



# Mid Sussex Amateur Radio Society

## **NEWSLETTER**

July 2020

# Mid Sussex Matters



Google Project Loon



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Special edition By Mike G8KMP

Meetings are held on Friday evenings starting 7.45pm at the rear of  
Cyprus Hall, Millfield Suite, Cyprus Road, Burgess Hill,

West Sussex

**Visitors are always Welcome**



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### **From the President's Corner**

The problems that we are experiencing with the present day's situation are many, but there is one benefit that I have noted in that there are now more MSARS members calling into the HF nets, particularly the 8am Sunday morning net, which now has 10 or more members participating.

We also have regular visits from Alain F4GHB in Burgundy and Tim, 2E0EGZ in Southampton with others joining in for a chat on a regular basis.

Bob, N4XAT continues to listen to us via one or other of the SDR's and sends a daily sitrep to us via Messenger, until he gets an opening to allow his 100 watt CW signal to reach us via his magnetic loop.

One MSARS member just starting on HF is Ray M7AOE who lives in Crowborough (a very good take off from there) and has now joined both HF nets.

He has a FT911A with a monster handbook and we have been talking him through it slowly. I can hear him every day on both 20 and 80m but with just 10 watts to a short doublet, some other members are struggling to hear him.

Bob, N4XAT is copying Ray via the Swedish SDR and Ray is getting good reports from Europe. He needs a decent ATU and I've put a request in the "Wanted" section of this Newsletter in case any reader can help.

The RSGB have just published a new book "Transmission Lines Explained" and I have a copy. It reminds us that open wire line or 300 or 400 ohm ladder lines are much better feedlines than coax for wire dipoles, loops or long wires and tells you why.

I've used 400 ohm feedline for many years with more than 200 feet feeding the Delta Loop at the top of my garden, because the loss over such a length is appreciable less than coax.

It also allows the 20m loop and feedline to be matched via the ATU for multi band operation.

I note that Bernie continues to develop his Zoom talks for the rest of you, a great help until we can resume face to face meetings.

Meanwhile take care, and keep in contact using the Club nets.

73, Ken G3WYN.



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### Science and Technology during 'Lock-Down' by Mike G8KMP

2020 started off with me organising several visits over the year, one was in my research about the 'Aspidistra' transmitter housed in a bunker at the top of Ashdown forest.

It was to the Imperial War Museum in London, to see the original circuit diagrams of the transmitter, and photos deposited there by Harold Robin, when the bunker was decommissioned to make way for a new Southeast Cold war bunker.

Another was to go to the old Croydon Airport on the 29 March, as it was the Centenary of Croydon, of the first London International Airport.

The site began in 1915 as the RFC Beddington Royal Flying Corps. This was one of several airfields set up from which fighter aircraft, mostly Sopwith Pups, could try to intercept Zeppelin airships and Gotha Bombers on their way to bomb London.

Another field nearby eventually became Croydon Aerodrome in 1920. Amy Johnson, who my parents saw there, took several trips around the world from Croydon.

I was looking forward to seeing photos and articles and listen to a talk about the history of the airfield. This was because I lived in nearby Mitcham, and used to cycle to the airport after school to collect the registrations of the planes I saw there.

Also, the MSARS events I was looking forward to this year such as Mills on the Air, and VHF-NFD up on the downs.

Then we heard about the corona virus in China, and thought that it would just be in that country.

How wrong we were as it started to spread throughout the whole world in late February!

In the early days of March, we had to take care of where we went, and Society's were starting to close down their meeting place's.

Our own Society even thought it best to cancel the 13 March lecture by Phil Godbold G4UDU, and instead we used ZOOM and HY for him to give the lecture. It was all a bit rushed and some members were not geared up for it, but were helped by Berni MOXYF giving out all the information required to get onto ZOOM.

On the 13 May, I tried to get into the Zoom meeting with Denby Dale ARS, but due to the limit of 100 people, I could not get into the talk by Robin Moseley G1MHU.

One of my daughters organised a Zoom meeting to have a Family gathering with my two daughters and my four grandchildren, along with my brother in law in Canada, with his two daughters and three grandchildren.



