaust suddenly fell dark and it briefly sailed on in silence. If an observer had been present as it passed, they might have heard a sonic boom, followed by a motorized whooshing, now accompanied by the burning exhaust of liquid propellant. But those senses would have to be acute, as the missile was traveling more than a mile per second.

In an operations bay twelve hundred miles away at the Beijing Aerospace Flight Control Center, General Xu Junhai watched the missile on a large video screen. Long-range cameras on Hainan and on ships in the South China Sea showed only a speck as the missile sped from view. Xu turned to one of several engineers seated at a console, monitoring telemetry data. "Has the motor engaged?"

The engineer, a slight man with thick, square glasses, nodded without looking up. "Yes, sir. The Dragonfly has successfully transitioned from solid-fuel propulsion to scramjet flight."

"Speed?"

"Just over twenty-eight thousand kilometers per hour and accelerating."

The General turned back to the video screen, where he saw a small puff of smoke where the missile had been tracking. "What was that?"

His query was met by a long pause. "The data feeds have ceased. There . . . there seems to be a malfunction." The engineer kept his face down, fearful to make eye contact with the General. "The flight appears to have terminated."

The General, a humorless man of sixty who wore his thinning hair slicked back, couldn't hide his displeasure. "Terminated?" he boomed. "Again?"

It was the third failure in a row for the sleek prototype missile.

The engineer nodded.

The General called across the room to a bulbous man in uniform who was conversing with the flight director. "Colonel Yan."

Colonel Yan Xiaoming turned and approached with the trepidation of a man headed to the gallows.

The General stared at him. "Tell me what has happened."

"We are still assessing the data," Yan said, "but it was a flight failure during midphase acceleration."

"I can see that. What is the cause?"

The Colonel glanced at the clipboard he gripped tightly. "Preliminary readings indicate a possible thermal failure in the lead fairing. But the vehicle did produce a new speed mark prior to failure."

"A thermal failure? That was the cause of the last launch's demise? I had been led to believe that problem had been solved."

"It is proving a difficult challenge."

The General waved at the video screen that now showed an empty sky. "The President was expecting success today." He let the words sink in. "This is your third failure. It will also be your last. When can I tell the President that the issues will be resolved?"

"I . . . I cannot provide a current time estimate. Dr. Liu is examining potential solutions. We will not rest until we have an answer, sir."

"I want a full report of the failure on my desk in the morning," Xu said, "and a solution by the end of the week." He turned on his heel and stomped from the control center, his face flush with anger.

An uncomfortable silence hung over the room for a moment, then the technicians resumed examining the flight data.

Colonel Yan made a phone call, then turned again to the flight director. "Have Dr. Liu meet me in my office." He departed the room slowly, taking a last look at the blank video screen.

Yan made his way to a third-floor office in the headquarters building for the People's Liberation Army Rocket Force. As program manager for the Dragonfly missile project, Yan's office was a large but plain space that overlooked a bare dirt field. He glanced out the window at a column of fresh recruits in the People's Liberation Army marching back and forth, their khaki uniforms blending with the mud underfoot.

Yan slumped into his desk chair and rifled through a drawer for a bottle of Japanese whisky called Hakushu he had acquired on a visit to Hong Kong. He poured himself a full shot and knocked it back. As the fiery liquid trickled down his throat, he contemplated his fall from grace.

It had started with his mistress, a woman he'd been introduced to in Hong Kong two years earlier, along with the whisky. She was a patent attorney for a Chinese electronics firm who happened to be relocating to Beijing. At least that's what she'd told him. She was, in fact, an operative for the Taiwan military. He found this out only after he discovered she had copied classified files from his computer on multiple occasions. And only after his wife had decided to divorce him.

Did Communist Party officials or General Xu know? When the woman turned up missing, not a word was said. But his rising career had come to a sudden halt. Superiors dismissed him, and old friends ignored him. With the failures so far in this lone project he had been allowed to manage, he now seemed on the brink of losing everything. His commission, his membership in the Party. Maybe even his life.

