

# The German Radar Station *La 318 Frosch*

Giancarlo T. Tomezzoli<sup>1</sup>, Jean-Luc Moser<sup>2</sup>

<sup>1</sup>Etno-Archaeological Observatory, Munich, Germany

<sup>2</sup>Archives Municipales, Saint Malo, France

Email: gt21949@gmx.de, jean-luc.moser@sfr.fr

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## Abstract

It is common opinion that WWII was characterised by small and great air, land and sea battles. This is true, but it ignores the role played by installations of advanced technology for collecting information about the enemy intentions. The German support point *La 318 Frosch* (*Frog*) at Cap Fréhel (Plévenon) near Saint Malo (Brittany—FR) is one of the best examples. Built among precedent military and civilian French signal components, it hosted sophisticated surveillance components. The visits conducted on the site, permitted to identify *La 318* components, to determine their preservation state at about eighty years from the end of the WWII and to proceed to the components reconstruction.

## Keywords

WWII, *La 318*, *Frosch*, *Goldfisch*, Radar, *Freya*, *Würzburg Riese*, *Mammut*, Cap Fréhel, Plévenon, Brittany

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## 1. Introduction

It is common opinion that WWII was characterised by small and great air, land and sea battles. This is true, but it ignores the role played by installations of advanced technology for collecting information about the enemy intentions (Jones, 2009). The German support point (Stp—*Stützpunkt*) *La 318* (Lamballe 318) *Frosch* (*Frog*) at Cap Fréhel (Plévenon) near Saint Malo (Brittany—FR) is one of the best examples. Built among precedent military and civilian French signal components, it hosted sophisticated surveillance components.

## 2. History

After precedent lighthouses, on 1702 on Cap Fréhel a headlight began its service burning at the beginning coal and after whale and rapeseed oil. On 1<sup>st</sup> May 1847 a new 1<sup>st</sup> class lighthouse began its service. Its two white pulses every 10 sec. were

visible up to 40 km. It had an octagonal tower 22 m high, 3.40 m in diameter with dependencies for guardian lodgments on the sides. On 1860, the municipality of Plévenon purchased for 60 Francs a 50 ares parcel (half hectare) from the French Navy for constructing an electro-semaphore in connection with that of Saint-Cast-Le-Guildo, on the place of an ancient telegraph. The electro-semaphore, T shaped, with large windows and no floors, was burned on 1940 by French soldiers before the arrival of German troops. From 1940, due to the German military interest, *La 318* was developed, comprising surveillance and defensive components, under the direction of the *Oberbauleitung* Saint-Malo. A Decauville rail track was arranged for the transport of construction materials on the site (GLAD, 2020).

The sources are not in agreement about the surveillance radar in service at *La 318*, either: 1 × *FuMG 401 LZ Freya*, 1 × *FuMG 65 L Würzburg Riese* at *Stp I*; 1 × *Mammut* at *Stp II*; 1 × *FuMG 450 Flamme*, 1 × *FuMG 65 L Würzburg Riese*, 1 × *Würzburg 39(t)* at *Stp III* (Kerhousse, 2016); or: 1 × *FuMO 214 Würzburg Riese*, 1 × *FuMO 2 Calais B*; 2 × *FuMG 65 L Würzburg Riese*, 1 × *FuMG 80 Freya A/N* and later 1 × *FuMG 401 LZ Freya*, 1 × *FuMG 80 Freya* with *Gemse* and *A/N*, and still later 1 × *FuMG 450 Freya*, 1 × *FuSE 62 D*; 1 × *FuMG 41 G (cF) Mammut*, 1 × *FuMO 214* (DAWA, 2016). A radar *FuMO 2* was placed on top of the headlight for air and sea surveillance (DAWA, 2016; Powelei, 2012)—Appendix A1. A radio station was located in the lighthouse and five mine fields with stakes against glider planes were established.

In service took turn the 22./*LgNaRgt Westfrankreich*, 1. and 3. *FuMAbt*, 24./*LgNaRgt* 12 and after 5./*FlugmeldeLeitKp II./LnRgt* 54, 1/3 *FuMAbt Brest*. In total, *La 318* garrison reached 230 officers and soldiers.

On 11<sup>th</sup> August 1944 the garrison destroyed the lighthouse, and, under the orders of lieutenant Sasse, on 30<sup>th</sup> August 1944 surrendered unconditionally to the American troops.

On 1945 the headlight restarted its service with a high tension provisional light and an emergency generator. On 1<sup>st</sup> July 1950 a new lighthouse began its service with a halogen lamp whose two white pulses every 10 sec. were visible up to 200 m in foggy and 110 km in clear weather. On 1952, the Touring-Club-de-France (founded in 1890) rented part of the Roche Jaune for facilitating the reception of tourists and prepared a platform, at the site of an ancient steam foghorn. On the platform, stands up the tower of a modern two sounds per minute foghorn (GLAD, 2020).

### 3. The Visits

The visits to *La 318* (Figure 1) took place on 18 August 2005, 11 January 2011, 08 August 2020 and permitted to identify *Stp I*, *Stp II* and *Stp III* components (Kerhousse, 2016).

#### 3.1. *Stp I*

The *Stp I* identified components (Figures 2-8) were the following.

A ditch ( $48^{\circ}40'49.64''\text{N}$ ,  $2^{\circ}19'27.94''\text{W}$ , height 57.74 m) (1), 45 x 16 m, about  $713 \text{ m}^2$ , provided with a side access ladder. On its floor, partially invaded by vegetation, two parallel concrete rails, spaced apart of 3.5 m. On the side walls, pebbles of the EroVili (Tomezzoli & Marzin, 2015) and formwork



**Figure 1.** La 318—*Stp I; Stp II; Stp III*; a Pointe du Jas; b Amas du Cap; c Roche Jaune; d lighthouse square; e nowadays parking; f Pointe du Château-Renard; g Lalande de Fréhel; h Cap Fréhel access road. [Geoportail]

element traces were visible. Its concrete structure, disfigured by a recent graffiti on the north side wall, was in good preservation state without damages due to combats.

A small bunker ( $48^{\circ}40'48.97''\text{N}$ ,  $2^{\circ}19'27.29''\text{W}$ , h 62.51 m) sunk into the terrain, 12 m south from the *L 486*. Its coverage was partially invaded by vegetation. A short access trench led to its entrance, which obstructed by vegetation, let the interior inaccessible. Its concrete structure was in a good preservation state without damages due to combats.