**Zoom launched its first program and by May 2013 it had 1 million users.**

On February 4, 2015, Zoom had 40 million users, with 65,000 organizations subscribed and a total of 1 billion meeting minutes since it was established.

Two years later Zoom launched a saleable tele-health product, allowing doctors to host remote consultations with patients.

During the Covid-19 pandemic, Zoom saw a major increase in usage for thousands of educational institutions that switched to online classes using Zoom.

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On one day in March 2020, the Zoom app was downloaded 2.13 million times. Daily average users rose to about 200 million in March 2020, with 300 million daily meeting participants by the end of April 2020. The 16 March was the day we were told that we could not go on non essential travel in England.

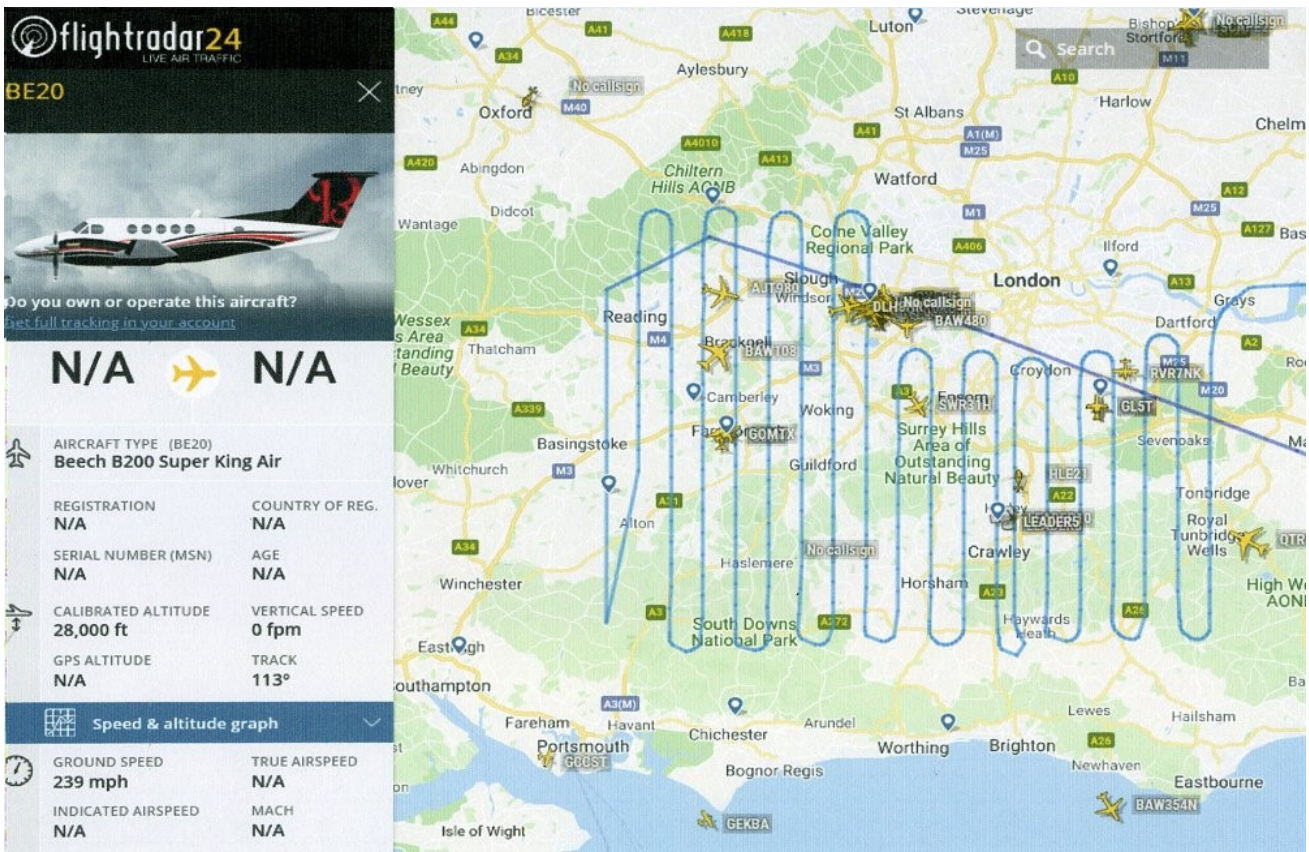
A week later was the 'Stay at home' issued from the Government, and my Grandson Zach on leaving his school, had been given a print out of the International Space Station, and the times that it will pass overhead during the following week.