As he tucked the bottle away, there was a knock at the door. Two men, at the opposite end of the age spectrum, entered the office. The first, white-haired and in a lab coat, walked with a shuffle. Dr. Liu Zhenli was a respected rocket engineer who had worked on China's first intercontinental ballistic missiles in the 1970s.

The other man, a soldier dressed in fatigues, was tall and muscular and carried himself with a forceful confidence. His name was Lieutenant Zheng Yijong, and he was a member of the Army Rocket Force Special Operations Command. He was also Colonel Yan's nephew.

Yan waved them both to sit down. "As you know, the Dragonfly has had another launch failure. It appears to be a thermal issue again." He gazed out the window at the marching recruits. "We are under great pressure to succeed. There can be no more failures."

"We are pushing the boundaries of physics," Liu replied. "We have already attained atmospheric speeds unheard of in a suborbital craft. It represents a great technological success, for we have solved the issue of propulsion. It is now a problem of materials management."

"The missile is melting?" Yan said.

"In a manner of speaking. As you know, the problem is that a compact missile flying within the atmosphere at hypersonic speeds encounters extreme thermal stress, particularly with the leading edge. The missiles are succumbing to heat failure from atmospheric friction on account of high velocity."

"Yes, but our ICBM rockets endure similar temperatures upon reentry, do they not? And they don't melt in flight."

"This is true. But those are large vehicles, buffered by thick shields that dissipate heat over a wide area. We don't have that luxury with tactical devices such as the Dragonfly. A bulky heat shield would prevent the speeds we have already attained-and hope to surpass."

"Can't the same type of materials," Yan said, "be modified for use on the Dragonfly?"

"We've tested all kinds of ceramic, carbon, and composite materials, but none has held up under the speeds we are dealing with."

"The flight director indicated you have discovered a potential solution."

"A bit of a fluke," Liu said, "but the lab was testing some natural amalgams and found a sample that showed remarkable thermal resistance. But sourcing the input material is a bit problematic."

Zheng cleared his throat, and Liu turned and looked at the man.

Yan caught the gesture. "Dr. Liu, this is Lieutenant Zheng, with the Special Operations Command. He is a very resourceful man. I am assigning him to the Dragonfly project to assist in whatever means are necessary to make the missile a success."

Zheng looked at his uncle with empty black eyes and an eager expression.

Yan knew Zheng was competent, but also something of a brutish hothead. He had knifed a man in a bar and would have been tossed out of the service if not for Yan's intervention. The Colonel doubted his nephew's mental stability, but was no longer in a position to dally. He needed results.

"Lieutenant, I need you to secure the crash site. Ensure there are no interlopers, and to protect the site until the Navy salvage team can recover the remains, whenever they decide to show up. At the same time," he said, motioning toward the engineer, "perhaps you can assign another team to assist Dr. Liu with sourcing the thermal-resistant materials he wishes to acquire."

Zheng nodded. "I will personally secure the crash site, sir. I also have personnel who can assist in the other matter." He turned to Liu. "Tell me, Doctor," he asked in a guttural voice that reminded Liu of a hyena, "where do we acquire the thermal material you desire?"

Liu gave a paternal smile. "It's not that simple."

"Why is that?" Yan asked.

Liu didn't answer right away. He looked past the Colonel and stared out the window at the brown field beyond.

"Because it is something," he finally said, "that is out of this world."

2

Staff Sergeant Nathaniel Jenkins was absentmindedly tapping a pencil against the top of his desk when his computer monitor began to beep. The sensors on a reconnaissance satellite hundreds of miles over the South China Sea had detected a small rocket launch from the Wenchang space facility. Earlier satellite data had not shown any preparation at the Chinese base's launchpads, which prompted Jenkins to sit up in his chair.

While tracking the new launch, the Air Force specialist quickly retrieved recent satellite photos of the base and magnified the images. A member of the 100th Missile Defense Brigade at Schriever Air Force Base on the eastern edge of Colorado Springs, Jenkins was one of dozens of analysts assigned to track missile launches around the world.

His supervisor, an auburn-haired lieutenant named Harrington, heard the computer's warning and stepped up behind him. "What do you have?" she asked.

