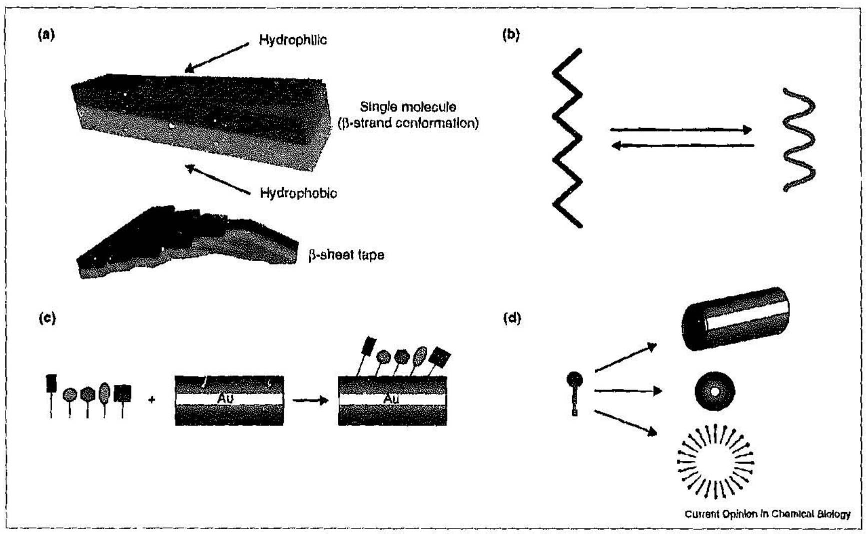
Совершенно Секретно

2008

Figure 1



Various types of self-assembling peptide systems. **(a)** Amphiphilic peptides in β-strand conformation are chiral objects. As a consequence, they self-assemble into twisted tapes. **(b)** Helical dipolar peptides can undergo a conformational change between α-helix and β-sheet, much like a molecular switch [44•]. **(c)** Surface-binding peptides can form monolayers covalently bound to a surface [45•]. **(d)** Surfactant-like peptides can form vesicles and nanotubes [9••,10•].

common example of such amphiphilic molecules is the phospholipid, the predominant constituent of the cell membrane, which encapsulates and protects the cytoplasm from the environment.

The growing interest in nanotechnology has stimulated the discovery and development of new materials that can self-assemble into well-ordered structures at the nanometer scale [23•]. Although such ordered and reproducible structures are very common in biology, they are a tremendous challenge for the material scientist. Therefore, much effort has been focused on investigating the use of biological molecules for nanotechnology applications [24•,25,26•].

Our laboratory has designed many simple amphiphilic peptides that consist exclusively of natural L-amino acids [3••,7••,8•,9••,10•] (Figure 1). One subset of these molecules is surfactant-like peptides ([9••,10•], von Maltzahn *et al.*, unpublished data). They share a common motif: the polar region of each molecule has one or two charged amino acids and the non-polar region is made from four or more consecutive hydrophobic amino acids (see figures in [9••,10•]). For example, the V_6D sequence has six hydrophobic valine residues from the N-terminus followed by a negatively charged aspartic acid residue, thus having two negative charges, one from the side chain and the other from the C-terminus [9••].

This peptide self-assembles in aqueous solution into 30–50 nm supramolecular structures, as detected by dynamic light scattering. Transmission electron microscopy (TEM) studies of the flash-frozen sample reveal the presence of a vast array of tubular structures having diameters approximately 30–50 nm (Figure 2) with lengths of several microns. Nanovesicles were also observed, suggesting that the dynamic behavior of the supramolecular assemblies may be tunable by changing the sequence of the monomer and the environment. The supramolecular structure of nanotubes formed by the surfactant peptide V_6D is proposed in Figure 3. These peptides can be tailored for added functionality using standard techniques in peptide chemistry. For example, biotinylation of a monomer will make it bind to a surface coated with streptavidin, or a string of histidines will allow it to bind to nickel for interfacing with inorganic materials.