The first time I looked out in the evening it was cloudy, but the next day it appeared on time and very bright.

But while looking out just before the said time for the ISS, I saw four or so items in the sky going almost in the same direction but wondered what they were.

1 April came and the Gatwick North Terminal closed down, leaving the South terminal still operating, but this seemed to partly shut down for airlines.

Then while looking on the 'Flightradar24' site, I noticed that there was a small plane going north then south several times, which seemed to be mapping the area as this sort of aircraft would have camera mounted on the underside.



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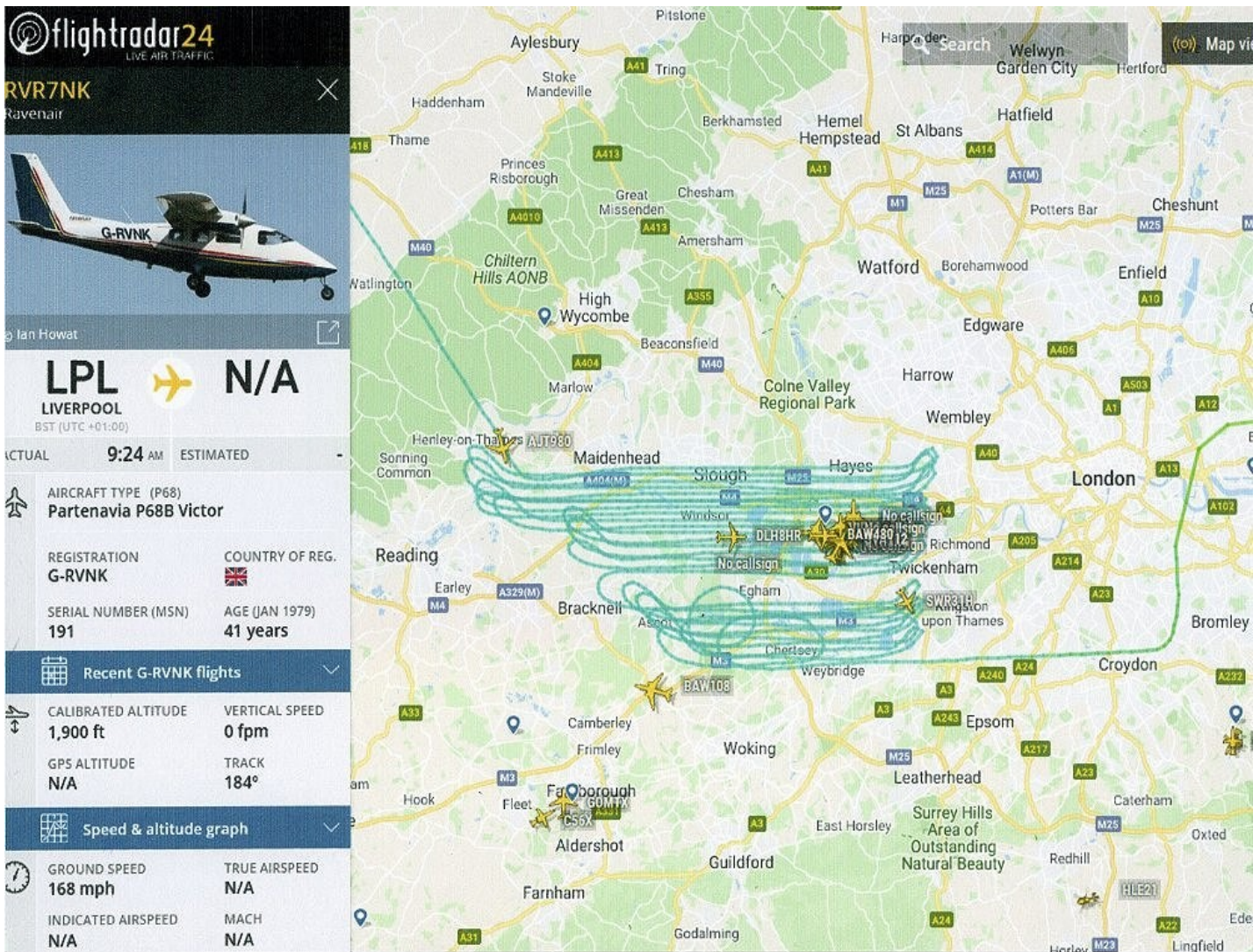
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On contacting my avid aviation friend Ted, he too had noticed a plane doing the same thing near to Gatwick Airport especially as small photographic planes can hardly do this scanning with large planes flying around in this area, and what good sunny weather they were having for the job.