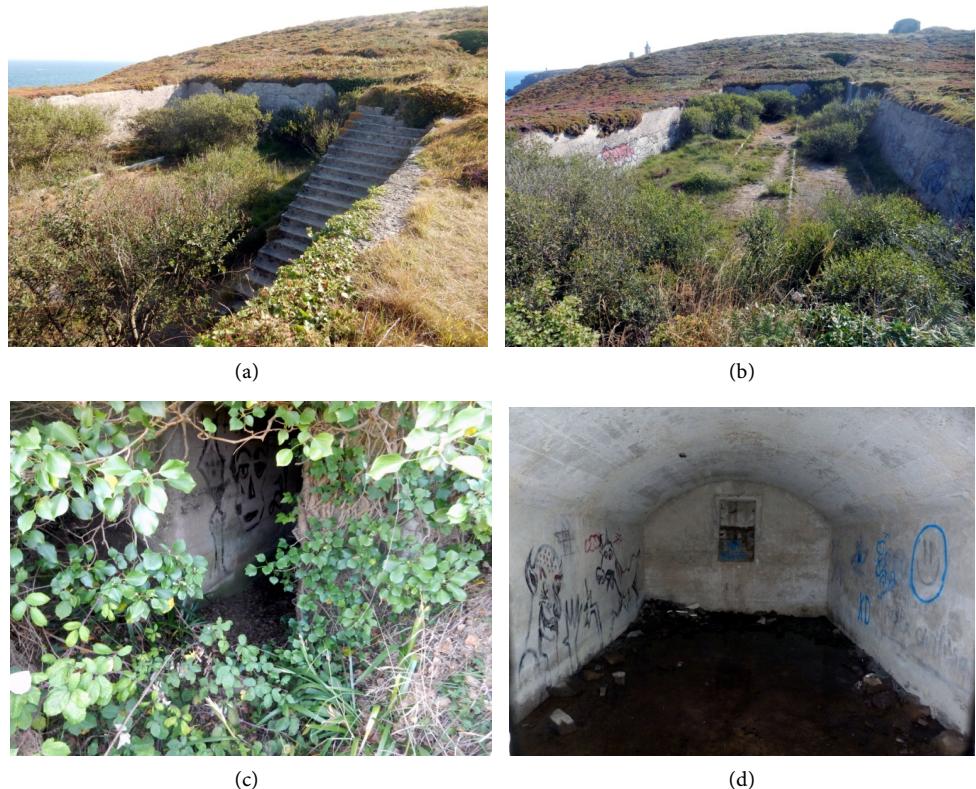
A water tank (*WBH Wasserbehälter*) bunker ( $48^{\circ}40'49.49''\text{N}$ ,  $2^{\circ}19'24.41''\text{W}$ , h 69.82 m) (2) (Powelei, 2012). Its entrance, invaded by vegetation, introduced into a 7.5 m long corridor, which preserved on its walls and ceiling the original white painting disfigured by modern graffiti and formwork element traces. At 90° left on the corridor end the entrance to an  $6.5 \times 3.5$  m room. It preserved on its walls and vaulted ceiling the original white painting disfigured by modern graffiti and formwork element traces. On its back wall a  $1.5 \times 0.8$  m, 50 cm

deep niche probably for room ventilation. The corridor and room concrete structure was in good preservation state without damages due to combats.



**Figure 2.** *La 318—Stp. I:* 1 ditch; 2 WBH bunker; 3 stone and brick construction; 4 V229; 5-7 Flak emplacements; 8 R 622; 9 stone barrack; 10 L 479 Anton bunker. [Geoportail].

A construction ( $48^{\circ}40'49.64''\text{N}$ ,  $2^{\circ}19'23.61''\text{W}$ , h 71.24 m) (3) similar to a Middle.



**Figure 3.** (a) ditch (1) access ladder; (b) ditch floor with concrete rails; (c) WBH bunker (2) entrance invaded by vegetation; (d) WBH bunker internal room.



**Figure 4.** Stone and brick construction (3): (a) lower wing; (b) construction interior.

Ages one for *Freya* radar (Powelei, 2012)—Appendix A5. Around a 5 m high, 5 m in diam. cylindrical tower, a semi-circular wing of the same high toward east and a lower wing toward west. The *Freya* antenna was placed on the tower coverage, the instrumentation and personnel lodged at the interior. Its internal and external stone and brick structure, partially invaded by vegetation, was in good preservation state without damages due to combats.

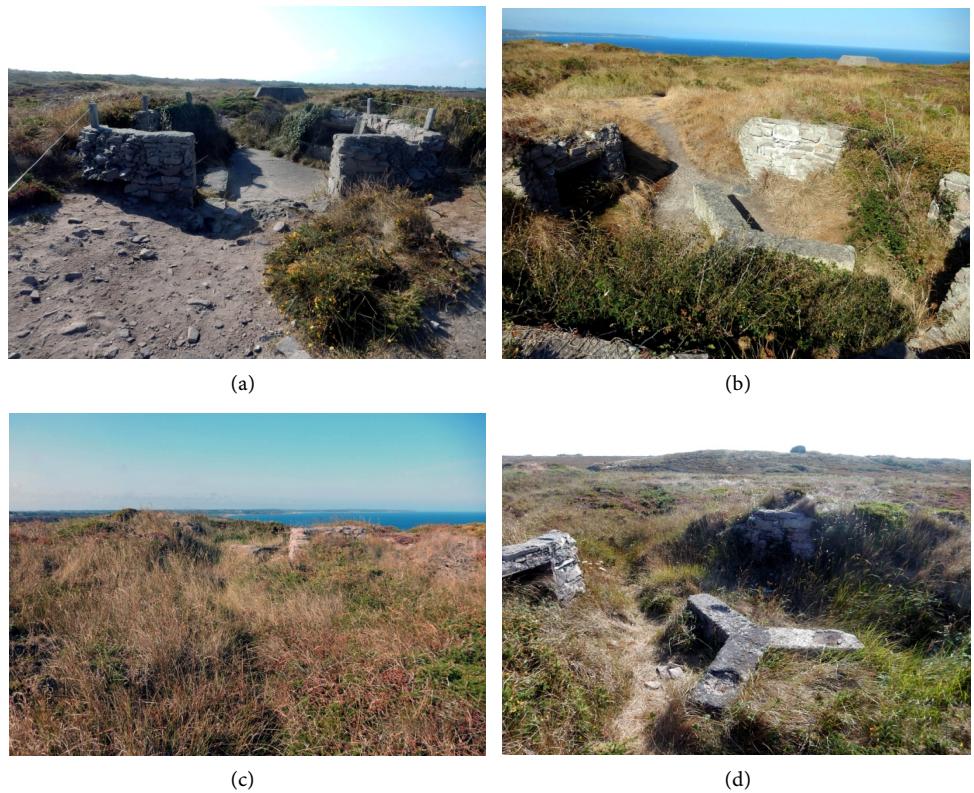
A *V 229* support ( $48^{\circ}40'51.6''N$ ,  $2^{\circ}18'32.75''W$ , h 65.09 m) (4) for radar *Würzburg Riese*—Appendix 5. A short metallic plate on the upper side protected its access opening on one of its side walls. The internal floor was covered by stones. On the internal walls two recesses for shelves or equipment were visible. On the upper side metallic fixation points and traces of the corresponding *Würzburg Riese* supporting elements were visible. On the walls, pebbles of the EroVili mixed with concrete were visible. The concrete structure was in good preservation state without damages due to combats.

A first RS 58c Tobruck ( $48^{\circ}40'48.81''N$ ,  $2^{\circ}19'31.4''W$ , h 63.43 m) with access trench and a second *RS 58c Tobruck* ( $48^{\circ}40'52.51''N$ ,  $2^{\circ}19'31.51''W$ , h 62.52 m) with access trench were visible although partially invaded by vegetation.