"The Chinese lit off something small at Wenchang sixty seconds ago. Barely registered on infrared, nor does it appear to be headed atmospheric. Our last pad photos show empty, so there was little prep time."

"Probably a cruise missile," Harrington said. "See if Kyogamisaki or LRDR picked it up."

Jenkins typed on his keyboard, cycling through an integrated system of radars and sensors positioned around the globe to detect foreign missile threats. He accessed the surveillance feed from an AN/TPY-2 radar system at a communications station near Kyoto, Japan. "Kyogamisaki's got only limited telemetry," Jenkins said. "LRDR should have something."

LRDR, pronounced "larder," was the acronym for Long Range Discrimination Radar, a recently deployed tracking system located in the middle of Alaska. Jenkins nodded as the system

consolidated the two data streams and created a visual animation of the missile's flight path across the backdrop of the sea.

"Flight has terminated," he said as the tracking data ceased. "Flight range approximately seven hundred and twenty-five miles."

Harrington nodded. "Must be a tactical vehicle. Probably an HN-3."

"Something's not right, though." Jenkins pointed at the monitor. "Flight duration shows under three minutes."

Harrington considered the relative speed and shook her head. "No cruise missile can fly that fast."

Jenkins went back to work on the keyboard, consolidating additional metrics from each radar system. On-screen, he created a pair of columns marking the relative speed of the missile at various intervals of its brief flight. He ran a finger across the computer screen, assessing the numbers.

"Ma'am, I've confirmed the data from both radar systems. The figures are off the charts."

Harrington squinted at the screen. "Mach 25. That can't be. Are you certain?" She ran a hand through her short hair. "It just can't be."

Jenkins verified the calculations, then looked up at her and nodded.

"Double-check the data feed once more, Jenkins, then print out a full analysis. When you are finished, have Corporal Winters take over your duty station."

"Yes, ma'am. What do I do then?"

"You'll bring the data and come with me. To see the General."

3

The sunken Japanese warship appeared out of the gloom like an aged warrior. Its gray skin was dark and discolored, its decks buried under a thick layer of silt. While it was not massive, its lean, graceful lines lent an air of speed and danger. A pair of twin turrets on the bow thrust their hundred-millimeter guns upward with menacing readiness. Yet streaks of rust, algae, and layers of concretion confirmed the vessel would never again see the light of day.

"Looks to be a warship, all right." Summer Pitt leaned toward the viewport in front of her. "It's sitting nice and upright at the bottom of the canyon. I can see some damage near the stern," she added, focusing on the sunken vessel. Summer was tall and striking, with vibrant red hair that flowed past her shoulders, and her willowy figure was apparent even in the drab blue jumpsuit she wore.

Beside her, equally tall and lean, a man with dark hair sat in the submersible's pilot's seat, his hands manipulating a pair of thrusters. "A destroyer, by the size of it," Summer's twin brother, Dirk, replied. Dirk eyed the wreck with joyful fascination. "Let's grab some video for the gang up top and maybe we can peg an identification."

Under his guidance, the submersible traversed the length of the wreck. The sunken ship was wedged in a steep, narrow subsea canyon, and Dirk had to maneuver the submersible carefully to avoid striking the sheer walls. The close proximity of the rear thrusters sent clouds of silt billowing through the water. He patiently held the submersible still until things cleared, then moved closer to capture detailed images of a jagged hole in the warship's port side.

"Looks like she swallowed a torpedo," Summer said, "and maybe a bit more."

Dirk surveyed the extensive damage. "Perhaps it set off their munitions. She must have gone down fast."

While Dirk completed the video mapping, Summer accessed a computer on the Caledonia, the oceanographic research ship that supported them on the surface. Though there was a notable time lag, underwater transponders allowed for the transfer of video, data, and communications between the submersible and its mother ship. Summer linked into the ship's computer and used it to search the NUMA database for shipwrecks in the region. The twins worked for NUMA, the National Underwater and Marine Agency, a federal organization responsible for studying the world's oceans. The agency was tasked with monitoring everything from weather patterns and coastal erosion to pollution and health of the marine ecosystems. With Summer an oceanographer and Dirk a marine engineer, they often worked together on projects that took them all over the globe.