From 6 April more and more aircraft were mapping areas over England, with 10<sup>th</sup> March having 12 areas being photographed by six different aircraft. Again all lovely weather, and no clouds to appear in the photos. They were still taking photos due to excellent good weather till the end of May!



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#### Flightrader24

This program gives civil aircraft information such as height, speed and direction, and if clicking on an aircraft, it also gives where it has come from and going to airports.

At one time over the UK, there were almost no planes landing in the UK at all.

Of course, a lot of Commercial passenger planes were flying from Europe over the top of Gatwick Airport at very high altitudes to Canada & the USA etc.

This program is useful if collecting a friend from an airport, as you can enter the flight number into the program and make all other planes disappear!

I soon had a phone call from Ted who was watching flightradar24, asking me what the round 'blobs' appearing in South Africa and South America were.

I looked and found them, but at the time did not know what they were, so later looked them up on the web. It was interesting to find out what they were there for:

It was for giving people in sparse areas the means to get on the internet from these balloons especially in emergency situations like the Covid-19 Pandemic.

Essentially, they are large balloons filled with helium, equipped with antennas and powered by photovoltaic panels, flying at an altitude of 20 kilometres, well above storms and airliners.



#### Loons

The majority of people in the world lack access to the internet. Either they can't afford a connection, or none exists where they live.

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The plans called for Google's "Project Loon" to put balloons in the air in an intricate dance to provide continuous service even as unpredictable, high-speed winds buffeted them about the stratosphere.

First of all, the balloons rise more than 60,000 feet above the Earth's surface, putting them far beyond the reach of the highest flying planes and atmospheric storms.

Secondly, the balloons could never hover in place. They're constantly propelled by stratospheric wind currents that can reach up to 100 mph.

All you can do is adjust their altitude. "Steering" them involves manoeuvring the balloons up and down in hopes of catching a succession of currents that will approximate the path you're aiming for.

Loon has pledged to bring internet access to Kenya's most inaccessible regions.

Loon is also testing over western Peru, offering service to a number of people.

The tennis-court-sized balloon is made from polyethylene, filled with helium and powered by a solar panel.

Each balloon carries an antenna, which relays internet signals transmitted from the ground, extending coverage over an area of 5,000sq km.

However, it is imperative that this partnership not only achieves quality connectivity (4G) but also that it is affordable and meaningful.

On the 22 April I had a phone call from Ted telling me about a rocket that was going to be sent up to space to eject some 60 satellites into space that evening.

I knew nothing about this, so got all the information from him:

**SpaceX's Falcon 9 Rocket launched 'Starlink 6' at 19.30 UTC with 60 satellites from NASA's Kennedy Space Center at Cape Canaveral, Pad 39A. The satellite's weigh 260kg each.**

**Thrusters are powered by Krypton to manoeuvre in space. They are the first Krypton propelled spacecraft ever flown.**

I watched the launch on meteor watch, then went to look out for them in the sky later, but Burgess Hill was misty so missed most of them, only seeing four of the 60.

It was said that they look like a 'String of pearls.'

As of 22 April 2020, SpaceX has launched 422 Starlink satellites.

Then I realised that I may have seen some previously launched satellites on the 29 March while looking out for the ISS information I had from my grandson!

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#### Starlink



In early 2015, two space entrepreneurs announced satellite Internet ventures in the same week.