A  $2 \times 1.5$  m open cistern ( $48^{\circ}40'49.78''N$ ,  $2^{\circ}19'32.23''W$ , h 64.17 m) similar to those observed at *Be-2* at Mont Saint Michel de Braspart (Tomezzoli & Dupont,



**Figure 5.** *V 229* (4): (a) support for *Würzburg Riese*; (b) interior walls with two recesses for shelves or equipment.



**Figure 6.** (a) first *Flak* emplacement (5); (b) second *Flak* emplacement (6) with Y gun support; (c) third *Flak* emplacement (7); (d) third *Flak* emplacement (7) with Y gun support.

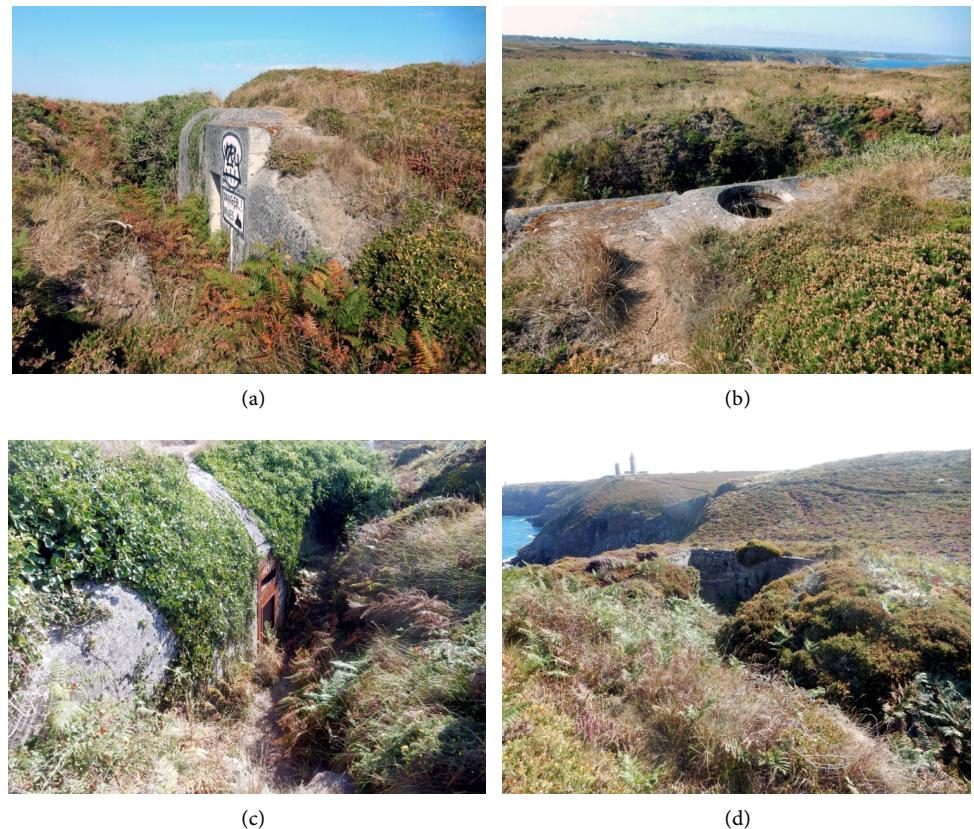
2011). Its concrete structure was in a good preservation state without damages due to combats.

A first, rough in construction, octagonal *Flak* emplacement ( $48^{\circ}40'52.2''N$ ,  $2^{\circ}19'33.18''W$ , h 65.05 m) (5) manufactured by stones bound with concrete, without underground bunker. Three niches for ammunitions were visible on three corresponding side walls. On the floor, no Y support for gun holder legs. Its structure, partially invaded by vegetation, was in a good preservation state without visible damages due to combats.

A second, rough in construction, octagonal *Flak* emplacement ( $48^{\circ}40'52.37''N$ ,  $2^{\circ}19'32.52''W$ , h 63.98 m) (6) manufactured by stones bound with concrete, without underground bunker. Two niches for ammunitions were visible on two corresponding side walls. On the floor, a Y support for gun holder legs. Its structure, partially invaded by vegetation, was in a good preservation state without visible damages due to combats.

A third, rough in construction, octagonal *Flak* emplacement ( $48^{\circ}40'50.66''N$ ,  $2^{\circ}19'32.99''W$ , h 65.37 m) (7) manufactured by stones bound with concrete, without underground bunker. One niche for ammunitions was visible on one side wall. On the floor, a Y support for gun holder legs, with a circular niche on each Y arm. Its structure, partially invaded by vegetation, was in a good preservation state without visible damages due to combats.

A R 622 bunker ( $48^{\circ}40'51.15''N$ ,  $2^{\circ}19'31.04''W$ , h 64.94 m) (8) for two groups



**Figure 7.** (a) *R 622* (8) entrance of the observation post; (b) *R 622* observation post aperture; (c) *R 622* entrance; (d) stone barrack or water reservoir (9).

each of ten soldiers (Rudi, 1988), partially covered by vegetation. On the coverage, the circular aperture of the observation post with a circular metal ring and three circular concrete emplacements each with a 10 cm in diam. circular aperture. Two entrances were obstructed by vegetation and recent barriers, so that the interior remained inaccessible. However, one of said entrances let visible a descending ladder with original white and orange wall paintings and rusted ceiling metal portions. The concrete structure was in good preservation state without visible damages due to combats.

A  $3 \times 5$  m stone barrack or water reservoir ( $48^{\circ}40'51.25''N$ ,  $2^{\circ}19'30.26''W$ , h 62.08 m) (9). The floor was invaded by stones and vegetation and its access trench was still visible on the terrain. The stone structure was severely degraded.

An *L 479 Anton* bunker ( $48^{\circ}40'47.07''N$ ,  $2^{\circ}19'22.73''W$ , h 69.78 m) (10) for night-fighter control (Fleuridas et al., 2010)—Appendix A2-A3, similar respectively to that of the radar camp at Saint-Pabu-Le Bous (Tomezzoli & Colliou, 2017a; Tomezzoli & Colliou, 2018) and at Saint-Jacques de la Lande near Rennes (Dupont et al., 2007). Pebbles of the EroVili and traces of formwork elements were visible on the façade. The entrances were obstructed by recent barriers and vegetation, so that the interior remained inaccessible. However, the re-cooling room conduit let visible the original white wall painting. Its concrete structure, disfigured by recent graffiti, was in good preservation state without damages due



**Figure 8.** *L 479* bunker (10): (a) observation post entrance; (b) façade; (c) observation post interior; (d) façade detail; (e) re-cooling room conduit with original white painting.

to combats.

### 3.2. *Stp II*

The *Stp II* identified components (**Figures 9-12**) were the following.