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DOCUMENTS OFFICIELS
VINGTIÈME ANNÉE

Supplément de janvier, février et mars 1965

DOCUMENT S/6134

ed 31 December 1964 from the representative a to the President of the Security Council

[*Original text: English*]
[*4 January 1965*]

e honour to report to you for the information rity Council the following seven incidents that place since I wrote to you last on 15 De-4 [S/6111].

the night of 13 December 1964, at about , when the mine-sweeper H.M.A.S. *Teal* was the proximity of Raffles Light House to the ngapore Island, it was suddenly fired upon a within Malaysian territorial waters. The ed the fire and moving closer captured one from which the fire was proceeding. In the 4 Indonesian armed personnel; 2 had been 2 were captured alive. The boat was sub-scertained to have contained 7 armed men, were apparently lost overboard in the . Two Russian-made grenades and one FN rifle were recovered from the boat.

he night of 13-14 December H.M.S. *Ajax* oats off the coast of Malacca, near Cape On being intercepted, one boat turned round off to international waters. Later gunfire ed but the *Ajax* lost contact. Subsequently and the presence of 4 boats suggest that ve taken place. A search of the area has d the presence of enemy personnel.

Lettre, en date du 31 décembre 1964, adressée au Président du Conseil de sécurité par le représentant de la Malaisie

[*Texte original en anglais*]
[*4 janvier 1965*]

J'ai l'honneur de vous signaler, pour que vous les portiez à la connaissance du Conseil de sécurité, les sept incidents ci-après qui se sont produits depuis ma dernière lettre du 15 décembre 1964 [S/6111].

1. La nuit du 13 décembre 1964, à 22 heures environ, le dragueur de mines *Teal*, en patrouille à proximité du phare de Raffles, au sud de l'île de Singapour, a subitement essuyé le feu d'un bâtiment se trouvant dans les eaux territoriales de la Malaisie. Le *Teal* a riposté et, se rapprochant des assaillants, a capturé l'un des bateaux qui avaient ouvert le feu. Dans ce bateau se trouvaient quatre soldats indonésiens ; deux avaient été tués et deux ont été capturés vivants. On a pu déterminer ensuite que le bateau portait sept hommes armés, dont trois sont apparemment tombés à la mer au cours de l'engagement. Deux grenades de fabrication russe et un fusil FN chargé ont été saisis.

2. La nuit du 13 au 14 décembre, le bâtiment *Ajax* a remarqué la présence de six bateaux au large de la côte de Malacca, près du cap Rachado. Au moment où ils étaient interceptés, l'un des bateaux a viré de bord et gagné les eaux internationales. Par la suite, des coups de feu ont été échangés mais l'*Ajax* a perdu le contact. Une enquête ultérieure a amené la découverte de quatre bateaux, ce qui laisse supposer que des débarquements ont eu lieu. Des recherches effectuées dans la région

(although low-level funding for the program began as early as FY1994). Currently, the ABL program is the primary focus of the Missile Defense Agency's (MDA) Boost Defense program.[8] The ABL's lethality test demonstration, which is designed to test the various subsystems and target and destroy a ballistic missile, has been delayed many times. According to the Missile Defense Agency, that lethality test, which was initially scheduled for late FY2003, is now planned for no earlier than 2008.

Congress has funded the development of missile defenses in the face of growing concerns about the proliferation of missiles around the world. Of all the current efforts, most missile defense advocates believe the ABL shows the best near-term promise for destroying enemy ballistic missiles during their boost-phase. While the missile is still in the earth's atmosphere, the airborne laser would seek to rupture or damage the target's booster skin to cause the missile to lose thrust or flight control and fall short of the intended target before decoys, warheads, or submunitions are deployed. The expectation is that this would occur near or even over the enemy's own territory. Second, although the United States has primarily pursued kinetic energy kill mechanisms for missile defense for the past twenty years, most defense analysts believe that if the United States chooses to pursue increasingly effective missile defenses for the longer term future, then alternative concepts such as high-powered lasers may be the answer.