In addition to SpaceX CEO Elon Musk announcing the project that would later be named Starlink, serial-entrepreneur Richard Branson announced an investment in OneWeb, a similar constellation with approximately 700 planned satellites that had already procured communication frequency licenses for their broadcast spectrum.

Starlink is a satellite constellation being constructed by SpaceX to provide satellite Internet access. The constellation will consist of thousands of mass-produced small satellites in low earth orbit (LEO), working in combination with ground transceivers.

In October 2019, Elon Musk publicly tested the Starlink network by using an internet connection routed through the network to post a tweet to social media site Twitter.

They plan to launch 60 more per Falcon 9 flight, with launches as often as every two weeks in 2020.

On 17 April, SpaceX submitted an application to the Federal Communications Commission (FCC) proposing to operate more satellites in lower orbits than the FCC previously authorized.

The first phase will include 1,584 satellites orbiting at 550 km (340 mi).

SpaceX intends to provide satellite internet connectivity to underserved areas of the planet, as well as provide competitively priced service to urban areas.

Each Starlink satellite weighs 500 lbs. (227 kilograms) and is roughly the size of a table.

Current satellite internet, works using large spacecraft that orbit 22,236 miles (35,786 km) above a particular spot on the Earth.

But at that distance, there are generally significant time delays in sending and receiving data. By being closer to our planet and networking together, the Starlink satellites are meant to carry large amounts of information rapidly to any point on Earth, even over the oceans and in extremely hard-to-reach places where fibre-optic cables would be expensive to lay down.

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#### One Web

Richard Branson's 'One Web' sent a Russian-built, European-launched Soyuz rocket with the first six satellites of OneWeb's broadband data constellation into orbit.

This kicked off a years-long campaign aimed at making high-speed internet connections available to billions of people around the world.

Lift off marked the latest milestone for the international OneWeb consortium, which is locked in a satellite broadband race with SpaceX, Telesat and other high-profile ventures.

Such satellite constellations promise to provide global high-speed data services for applications ranging from emergency response to community Wi-Fi and ubiquitous voice and streaming-video coverage.

After years of preparation, the launch went off without a hitch at Arianespace's launch complex in French Guiana, on South America's east coast.

Over the course of more than an hour, OneWeb's first 325-pound satellites were deployed into 625-mile-high (1,000-kilometer-high) orbits from a cylindrical dispenser.

#### AMAZON

Amazon is joining the race to provide broadband internet access around the globe via thousands of satellites in low Earth orbit, newly uncovered filings show.

The effort by Amazon, code-named Project Kuiper, follows up on last September's mysterious reports that Amazon was involved in satellites and space-based systems.

The Seattle-based company is likely to spend billions of dollars on the project, and could conceivably reap billions of dollars in revenue once the satellites go into commercial service.

It'll take years to bring the big, audacious project to fruition however, and Amazon could face fierce competition from SpaceX, OneWeb and other high-profile players.

The filings lay out a plan to put 3,236 satellites in low Earth orbit — including 784 satellites at an altitude of 367 miles (590 kilometres); 1,296 satellites at a height of 379 miles (610 kilometres); and 1,156 satellites in 391-mile (630-kilometer) orbits.

"Project Kuiper is a new initiative to launch a constellation of low Earth orbit satellites that will provide low-latency, high-speed broadband connectivity to unserved and underserved communities around the world," an Amazon spokesperson said in an emailed statement.

"This is a long-term project that envisions serving tens of millions of people who lack basic access to broadband internet. We look forward to partnering on this initiative with companies that share this common vision."

Internet access is already available via satellites in geosynchronous orbit, such as the constellations operated by Viasat and Hughes Network Systems, but satellites in low Earth orbit are expected to offer advantages in terms of low latency and low cost.

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Facebook, Boeing and Luxembourg-based LeoSat also have laid out plans for space-based internet access.

The cost of designing, manufacturing, deploying and operating thousands of satellites is sure to run into billions of dollars, but the fact that Amazon's market capitalization is currently close to \$900 billion suggests it can cover that cost.

It so happens that Amazon's billionaire founder and CEO, Jeff Bezos, has more than a passing interest in space: His Blue Origin space venture is developing an orbital-class rocket called New Glenn that's due for its first launch in 2021 and could launch bunches of Project Kuiper's satellites at a time.