An *L 485* bunker for radar *FuMG 41 G (cF) Mammut Caesar* ( $48^{\circ}40'33.34''N$ ,  $2^{\circ}19'14.6''W$ , h 74.38 m) (1) ([DAWA, 2016](#)) invaded by vegetation—Appendix A4. The façade let visible pebbles of the EroVili and formwork element traces. Although disfigured by modern graffiti, it was in good preservation state without damages due to combats. Two rectangular pylons protruding from the coverage and invaded by orange lichens at the top were in good preservation state. A cylindrical tube emerged from the top of the west one. An entrance gave access to an observation post surprisingly clean, without internal walls painting. Another entrance, preserving its original white painting and defense loophole at the ladder end, allowed access to the interior. The internal rooms were surprisingly clean and in good preservation state without damages due to combats. The walls preserved their original white and orange paintings here and there disfigured by modern graffitiies and formwork element traces. On the floors the original tiling was still in place and the ceilings appeared severely rusted. The compensator room preserved on one wall the main entrance for instrumentation and



**Figure 9.** *La 318—Step II:* 1 bunker L 485 for radar *FuMG 41 G (cF) Mammut Caesar*; 2 barrack; 3 possible *RS 58c Tobruck*; 4 water reservoir/pool; 5 Flak emplacement; 6 Flak emplacement. [Geoportail].



**Figure 10.** *L 485* (1): (a) protruding rectangular pylons; (b) observation post entrance; (c) façade with modern graffities; (d) entrance with defense loophole.



**Figure 11.** *L 485:* (a) internal room, on the right wall defence loophole on the left wall metallic support of unknown purpose; (b) compensator room.

materials obstructed by terrain and on each adjacent side wall the access to the antenna room. Each access had 12 circular cable passages on each side. On the floor a  $3 \times 2$  m rectangular support for the compensator, with two square supports on each longer side. Another  $1 \times 0.5$  m rectangular support with a fixation point at each angle was aligned with the shorter side. The antenna room ceiling had twenty four cable accesses toward the corresponding external protruding pylon. All the technical instrumentations and furniture disappeared.

A  $15 \times 13$  m barrack ( $48^{\circ}40'34.22''N$ ,  $2^{\circ}19'12.07''W$ , h 67.08 m) (2). The roof disappeared and because of vegetation coverage, the interior remained inaccessible. The stone structure was severely degraded.

A possible *RS 58c Tobruck* ( $48^{\circ}40'32.91''N$ ,  $2^{\circ}19'11.32''W$ , h 66.77 m) partially invaded by vegetation.

A  $6 \times 10$  m barracks ( $48^{\circ}40'32.7''N$ ,  $2^{\circ}19'11.36''W$ , h 69.06 m) near the *RS 58c*. Because of vegetation coverage, the interior remained inaccessible. The stone structure was severely degraded.



**Figure 12.** *L 485:* (a) gas lock and antenna room; (b) antenna room ceiling.

A  $7 \times 10$  m, 1.5 m deep water reservoir/pool ( $48^{\circ}40'35.19''N$ ,  $2^{\circ}19'16.35''W$ , h 71.31 m) (4). Completely invaded by vegetation, it remained inaccessible.

A first  $2.5 \times 2.0$  m *Flak* emplacement ( $48^{\circ}40'35.52''N$ ,  $2^{\circ}19'16.84''W$ , h 73.04

m) (5) with a 3 m long access passage. Completely invaded by vegetation, it remained inaccessible.

A second  $2.5 \times 2.0$  m *Flak* emplacement ( $48^{\circ}40'33.51''N$ ,  $2^{\circ}19'15.54''W$ , h 74.35 m) (6) without access passage. Completely invaded by vegetation, it remained inaccessible.

A third  $2.5 \times 2.0$  m *Flak* emplacement (Powelei, 2012). Completely invaded by vegetation its position identification was not possible.

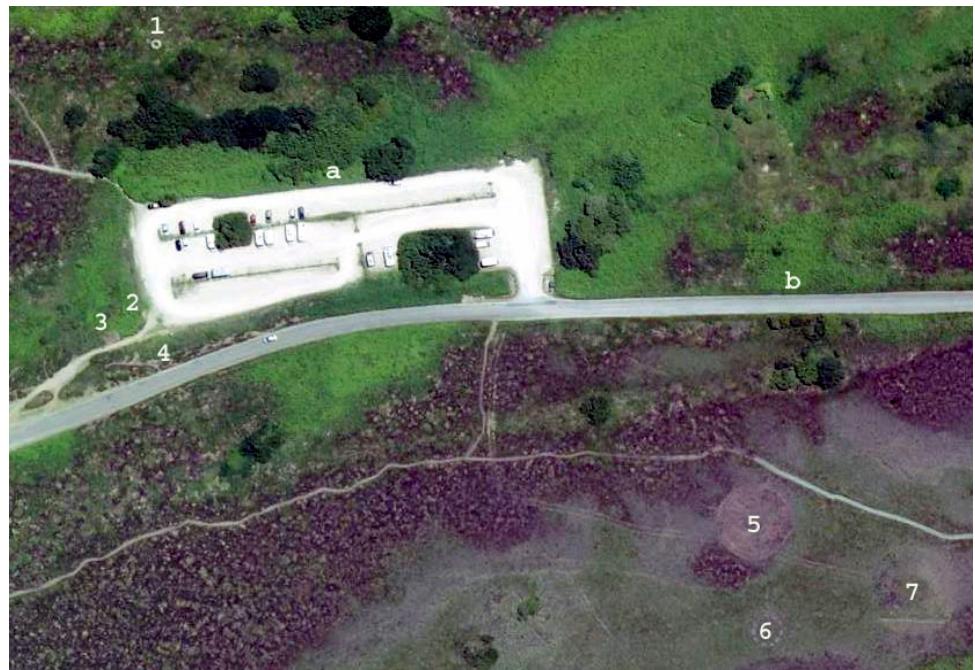
### 3.3. Stp III

The *Stp III* identified components (Figures 13-18) were the following.

A V229 support ( $48^{\circ}40'55.95''N$ ,  $2^{\circ}18'0.3''W$ , h 66.4 m) (1) for radar *Würzburg Riese*. The interior invaded by vegetation was not accessible. On the upper side the metallic fixation points and the traces of the corresponding *Würzburg Riese* supporting elements were visible. On the walls, pebbles of the Ero Vili mixed with concrete were visible. The concrete structure was in good preservation state without damages due to combats.

A  $4 \times 6$  m SEA power generator aggregate (*Stromerzeuger aggregat*) bunker ( $48^{\circ}40'55.95''N$ ,  $2^{\circ}19'0.3''W$ , h. 67.04 m) (2) (Lippmann, 2018) invaded by vegetation, the entrance closed by a wood barrier remained inaccessible. The coverage was 1 m thick and on the entrance side 7 vertical camouflages slits were visible. The concrete structure was in good preservation state without damages due to combats.

A  $4 \times 5$  m bunker ( $48^{\circ}40'56.44''N$ ,  $2^{\circ}19'5.21''W$ , h. 68.9 m) (3) buried in the terrain. The concrete coverage was in good preservation state without damages



**Figure 13.** La 318 *Stp III*—1 V229; 2 small bunker; 3 buried bunker; 4 rectangular structure; 5-7 circular areas; a nowadays parking; b Cap Fréhel lighthouse access road [Geoportail].



**Figure 14.** VF229: (a) support for *Würzburg Riese*; (b) imprint of the radar connection.

due to combats.

A  $17 \times 6$  m structure ( $48^{\circ}40'56.27''N$ ,  $2^{\circ}19'5.82''W$ , h. 70.29 m) (4), S/W-N/E oriented, of rectangular shape with rounded short sides, invaded by vegetation. The N/E side hosted the entrance, the interior four aligned circular gun emplacements, the S/W side disappeared under the Cap Fréhel lighthouses access road (b).

