

WHERE INNOVATION MEETS
AVIATION SUPPORT™



**DISINFECTION AGENTS
IMPACT ON INTERIOR
MATERIALS FLAMMABILITY**

JUNE 11, 2020



Discussion Points

- Current State of Aviation
- Chemicals
- Hardware
- PPE topics

STAKEHOLDERS

- Workers applying chemicals – OSHA
- Passengers boarding – EPA
- Disinfection effectiveness – FDA, CDC
- Effect of chemicals on aircraft systems – FAA, EASA, Operators

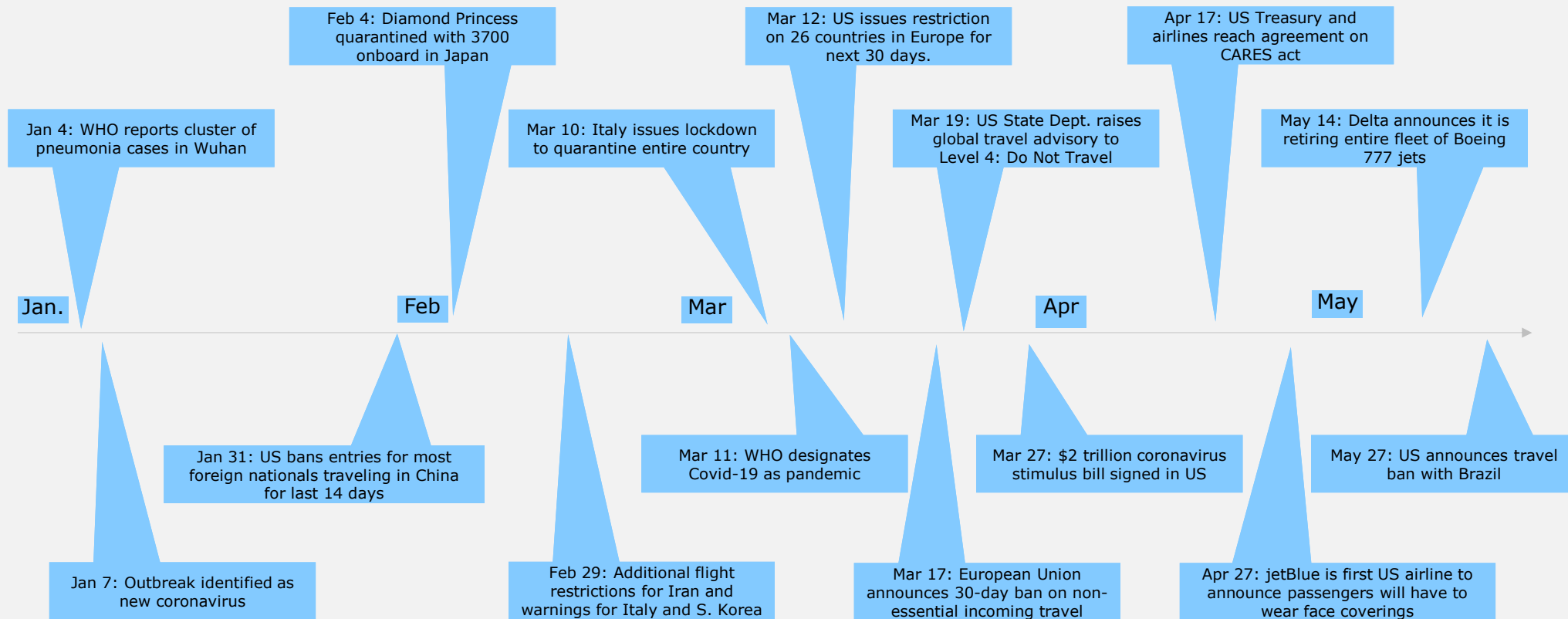


The Current State of U.S. Aviation

- Since March of 2020, the aviation industry has seen as much as a 90% decrease in passenger travel.
- The 17 top domestic airlines have parked a total of 3778 aircraft as of 6/5/20
- Industry group Airlines for America reports that of the planes flying, 73% are less than 50% full. While social media may suggest flights are full, the fact is that only 8.5% of flights are more than 70% full.
- At the same time, mainline carriers such as United, Delta, Southwest, American, jetBlue, Frontier, Spirit and others are introducing out disinfection/fogging programs to alleviate fears of passengers.
 - United: https://www.youtube.com/watch?v=O1gdRYpI1LU&feature=emb_title
 - Delta: https://www.youtube.com/watch?v=CFG_x0e2bGQ&feature=emb_logo
 - American: <https://player.vimeo.com/video/412832150>