Privately held Blue Origin, which is separate from publicly traded Amazon, already holds contracts to send broadband satellites into low Earth orbit for OneWeb and Telesat.

With all these companies undertaking to give people all over the world a fast internet service, I am sure there is too many, and that some will fall by the wayside.

Do you all remember the VHS and Betamax saga, where the VHS video recorder won, but the best technical video recorder was the Betamax!

I then found out that Nasa were having two astronauts sent into space by SpaceX, a private company on Wednesday 27 May. They would take off on a Rocket called Falcon 9 with the Crew Dragon capsule & two astronauts on board.

I was all set to watch the take off on SpaceX & Nasa's live TV program, and then told minutes before take off that it had been cancelled due to bad weather.

SpaceX then set Saturday, 30 May for Falcon 9's launch of Crew Dragon's second demonstration (Demo-2) mission from Launch Complex 39A (LC-39A) at NASA's Kennedy Space Center in Florida.

This flight with NASA astronauts Bob Behnken and Doug Hurley on board the Dragon spacecraft will return human spaceflight to the United States.

The instantaneous launch window opens at 3:22 p.m. EDT, or 19:22 UTC, with a backup instantaneous launch opportunity available on Sunday, May 31 at 3:00 p.m. EDT, or 19:00 UTC.

This time I watched the live TV broadcast and all went to plan.

Demo-2 is the final major test for SpaceX's human spaceflight system to be certified by NASA for operational crew missions to and from the International Space Station.

SpaceX is returning human spaceflight to the United States with one of the safest, most advanced systems ever built, and NASA's Commercial Crew Program, is a turning point for America's future in space exploration that lays the groundwork for future missions to the Moon, Mars, and beyond.

**SpaceX Astronauts (Photo 5)**



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NASA astronauts Bob Behnken and Doug Hurley rode on Demo-2, which was the first orbital crewed mission to launch from the United States since NASA's space shuttle fleet was grounded in July 2011.

Since then, Russian Soyuz spacecraft have been the only ride to and from orbit for American astronauts, and everyone else as well.

SpaceX is now clear to begin flying operational crewed missions to and from the ISS with Crew Dragon and the Falcon 9. The company is committed to fly six such missions under a \$2.6 billion deal it signed with NASA in 2014.

The walkway connects the Fixed Service Structure (FSS) of Pad 39A to the tip of the Falcon 9 rocket, where the astronauts board the Crew Dragon. Because Falcon 9 rockets are taller than the space shuttles that used to launch from Pad 39A, the new access arm is about 70 feet (21 meters) higher than the orbiter access arm that was previously attached to the FSS for 30 years.

Although NASA is not yet sure if the Demo-2 astronauts will be at the ISS for the next spacewalks, the astronauts received some spacewalk training just in case.

The crew is also trained to participate in many of the hundreds of scientific experiments going on at the ISS.

The Crew Dragon spacecraft will enter Earth's atmosphere traveling at a speed of about 17,000 mph (27,000 km/h). The friction of particles in the atmosphere will create a drag force, slowing it down drastically while heating the outside of the

capsule to temperatures nearly as hot as the sun. A heat shield protects the astronauts from these extreme temperatures, but the spacecraft likely won't look as pristine after its return as it will before the launch. When SpaceX's Demo-1 Crew Dragon spacecraft returned from its uncrewed test flight in March 2019, it looked like a toasted marshmallow.

NASA and SpaceX have a list of criteria that will determine whether the Demo-2 mission is considered a success. The Crew Dragon must demonstrate that it can successfully separate, rendezvous and dock/undock at the ISS, and safely bring the astronauts back to Earth. If everything goes according to plan, SpaceX will soon begin regularly ferrying astronauts to the ISS with its Crew Dragon capsule.

Wow, so much happening around us while we are locked down in our homes to prevent us getting the covid-19 virus. Let's hope that in the very near future we can all get back to a 'normal' life again for some of us, but life will be different I am sure.

Finally, my friend Ted found this plane, drawing a Troll in the air over Germany.