A *FuMo 2 Seetakt* emplacement near the lighthouse of 1950 remained unidentified.

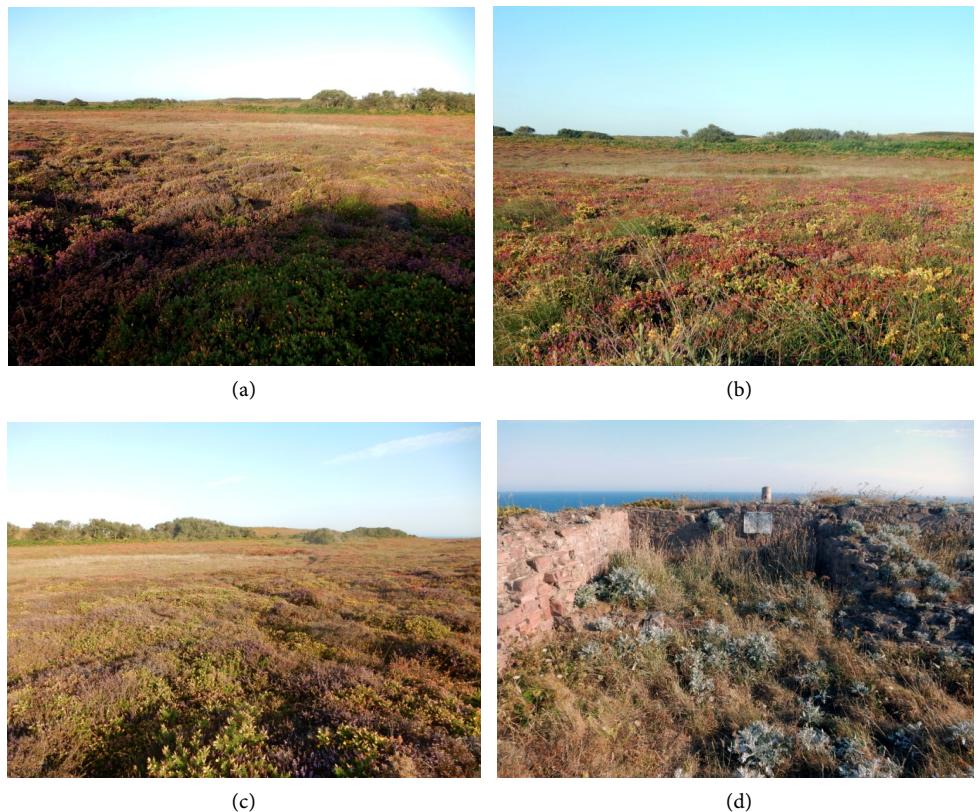
A first 30 m in diam. circular area ( $48^{\circ}40'49.37''N$ ,  $2^{\circ}19'8.28''W$ , h. 69.39 m) (5), a second 10 m in diam. circular area, ( $48^{\circ}40'47.55''N$ ,  $2^{\circ}19'9.46''W$ , h. 63.56 m) (6) and a third 35 m in diam. ( $48^{\circ}40'49.18''N$ ,  $2^{\circ}19'10.17''W$ , h. 63.34 m) (7) located about 200 meters S/W of the nowadays parking ( $48^{\circ}40'54.05''N$ ,  $2^{\circ}19'3.3''W$ , h. 66.67 m) (a). They were evident because of different colour and height of their moorland grass with respect to that of the surroundings.

Two storage bunkers, two cisterns, a stone personnel bunker with concrete coverage, a bunker with *Flak* open emplacement (OBFla), a VF 229, a VF machine bunker (*Trafostation*), two tobruck, an ammunition bunker, a *Freya FuSE* 80 emplacement, two *Flak* emplacements (Powelei, 2012) about 130 m south of the a nowadays parking (a), invaded by vegetation, remained inaccessible.

The French Batterie Est ( $48^{\circ}41'13.87''N$ ,  $2^{\circ}19'1.36''W$ , h. 61.09 m) and Batterie



**Figure 15.** (a) small bunker (2); (b) lighthouses square, on the left the headlight, on the right the 1950 lighthouse with dependencies.



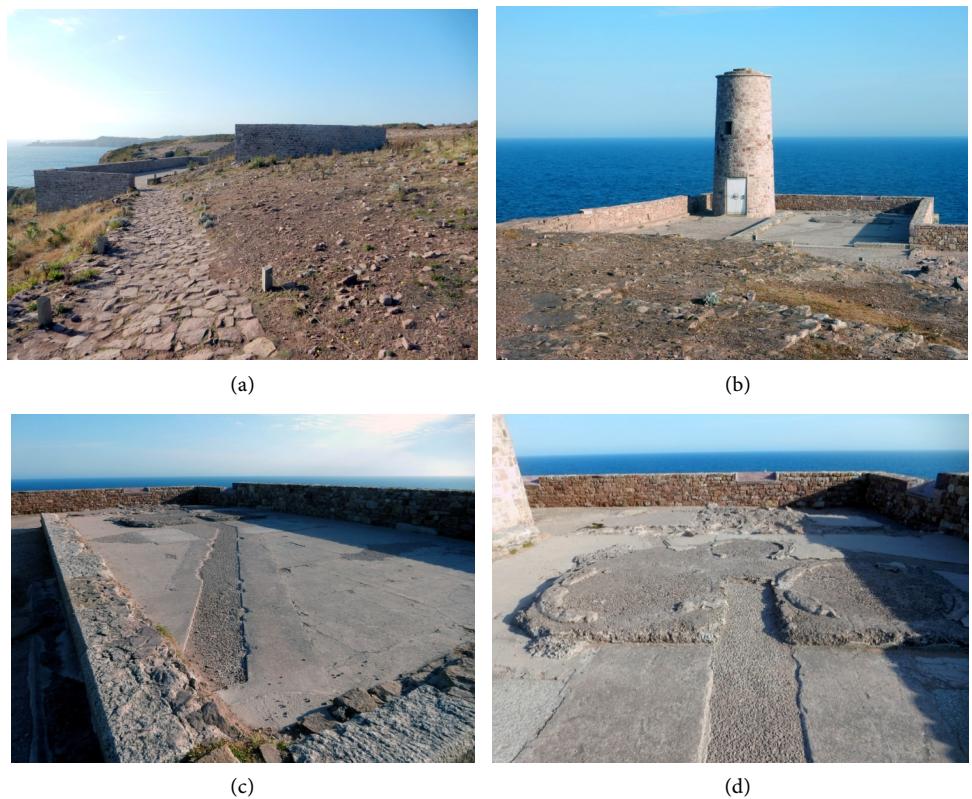
**Figure 16.** (a) 30 m in diam. circular surface; (b) 10 m in diam. circular surface; (c) 32 m in diam. circular surface; (d) a room of the French ammunition depot.

Ouest ( $48^{\circ}41'13.79''N$ ,  $2^{\circ}19'3.37''W$ , h. 58.33 m), on Roche Jaune, each comprising a platform with two in barbette parallel 95 mm Lahitolle 1888 or 1914/18 gun emplacements each formed by a concrete arc connected by three concrete segments to a central, circular six bolts metallic support, observed during the 11 January 2011 visit, disappeared.

