Some scenarios for the last seconds of the MH370

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This presentation was conceived a year ago, more has been and will be done and revealed in due course. It represents only the author's views.

Since then, CAPTIO changed name to CAPTION and the composition of its members was altered accordingly.

The author continues to contribute to the new team.

Only three Debris items 100% certain to be from MH370

Right flaperon and inner part of right outer flap debris with trailing edges missing and wing attachments broken off

Right flaperon: analyzed by the French Authorities (DGA/TA)

Right outer flap and left outer flap trailing edge: analyzed by the Australian Authorities (ATSB) Left outer flap only trailing edge found

Five Debris items "almost certain" to be from the MH370

Right aft wing to body fairing panel

Parts of the **right horizontal stabilizer** and part of the **vertical stabilizer leading edge** showing impacts

Right aileron with all its attachments to the wing apparently <u>broken</u> <u>in tension</u> ! Part of the **Right** Engine Fan Cowling broken in bi-axial tension

Right hand nose

gear forward door

The case for a violent right wing first impact

- Right wing flaperon and inner flap attachments to fail in this catastrophic way can be due to combined loads resulting from large wing deformations and/or fracture of the wing.
- This can imply an impact of the aircraft with the sea at a large roll rotation and significant vertical speed, leading to:
 - impact of the right wing tip with the sea resulting in the ripping off of the right aileron,
 - then violent impact of the rest of the right wing suffering large deformations that break the flap attachments and lead to possible failure of the wing near the flaperon section, hence releasing flaperon and flap.

The case for a violent right wing first impact

Ditching



The case for a violent right wing first impact

Uncontrolled ditching







Violent wing first-impact with extreme upward bending leading to failure in Rib 25 area



Further on ...

The Inmarsat data analysed by Boeing suggest that MH370 run out of fuel before plunging into the ocean.

■ ie. both engines inoperative.

- The associated trajectory is a subject of debate that will not be touched in this presentation. However, it appears well accepted today that the aircraft was professionally piloted, probably to the end.
- No floating mass of debris has been detected anywhere in the ocean following the disappearance of MH370 and this leads us to exclude a possible suicide vertical dive or a deep stall water impact similar to the AirFrance Rio-Paris A330 accident (vertical speed of about 11000 ft/min).

Privileging a " soft " ditching event (asymmetric first impact)



Important points of this scenario

Satisfies the absence of debris floating mass in the ocean.
 Satisfies the recovery of limited debris parts, almost all originating from the right wing (including the right spoiler recently discovered).

 Previledges hydrodynamic forces and satisfies the almost absence of fragment impacts upon the recovered debris.
 Assumes piloted aircraft to the end.

Looking at alternative impact scenarios

The case of uncontrolled glide

- Assumes the aircraft glided uncontrollably from cruise height.
 Assumes that it followed a complex phugoidal descent, in accordance to Boeing simulations.
- Some speculate that aeroelastic instabilities broke off the right wing.
- Some speculate that it hit the ocean with even supersonic speed.
 - Appears unlikely if the wing was broken due to asymmetry and increased drag coefficient.

Impact conditions with uncontrolled glide



Impact conditions with uncontrolled glide



Uncontrolled glide – wing broken



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Primarily very high vertical speed

Important points of this scenario

- It leads to aircraft disintegration upon impact hence necessitates the creation of a significant debris floating mass over the ocean.
 In terms of vertical speed upon impact, similitude to the Rio-Paris accident or
 - the SwissAir mid-Atlantic accident.
- Does not satisfy the recovery of limited debris parts, almost all originating from the right wing.
- Privileges aerodynamic forces but does not necessarily agree with the state of overall damage of the discovered debris, if it had hit the ocean after a free fall from high altitude.
- Assumes unpiloted aircraft to the end.

The case of piloted suicidal glide

Assumes the aircraft glided ('dived") controllably from cruise height, along a glidepath of minimal lift.
 Assumes it hit the ocean in a streamlined path ('like a dart")
 Assumes that any aeroelastic instabilities were under control.

Piloted suicide



Piloted suicide



Important points of this scenario

This is a ballistic type of event. It leads to aircraft destruction mostly after penetration into the ocean. The debris cloud might be inside the sea and probably sink fast. Might satisfy the recovery of limited debris parts, but not necessarily originating only from the right wing. Privileges hydrodynamic forces. Assumes piloted aircraft to the end.



Speculative scenario

Inverted impact

Important points of this scenario

Highly speculative.

It attempts to resolve the origin of damage to the flaperon by the water impact as the engine effect (which is normally in front of it) is now above it.

Hard to talk about debris in general but it will certainly include largely the tailplane, not only the wing.

which is not the evidence.

Privileges hydrodynamic forces.

Summary

The scenario of a ditching piloted to the end is for the time being the one privileged by the author, as it appears to be the only one compatible with the debris evidence. However, an open mind is kept for any other viable options. The work presented here dates a year ago, and represents only the author's views. Further information can be found in the new CAPTIO website (CAPTION): https://www.mh370-caption.net/

To be continued ...

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