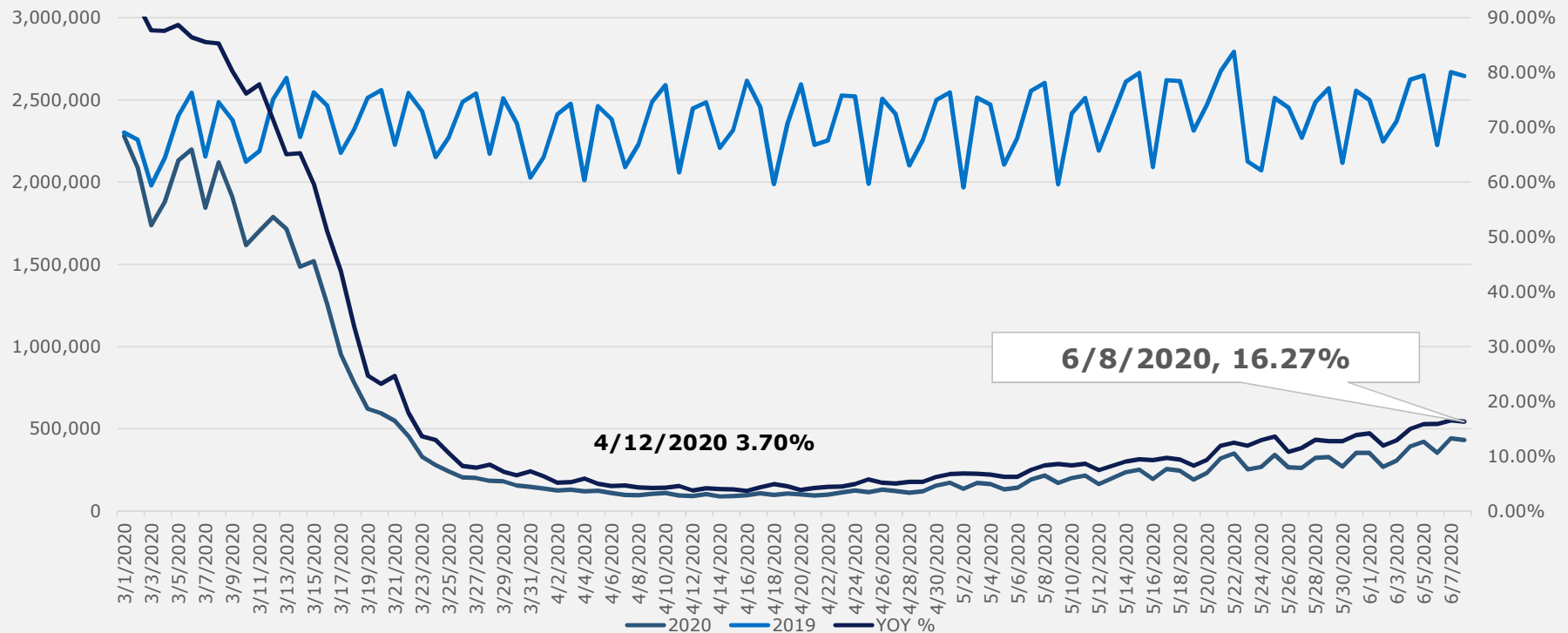
It is imperative that the aviation industry organize its efforts to address safety and health concerns, provide proof that those efforts will not endanger the long term safety of materials and communicate to the public.

Timeline of Covid-19 Events for Aviation



The Year-over-Year TSA Airport Throughput

TSA Throughput 3/1 to 6/8



Passenger volume decreased significantly after the European travel ban on 3/12 reaching a low point on 4/12 of only 3.7% of the previous year's volume.