A nearby circular concrete gun emplacement ( $48^{\circ}41'15.2''N$ ,  $2^{\circ}19'3.12''W$ , h. 58.87 m) with 14 circularly disposed fixation bolts for 9.5 cm French Canon de Côte 95 M93, identified during the 11 January 2011 visit, disappeared.



**Figure 17.** Roche Jaune: (a) semaphore emplacement, on the background the foghorn tower, (b) semaphore emplacement circular surface, on the background lighthouse and headlight.



**Figure 18.** Roche Jaune: (a) belvedere; (b) foghorn platform, on one side the nowadays foghorn tower, on the other side emplacement of the old foghorn house, (c) old foghorn house, rests of the perimeter walls and diagonal covered trench; (d) old foghorn house, structures on the floor.

The  $6 \times 8$  m semaphore emplacement ( $48^{\circ}41'13.5''\text{N}$ ,  $2^{\circ}19'2.01''\text{W}$ , h. 62.19 m). The two houses forming its T shape disappeared. The perimeter walls disappeared and on the concrete floor a 2.5 m in diam. circular surface was visible.

A belvedere ( $48^{\circ}41'7.91''\text{N}$ ,  $2^{\circ}18'59.34''\text{W}$ , h. 57.23 m) with stone walls formed by a  $6 \times 21$  m rectangular platform and a 2 m higher 14 m in diam. semi-circular platform. It resulted from the 2012 demolition of the restaurant La Fauconnière built on the 1920s and present at *La 318* during the WWII.

Three rings on the terrain for anchoring a disappeared French semaphore mast, observed during the 18 August 2005 visit, disappeared.

The  $13 \times 13$  m foghorn platform ( $48^{\circ}41'16.09''\text{N}$ ,  $2^{\circ}19'3.21''\text{W}$ , h. 56.83 m). On one side the tower of the nowadays foghorn in good preservation state, on the other side the  $7 \times 10$  m concrete emplacement of the old foghorn house. Rests of house perimeter walls were visible. On the concrete floor a diagonal, concrete covered trench for electrical cables, connected to three in triangular disposition 1 m in diam. concrete, circular emplacements. They formed the bases of the foghorn vapour generators. In front of the circular emplacements the semi-circular coverage rests of the water cisterna.

#### 4. Discussion

The majority of the literature sources identify the *La 318* (*Rapport Pinczon du*

Sel, 1947-1948) cover name as *Frosch*, except two (Glad, 2020; Lippmann, 2018) which identify the cover name as *Goldfish*. However, the radar station *Goldfish* was at Guernsey, one of the Channel Islands (DAWA, 2016). Therefore, the identification of these two sources is incorrect.

Substantially, *La 318* repeats the architecture of *Stp Re 510* (Renan 510) *Pinguin* at Saint-Pabu-Le Bous (Tomezzoli & Colliou, 2017a) near Brest, of *Funkmeßstellung 2. Ordnung Mandrill* at Monterfil (Dupont et al., 2007; Tomezzoli & Pottier, 2015) near Rennes and *Funkmeßstellung 1. Ordnung Made* at Les Méés (Dupont et al., 2007) near Le Mans essentially based on two *Freya* and two *FUSE 65 Würzburg Riese*. Two *Freya* and two *Würzburg Riese* were necessary for assuring continue surveillance also in case of maintenance or malfunctioning of one of them.

*Mammut Caesar* was an early warning radar able to detect aircrafts up to 300 km in two directions perpendicular to its rectangular antenna, but blind in a range of 60° on the antenna sides. *Freya* was an early warning radar detecting aircrafts up to 200 km but unable to determine their altitude. *Würzburg Riese*, often coupled to an IFF (Identification Friend Foe) device, was a near field warning radar detecting aircrafts up to 70 km, their azimuth and their altitude. Therefore, incoming aircrafts were first intercepted by the *Mammut* and *Freya* and after by the *Würzburg Riese* which, in case of foe aircrafts, provided data for directing the fire of the *Flak* emplacements. During day and night aircraft interceptions, the personnel of *L 479 Anton* collected all the available radar information and drove at least two interceptors against the target aircraft/s. The second interceptor was directed on the target aircraft/s in case of failure of the first one (Trenkle, 1979).

The personnel in service at *La 318* lodged mainly in the lighthouse dependencies and in wood barracks on the right side of the lighthouses access road (b) (h). However, no barrack rests were identified.

#### 4.1. *Stp I*

The presence of the *L 479 Anton* indicates that the *Stp I* components pertained to the *Luftwaffe*, as in the case of Saint-Pabu-Le Bous (Tomezzoli & Colliou, 2017a).

The ditch reminds the barrack emplacements (6)-(10) observed at the *Stp Menez-Hom* (Tomezzoli, 2017b). It protected either a large barrack or barracks (Lippmann, 2018; Powelei, 2012) or electrical generators (GLAD, 2020). The sources would not be in contradiction if the electrical generators were lodged in the large barrack or barracks, today disappeared, laid on the observed concrete rails. However, it is also possible that said large barrack or barracks lodged personnel. The ditch was covered with camouflage nets.

A 22 x 16 m rectangular excavation (48°40'48.26"N, 2°19'24.16"W, h. 64.51 m) between *L 486* and *L 489*, identified in a French air reconnaissance image (C3639-0531\_1948\_MISSIONBRETAGNE16AV, n°146, 1/26228, Argentique, 14/05/1948) escaped identification because the vegetation coverage.

A *R 656* for fifteen soldiers has been signalled (Lippmann, 2021), but its presence has not been identified.

Candidates for the *Flak* emplacements were either a 2 cm single Flak 30, or a 2 cm *Flakvierling* 38 or a 3.7 cm Flak 18/36/37 gun.

#### 4.2. *Stp II*

The presence of the *FuMG 41 G (cF) Mammut Caesar* indicates that the *Stp II* components pertained to the *Luftwaffe*.

Because no personnel lodgement was foreseen inside the *L 485* the personnel lodged in the two nearby barracks. It is possible that either the smaller one hosted a kitchen/canteen and the bigger one personnel lodgements. The disappeared technical instrumentations and furniture were probably confiscated by the American or French army.

The absence of the radar antenna in said 1948 French air reconnaissance image indicates that it was dismantled before 14/05/1948. Actually, antenna portions were used for the construction of cereals silos in a nearby farm.

The water reservoir/pool, already observed at the Murs-Erigné German base (Tomezzoli, 2016) and the Domaine de Pignerolle (Tomezzoli et al., 2013) provided relax to the personnel and water in case of fire in the *Stp II* components.

Candidates for the *Flak* emplacements were either a 2 cm single Flak 30, or a 2 cm *Flakvierling* 38 or a 3.7 cm Flak 18/36/37 gun.

#### 4.3. *Stp III*

The *Stp III* components pertained to the *Kriegsmarine*, as in the case of Saint-Pabu-Le Bous (Tomezzoli & Colliou, 2017a).

The rectangular structure (4) was a four guns in barbette French battery, preceding *La 318*. Because of its open structure, the guns might defend the whole Cap Fréhel.