This report tracks the current program and budget status of the Airborne Laser program. In addition, this report examines several related issues that have been of interest to Congress. It will be updated as necessary. This report does not provide a technical overview or detailed assessment of the ABL or Air-Based Boost Program[9]

System Overview

It is envisioned that the ABL would use a high-powered chemical laser mounted in a bulbous turret on the front of a modified Boeing 747 aircraft to destroy or disable enemy theater ballistic missiles during the initial portion or first several minutes of their flight trajectory (from shortly after launch and before they leave the earth's atmosphere). Analysts indicate that during this period (up to several minutes) the missile is at its most vulnerable stage — it is slower relative to the rest of its flight, it is easier to track because the missile is burning its fuel and thus has a very strong thermal signature, and it is a much larger target because any warhead has not yet separated from the missile itself. Analysts also point out the advantages of destroying the missile before any warhead, decoys, or submunitions are deployed, and potentially over the enemy's own territory.

To date, the ABL program has put a weapons-class chemical laser aboard a modified Boeing 747-400 series freighter aircraft (747-400F). The Air Force acquired the 747-400F in January 2000 directly from the Boeing Commercial Aircraft assembly line and flew it to Wichita, Kansas, where Boeing workers virtually rebuilt the aircraft. Among other things, they grafted huge sheets of titanium to the plane's underbelly for protection against the heat of the laser exhaust system, and added a 12,000-pound bulbous turret on the plane's front to house the 1.5 meter telescope through which the laser beams would be fired. This plane made its maiden flight in July 2002; it logged 13 more flights in 2002 before relocating to Edwards AFB California.

Since 2002, the focus of the ABL program has been on system integration, an effort that has been considered challenging. Officials have reported completing ground integration and testing of the Beam Control Fire Control (BCFC) segment and most of that segment's integration into the ABL aircraft. Additionally, six laser modules in the System Integration Laboratory (SIL) have been integrated and tested. Further integration and testing of the BCFC, laser modules in the SIL, and communications links took place in 2005. However, the primary goal to have achieved a lethality test by 2005 was not met. That test has now been moved to no earlier than 2008. Program officials have said the delay was due largely to program restructuring and budget changes. Others have suggested that technical and integration problems have proven more challenging than anticipated.

Major subsystems include the lethal laser, a tracking system, and an adaptive optics system. The kill mechanism or lethal laser system (as distinct from the other on-board acquisition and tracking lasers) is known as COIL (Chemical Oxygen Iodine Laser). COIL generates its energy through an onboard chemical reaction of oxygen and iodine molecules. Because this laser energy propagates in the infrared spectrum, its wavelength travels relatively easily through the atmosphere. The acquisition, tracking, and pointing system (also composed of lasers) helps the laser focus on the target with sufficient energy to destroy the missile. As the laser travels to its target, it encounters atmospheric effects that distort the beam and cause it to lose its focus. The adaptive optics system compensates for this distortion so that the lethal laser can hit and destroy its target with a focused energy beam.

The current ABL program began in November 1996 when the Air Force awarded a $1.1 billion PDRR contract (Program Definition Risk Reduction phase) to several aerospace companies. The contractor team consists of Boeing, Lockheed Martin, and Northrop Grumman (formerly TRW). Boeing Integrated Defense Systems (Seattle, WA) has overall responsibility for program management and systems integration, development of the ABL battle management system, modification of the 747 aircraft, and the design and development of ground-support subsystems. Lockheed Martin Space Systems (Sunnyvale, CA) is responsible for the design, development, and production of ABL target acquisition, and beam control and fire control systems. Northrop Grumman Space Technology (Redondo Beach,

[8] Because the ABL's predecessor — the ALL — came under the Air Force's Space and Missile Systems Center (SMC), the ABL at first also came under the responsibility of the SMC. After a prototype model was completed, ABL personnel management functions were transferred to the Air Force's Aeronautical Systems Center (ASC) in 2001 (both SMC and ASC are under the Air Force's Materiel Command, based at Wright-Patterson AFB, Ohio). Also in 1991, ABL funding and program management was transferred to BMDO (the Ballistic Missile Defense Organization, which was MDA's precursor organization). ASC is responsible for ABL's personnel and MDA is responsible for program execution or carrying out the program.

[9] A useful technical review of the ABL program at that time is CRS Report RL30185, *The Airborne Laser Anti-Missile Program*.

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