You can only see it on Flightradar24 by clicking on the said plane and let it trace its movement in the sky.

See photo on Final Page overleaf....

Take Care

Mike G8KMP

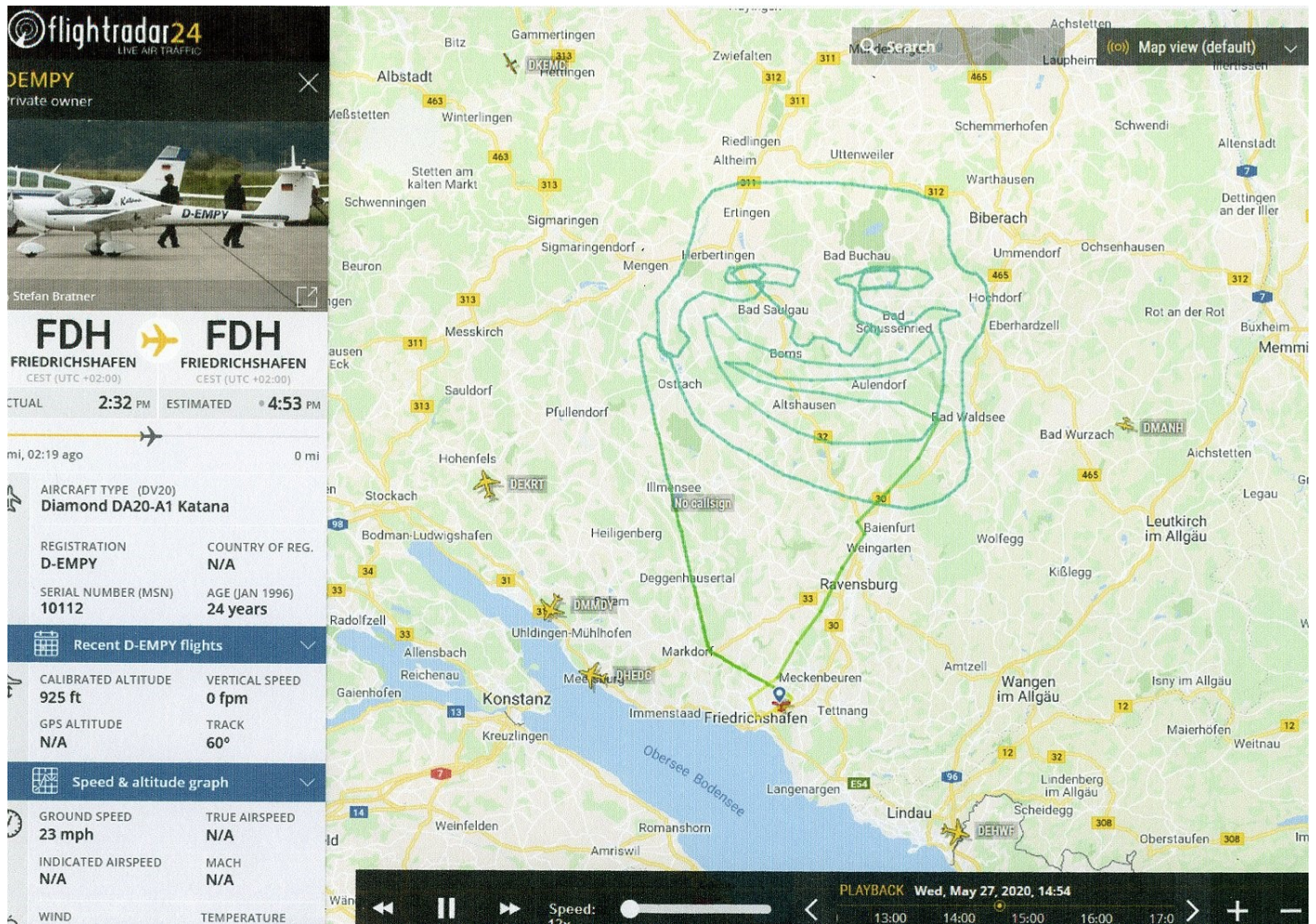


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Home of the Mid Sussex Amateur Radio Society

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[MSARS Web Site](#)

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