The three circular surfaces (5)-(7) were probably whip antenna emplacements. This is suggested by the radio station was located in the lighthouse (GLAD, 2020) and a corresponding reinforced field-like *Vf* (*Verstärkt feldmässige*) telecommunication (*Fernmelde stand*) bunker (Lippmann, 2018) which unfortunately was not identified and no concrete antenna cable fixing block was identified.

An east and west parallel 20 x 6 m barrack on the of the Cap Fréhel lighthouse square, visible in said French air reconnaissance image, hosting respectively the kitchen/canteen and officers lodgements (Glad, 2020) disappeared before 21/05/1952 (C3639-0531\_1948\_MISSIONBRETAGNE16AV, n°146, 1/26228, Argentique, 14/05/1948; C1215-0101\_1952\_F0915-1215\_0002, n°2, 1/25842, Argentique, 21/05/1952).

The French Batterie Est and Batterie Ouest constituted a defence against ships and submarines. Especially these last, because of their limited autonomy and the danger of navigating in immersion near the coast often emerged and engaged the coastal defences by their gun.

## 5. Conclusion

This article permitted us to put order in a lot of information concerning *La 318* and other precedent and coexisting French military and civilian structures on Cap Fréhel and to present the information in an organic way accessible to a public of experts and amateurs. We hope that this article will stimulate further studies on other WWII installations of advanced technology, because they influence on military operations, life and fate of thousands of men.

## Acknowledgement

The authors are grateful to Mr Fleuridas P. for his explanations and his kind permission to insert in the Appendix the plants of the bunkers *L 479 Anton* and *L 485*.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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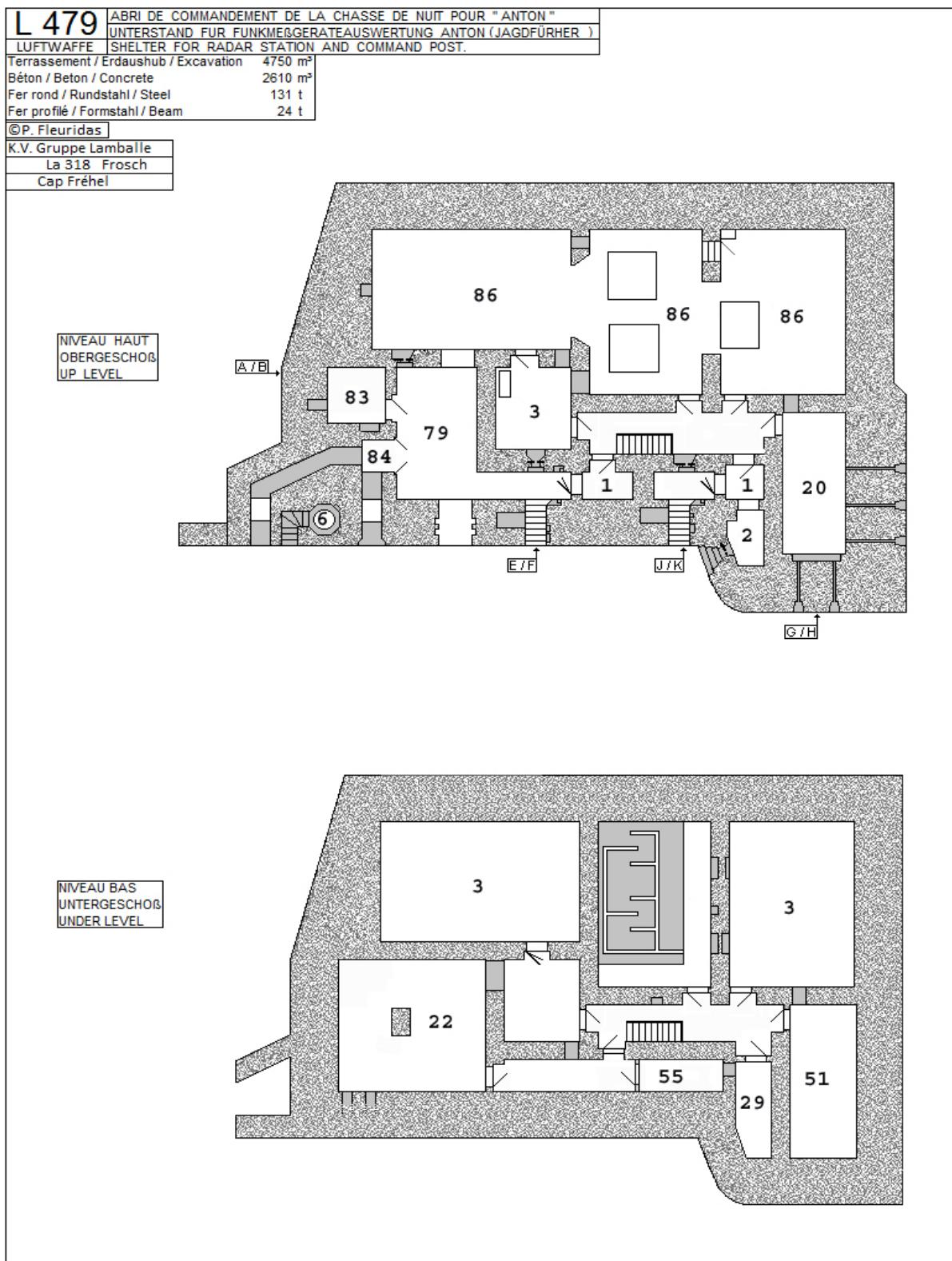
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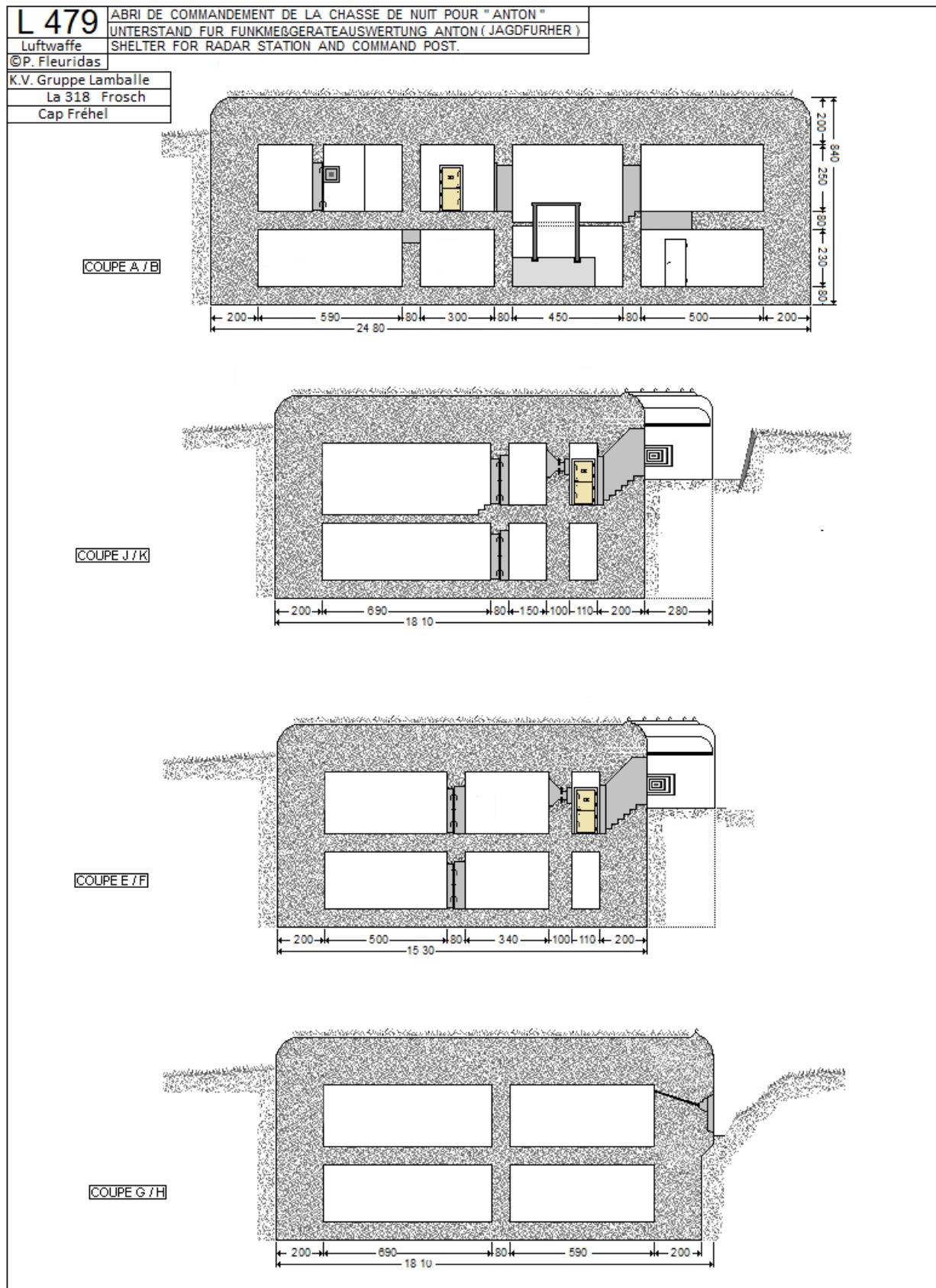
## Appendix