Purpose of Disinfection

- Make passengers feel better....
 - Make flight crews feel better...
 - Actually eliminate the viruses...
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- Currently, AccuFleet is providing disinfection/fogging services to national airlines in multiple locations including MCO, DFW, ATL, IAH, PHL.

Chemicals

- Currently 9 different chemicals we've identified for use on aircraft and approved by manufacturers, the EPA and airlines.
- With each, we've identified
 - Which PPE is required
 - If there is any adverse effect to seating and materials
 - Pricing
 - Backlog timing for procurement (if any)
 - Optimal application and treatment location type
- Additionally, we also compiled research on 423 different chemicals approved by the EPA for use in disinfection of coronavirus for evaluation and comparison. Many of these could not be used on aircraft because of inclusion of alcohol or bleach
- Most recently, we have arranged to test efficacy of our primary choice in chemical treatment with the manufacturer and a current customer to measure before and after bacterial levels as an analog to research how effective treatment is.

Current Status

- Baseline – spray and wipe of surfaces
 - Cockpit
 - Galleys
 - Lavatories
 - Passenger seating areas
- NEW: Fogging
 - Cosmetic deterioration
 - Structural deterioration
 - Electronics functional deterioration
 - Flammability deterioration
 - Methods and Procedures effects

Chemicals Research

<i>Name</i>	<i>Approved by (FDA, Boeing, etc)</i>	<i>Risk to Seats?</i>	<i>Backlog Timing</i>	<i>Required PPE?</i>
Chemical A	Boeing, EPA	Mfg Recommended	Available	Yes
Chemical B	Boeing	No	Available	Yes
Chemical C	Boeing, AMS1452	Unknown	International Shipping	Yes
Chemical D	Boeing	Mfg Recommended	Limited Supply	Yes
Chemical E	BOEING, Airbus	Unknown	Limited Supply	Yes
Chemical F	Airbus	Unknown	Back Order	Yes
Chemical G	Airbus	Unknown	Available	Yes
Chemical H	Boeing, AMS1452B	Mfg Recommended	Available	Yes

Equipment

- As the United States increasingly went into quarantine and businesses realized a significant decrease in operations, there was a rush to acquire equipment for disinfection and application purposes.
- AccuFleet was able to source Ultra Low Volume (ULV) fogging and treatment machines.
- At the same time, the company invested in the acquisition of electrostatic machines which have been on back order. We will receive our first delivery this month



Methods and Procedures effects during fogging

- ULV versus electrostatic?
- Air flow patterns in the aircraft
 - Into cheek and cargo area?
 - Into crown?
- Frequency
 - Short hop, short turn carriers (Southwest, Ryanair)
 - 10 trips a day, 365 days per year, disinfect between flights: 3,650 foggings

Equipment

- Another challenge in creating an effective program is securing the needed personal protection equipment (PPE). In March and April, securing appropriate PPE was a great challenge due to shortages driven by the needs of the healthcare industry and government.
- Considerations which have to be made are:
 - Frequency of replacement based on treatment type
 - Requiring health checks prior to work for employees
 - Training and safety certification and programs
 - Adhering to requirements of airlines, airports and government agencies for treatments



Pricing and Application Areas

- Airlines are now paying between \$150-\$500 per treatment depending on the size of aircraft.
- Aviation companies are also actively securing vendors to provide regular treatments to offices, employee areas, gate areas, warehouses and shuttle buses.
- Airports must come up with solutions for regular treatment of common areas.
- Communicating the process and frequency of treatment will be pivotal in maintaining public confidence in aviation as a safe and healthy means of travel.

Effectiveness testing

- Some treatments claim 6 month persistence
- Bacteria tests are common..
- Virus, particularly CV-19...NO SO MUCH

Current activity

- We are building a fog chamber with 3 rows of seats to do accelerated application testing.
- Chemical suppliers are doing color fastness and some flammability testing.
- Structural – Electronics – Effectiveness....???
- SAE Efforts
- FAA studies previously done, and upcoming

Evaluation of the Effects of Hydrogen Peroxide on Common Aircraft Electrical Materials

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THANK YOU

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