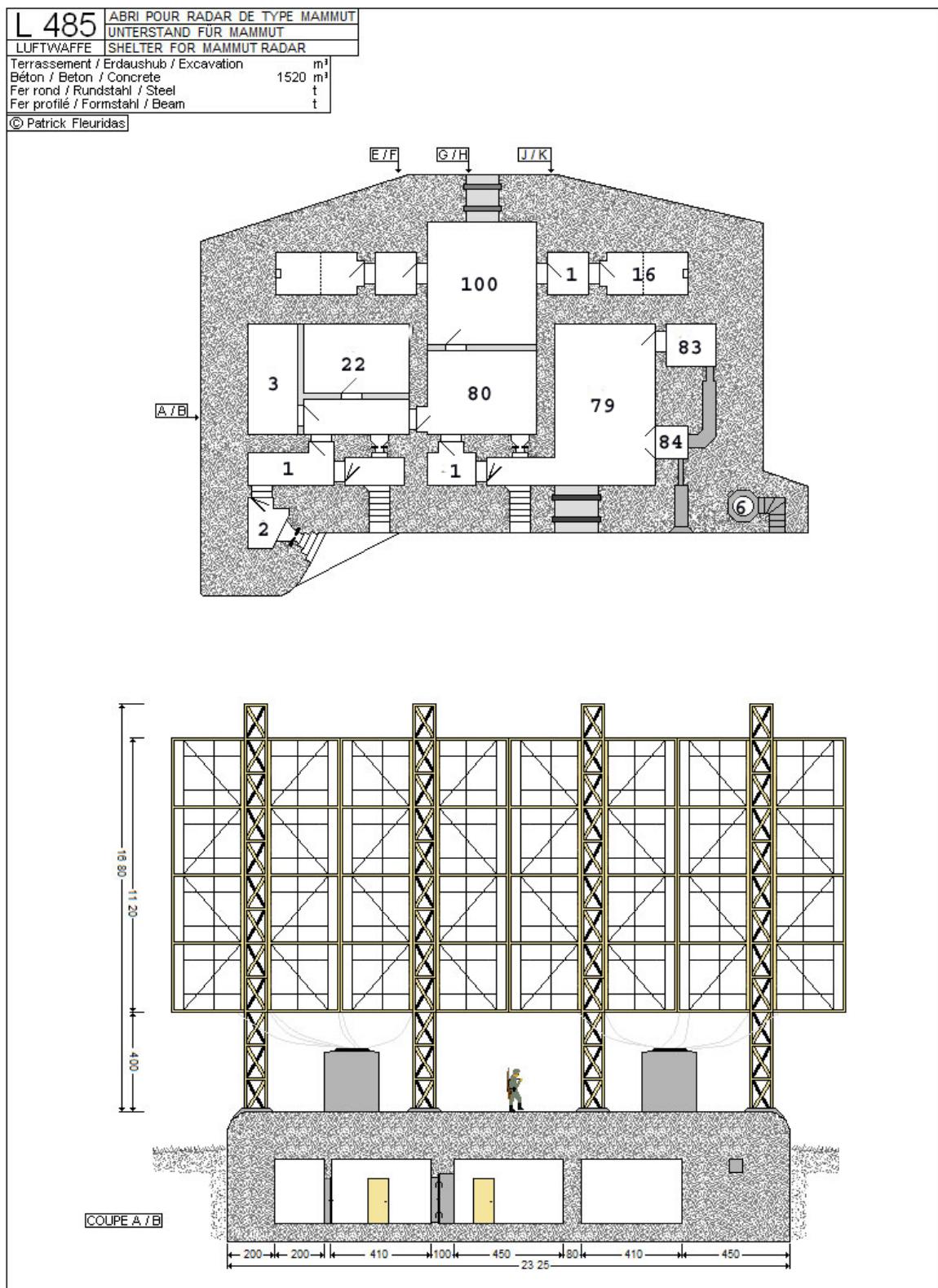
A1: reconstruction—FuMO 2 on top of the headlight for air and sea surveillance.



A2: *L 479 Anton* bunker for night-fighter control plan—1 gas lock, 2 close combat room, 3 crew room, 6 observation post, 20 wireless room, 22 ventilation room, 29 store room, 51 telephone exchange room, 55 store, 79 emergency generator room, 83 transformer room, 84 re-cooling room, 86 command post, 99 fuzes room (Courtesy Fleuridas P.) (Room numbering according to [Rudi, 1988](#)).



A3: L 479 Anton bunker for night-fighter control plan (Courtesy Fleuridas P.).



A4: bunker *L 485* and radar *FuMG 41 G (cF) Mammut Caesar*. 1 gas lock, 2 close combat room, 3 crew room, 6 observation post, 16 antenna room, 22 ventilation room, 79 emergency generator room, 80 workshop, 83 transformer room, 84 re-cooling room, 100 compensator room (Courtesy Fleuridas P.) (Room numbering according to Rudi, 1988).



A5: reconstruction—*FUSE 65L Würzburg Riese* on V229, in the foreground *FuMG401 Freya LZ* (radar image from a non-copyright site).